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Synthesis of literature on the impact of the UK regulatory model

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Executive Summary

Overview *This paper reviews research on the effects of the UK regulatory model on competition, consumers, investment and innovation, with a particular focus on energy, telecommunications and water sectors. Overall, the regulatory model has largely delivered its initial economic objectives.*

The paper is not a simple summary of the literature, but an analytical review that integrates the research findings into a concise whole. While not purporting to be primary research, this synthesis does provide some thoughts about areas in which current information seems inadequate or there is particular merit in new or ongoing research. This review is particularly relevant at a time when the role and effectiveness of regulators are being questioned in multiple domains. Maintaining a strong focus on the economic performance of regulated sectors remains of paramount importance for UK consumers and for UK productivity and competitiveness.

Wider context *This paper can be seen in the context of a broader debate on the objectives of regulation, notably related to vulnerability, fairness and achieving major system change, which were not the initial legislated economic objectives of the regulatory model.*

This synthesis fits into a key part of a broader discussion that is particularly intense in the UK, about whether the regulatory goals are themselves appropriate and whether government should reorient the focus of regulators. This broader debate includes questions about vulnerable consumers and fairness, about how to ensure that political objectives are met by the regulators and about how systems that are operational for periods of incremental change may work less well when dramatic changes need navigating. These questions are political and beyond the scope of this review. They do, however, reinforce the distinction between the role of legislative government, to establish parameters of action for regulators, with governments providing occasional steers to regulators, and the consequent role of independent regulators, to carry out their legislative mandate.

International evidence *International evidence seems to suggest the UK model has performed relatively well, often being perceived as a leader.*

A number of key points emerge from this review. The first is that, despite substantial domestic questioning of parts of the existing UK model, the limited number of international comparisons of regulatory quality suggest the UK is a regulatory leader in the domains under study, both in terms of quality perception and various aspects of practice. This results in a seeming dissonance between international comparisons and domestic views among some quarters that regulation needs substantial alteration.

Further exploring the reasons for this gap seems important. This exploration should involve further and up-to-date comparative work, that could include detailed, sub-national and comparable data from multiple countries.

Competition *Active competition has proven a particularly strong driver of consumer and productivity benefits, often with regulatory support.*

One major finding, with substantial support, is that active competition has been a key driver of consumer and productivity benefits in the energy and telecommunications arenas. Some authors suggest that the change in ownership arising from privatisation was not, in and of itself, a major driver of consumer benefits, instead the preparation to make an industry ready for privatisation, in many ways, achieved an initial productivity boost, and this was followed by subsequent regulation which created the competitive conditions that have been critical.

Investment and innovation *Investment and innovation have occurred at substantial levels, though there may be an increasing frequency with which large investments are undertaken at government behest that are not valued at their cost by customers.*

The UK regulatory model has been successful in ensuring that substantial investments have been made in the energy, telecommunications and water sectors. Such investment were a key objective of the new system when it was established. There is a risk of high cost investments not being valued as much by the customer as they cost. Where feasible, effort has been made to maintain technologically neutral approaches. The move away from political and regulatory neutrality concerning technology choice to the picking of winning technologies, if made, best occurs only after careful and detailed consideration, particularly when costs and capacities of technological possibilities in the medium-term are unknown. There is merit in an increased focus on the relative cost-benefit levels for different types of consumers resulting from political and regulatory requirements, including distributional impacts, as is occurring.

Consumer benefits *Consumer benefits include improved quality of supply (sometimes associated with increased investment), often lower prices (especially when adjusted for government policies and movements in world wholesale commodity prices) and reduced state subsidies.*

Consumer benefits have various dimensions, including quality of supply (partly associated with the level of investment), lower prices and lower state subsidies to previously nationalised industries. Those papers which deal with quality of supply support the proposition that this has increased (showing, for example, that quality-adjusted price reductions have been greater than unadjusted reductions). Several of the studies which focus

on price effects relate to the early post-privatisation period - complicated by the government's desire to enhance flotation prices, as well as by, in the water industry for example, the need for substantial post-privatisation investment.

Since then, the picture is mixed but tends to show prices falling when competition or regulatory action has been forthcoming. Periodic reviews have tended to reduce prices for monopoly activities in all the regulated industries and competition has tended to reduce the prices of contestable activities. However, some prices have also risen as a result of increases in world wholesale commodity prices (as with energy) and as a result of government 'policy costs' (as also notably with energy). Most recently, there have been the claims (as by Citizens Advice) that consumer prices are higher than needed through mis-estimation of various parameters used in the price review calculations.

Vulnerability

The focus on how to promote benefits for sub-groups of customers, particularly those who are not active in the market, sees different views over whether government and regulatory response is needed, particularly as “waterbed” effects may mean that when one group benefits, another loses.

Behavioural research findings suggesting market failings may lead to desires and plans for intervention to benefit consumers suffering ‘harm’. However, more attention may need to be given to the balance between the winners and losers from interventions, through waterbed effects; lowering prices at one point in a system may lead to increases in prices at another point in the system. Moreover, the focus on sub-groups who are not active in the market raises the question of whether a regulatory response is needed. Commentators disagree, with Citizens Advice suggesting intervention is needed, while Littlechild suggests it is not. In the future, if more attention is paid to the impacts of regulation on sub-groups of the population (e.g. different income groups, different geographic areas), governing principles will be valuable to avoid constant regulatory responses to help one group that, through waterbed effects, will hurt another group.

Future research

Going forward, particular research focus is merited on cost-benefit analysis of government and regulatory initiatives, and how to address and benefit from digitalisation in regulation.

In some areas of policy, the extent of cost-benefit analysis performed for investments is increasingly weak. Often such analysis is not the responsibility of regulators and is carried out by government. Without robust cost-benefit analysis the costs of political decisions are arguably hidden or simply not calculated. The focus on financial transparency of decision making, that arose around the time of privatisation, and which supported consumer interests, appears to have weakened.

Digitalisation is creating new and uncertain impacts. In the future, more attention would be valuable on the implications and needs of sector regulation with respect to these developments, as well as how responsibilities might reasonably be shared between different regulatory bodies.

1.0 Introduction

This section describes the parameters of this literature review, the broader context in which it has been carried out and the structure of the review into two parts: a short synthesis document (the Synthesis) and the appendix that includes summaries of selected papers from the review (the Appendix). The subsequent three sections will (1) describe the methodology used, (2) summarise the key results and (3) describe potential areas for future research.

The UK's current model of independent economic regulation was created in the context of privatisation, with some regulators created in the same legislative bills that organised the privatisation. More than 30 years after the first privatisations, it is worth stepping back to review developments since then. The purpose of this synthesis is to bring together points found in a detailed literature review, with a particular focus on the impacts of the UK regulatory model for energy, telecommunications and water/sewerage. This synthesis is therefore not intended as primary research and the purpose is to report findings of existing research in a way that might be useful to the debate. The authors hope that such a synthesis will nonetheless add value, in particular because relatively little effort has been made, up until now, to assemble the many detailed findings into a qualitatively broad review.

Inherently, this review covers a variety of themes, and relies on sources that, at times, may disagree with each other. Moreover, such an exercise may be characterised as incomplete from the perspective of some who may feel insufficient weight has been given to some points compared to others. The authors have sought to address these potential criticisms by holding a very open consideration of potential papers and having the synthesis reviewed by multiple parties.

The UK model of regulation can further the interests of consumers, largely indirectly, including by promoting competition and investment. While the precise methods by which these objectives are delivered differ for each sector, there are common objectives and foci of regulation across sectors. This commonality can include the setting of price controls that create an efficiency challenge but leave scope for companies to profit by outperformance. It also includes setting standards and enforcing obligations so that firms that do not comply are subject to financial penalties. The legislative framework was set by government, with independent regulators accountable to parliament being a relatively new framework at a global level at the time of its inception but which has since come to be relatively common in developed economies; the model is designed to be independent of at least day-to-day political interference that might create excess uncertainty for firms or raise concerns about undue influence. The model has been updated over time, with quite a substantial increase in the number and complexity of legislatively-mandated regulatory objectives¹, including an increasing focus on issues beyond competition, such as support for vulnerable consumers².

With the maturing of the model, debate has increased about the extent to which it delivers both good outcomes for consumers and the investment required to transform our infrastructure to respond to challenges around climate change, population growth and digitisation. Manifestations of this debate include:

¹ For example, see the evolution of the statutory duties of the GB gas regulator in Figure 1, pg 36, Chapter 3 'Institutions and Policymaking: A Tale of Increasing Complexity' in Deller, D and C. Waddams Price (Editors) (2018), ['Fairness in Retail Energy Markets? Evidence from the UK'](#), a report by the Centre for Competition Policy as part of the UK Energy Research Centre's (UKERC) research programme, available at: <http://competitionpolicy.ac.uk/documents/8158338/18232983/CCP+%26+UKERC+-+Fairness+in+Retail+Energy+Markets+Report.pdf/6499c409-10c9-8f5a-73a3-0290b5ab022f>. Figure 1 is the result of research by Michael Harker and David Reader.

² There has been some focus since the beginning, with special conditions for those of pensionable age.

- The National Infrastructure Commission (NIC) has provided a report to the Treasury with an assessment of what changes to the existing regulatory framework might be necessary to facilitate future investment needs, promote greater competition and increase innovation in order to meet the needs of both current and future consumers.³
- The Treasury has recently consulted on whether there is a case for strengthening the regulatory approach to encourage innovation.⁴
- The National Audit Office has produced a report on regulating to protect consumers looking at Ofwat, Ofgem, Ofcom and the Financial Conduct Authority.⁵
- The Public Accounts Committee has published a report looking at consumer protection in these markets, including at how effectively the regulators are protecting consumers' interests.⁶
- Lord Tyrie, Chair of the CMA, has recently presented a proposed programme of reform to the competition and consumer protection regimes that he asserts would improve the way the current framework delivers for consumers.⁷

³ See NIC (2019) Strategic investment and public confidence. <https://www.nic.org.uk/publications/strategic-investment-and-public-confidence/>.

⁴ See Treasury (2018) Encouraging innovation in regulated utilities: consultation. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752041/encouraging_innovation_in_regulated_utilities.pdf.

⁵ See National Audit Office (2019) Regulating to protect consumers in utilities, communications and financial services. <https://www.nao.org.uk/wp-content/uploads/2019/03/Regulating-to-protect-consumers-in-utilities-communications-and-financial-service-markets.pdf>.

⁶ See House of Commons Committee on Public Accounts (2019) Consumer protection. <https://publications.parliament.uk/pa/cm201719/cmselect/cmpubacc/1752/1752.pdf>.

⁷ See Tyrie, Andrew (2019) Letter from Andrew Tyrie to the Secretary of State https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781151/Letter_from_Andrew_Tyrie_to_the_Secretary_of_State_BEIS.pdf.

- In addition, new proposals are under development for the creation of increasing regulatory oversight in light of digitalisation, following the publication of *Unlocking digital competition*, the report of the Digital Competition Expert Panel.⁸

Given these consultations, it is particularly important to distinguish evidence from perceptions. As is increasingly evident from the delivery of internet news, perceptions can diverge substantially from evidence. To the extent that evidence supports the perceptions, it is important to be clear about how they do so. To the extent that evidence is in disagreement with the perceptions, highlighting the findings of key pieces of evidence is critical to help establish effective policy that delivers in the long-run. The purpose of this review will not only be to synthesise what the selected sources say, but also to analyse them critically and identify gaps meriting further study in the future, to the extent that these exist.

For the purpose of this review, and at the request of the UKRN, the effectiveness of the UK regulatory model is considered in terms of the extent to which it has facilitated investment, promoted competition, increased innovation, and protected the interests of consumers. These criteria can be applied to some of the recent policy developments. To name two, the interest in fairness can be framed as one of whether and which consumer interests are served; the question of how digitalisation is affecting society in these domains can also be addressed through competition, consumers and investment angles.

The literature review contains two parts.

- The first is a short **synthesis** of the key conclusions that can be drawn from the literature review, including any caveats, uncertainties or gaps in the research. This is

⁸ See Digital Competition Expert Panel (2019) *Unlocking digital competition*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/785547/unlocking_digital_competition_furman_review_web.pdf.

intended to be concise and includes references to the main studies relied on to substantiate conclusions. Where possible and appropriate, we illustrate findings with examples and quantitative information from the studies that have been reviewed.

- An **appendix** lists the papers reviewed and provides, for each paper, a short summary of the main results/conclusions, together with a short critical review of each paper and questions that arise for the future.

The aim of this review is not to build the case for a predetermined point of view, but rather to independently review and understand what the current literature says about the effectiveness of the UK regulatory model in a way that can inform current debates.

The review will proceed as follows:

- Section 2 provides an overview of the methodology;
- Section 3 provide the core analytic content of the synthesis, with an integrated overview of findings from selected prior research; and
- Section 4 identifies possible areas for future research.

2.0 Methodology

This section describes the methodology used in the review. It explains how studies are selected, how those that are considered are prioritised to produce a final collection, how they are reviewed and the techniques for including in the synthesis.

The papers were selected based on the initial list proposed by the UKRN and then iterated through consultation with authors and the public (through a social media announcement). The studies selected do not focus exclusively on UK experience, as

international comparisons of the effectiveness of the UK regulatory system with those of other countries can be relevant to this work, particularly to the extent that relevant data comparisons are possible across countries.

2.1 Identifying studies for consideration

The method for finding other studies included:

1. Search of working paper series;
2. Contacting the authors of the publications in the list to see whether the authors recommend other papers or have work in progress that is on point but not yet released; and
3. Opening a web submission form that was advertised via the CCP twitter account, (to which 3000 people subscribe) and posted to relevant fora, providing an opportunity for experts and the public to suggest papers and studies to include in our review.

2.2 Prioritising studies

In selecting papers for detailed review, weight was given to:

1. Considering a range of different types of study, with less emphasis on reviewing very similar papers, and more emphasis on papers that themselves review the earlier literature.
2. Prioritising studies from amongst those that might be equally relevant, with preference given to more recent papers.

3. Considering the weight accorded to conclusions of consultancy and advocacy studies compared to studies published in peer-reviewed journals, while recognising that academic work itself is not necessarily free from bias.

This study is intended to focus on the overall effectiveness of the regulatory system, rather than the effectiveness of particular policies regulators have adopted. Nonetheless, to the extent that the literature on the overall effectiveness is limited or does not distinguish between overall effectiveness of the regulatory system and particular policies, we do consider the effectiveness of large policy interventions, as a proxy for the overall effectiveness of the regulatory system.

2.3 Reviewing studies

For all the key studies identified, a paper-by-paper description was prepared (see Appendix) that:

- (1) Provides a precis of the key results; and
- (2) Critically analyses the approach of the paper. For quantitative papers, this can include evaluation of the models, data and empirical analysis used; for qualitative papers, this can include consideration of the characteristics of the sample and its appropriateness for the conclusions made.

Not all cited papers are included in the appendix. Exclusion of a source from the appendix should not be taken to imply the paper is not valuable, just that it did not meet some of the prioritisation criteria for inclusion in the appendix.

In this review, appropriate recognition is given to the fact that qualitative approaches can be useful when analysing effectiveness and that not all questions of interest can be answered using statistical methods. More generally, to the extent that some questions are not easily answered empirically, there may be a publication and research bias towards those questions that will yield interesting empirical results as opposed to those that deliver valuable qualitative results. Furthermore, in some respects, published papers sometimes have been mainly prepared more than a year before publication, and the lag between research and publication may affect the availability of published analyses of the most current policy questions.

2.4 Synthesising results

Based on the literature review provided in the appendix, conclusions have been drawn with reference to their evidence and caveats noted. We emphasise uncertainties or gaps in the research that may be worth addressing in the future. The synthesis is concise in order to be of the most value to its readers, while allowing readers to seek more detail in the appendix or the cited papers themselves.

3.0 Synthesis

This section synthesises the results from the reviewed papers, seeking to integrate them in a way that makes thematic sense, with themes including international comparisons, competitive effects, consumer benefits, promotion of innovation and facilitation of investment.

The synthesis is divided into two parts, one with international evidence on UK performance, which is inherently more comparative, and one primarily discussing domestic-focused research, which is more weighted towards non-comparative evaluation.

3.1 International comparison

Often, the UK regime is considered as one of the strongest among major countries. This conclusion is often lost among the regulator-specific criticisms that are natural and which abound, as well as being demonstrated in key topic-specific debates evidenced in the appendix. While being at or near the top of rankings internationally is certainly not a reason to avoid future changes and improvements to the UK system, the positioning of the UK can easily be forgotten when discussing options and failures. In perhaps the most detailed study of perceptions of regulatory quality in Europe, Hanretty et al. (2012) surveyed regulatory experts from five countries (comprising regulators, regulatees and academics), with each one asked to rate 5 key regulators in their country on a pair by pair basis (the sectors considered included energy, telecom and water)⁹ as well as to rate their national regulator against the regulators in four other countries on a sector by sector basis. Specifically, the respondents were asked which regulator does “better work”. The responses thus provide an overall assessment of regulators’ perceived quality that builds on the expert knowledge of practitioners. The results from integrating these pairwise comparisons are presented in Figure 1. They suggest that the mean perception of UK regulatory quality is significantly above that of other countries.

⁹ Rail regulators and competition authorities were also included.

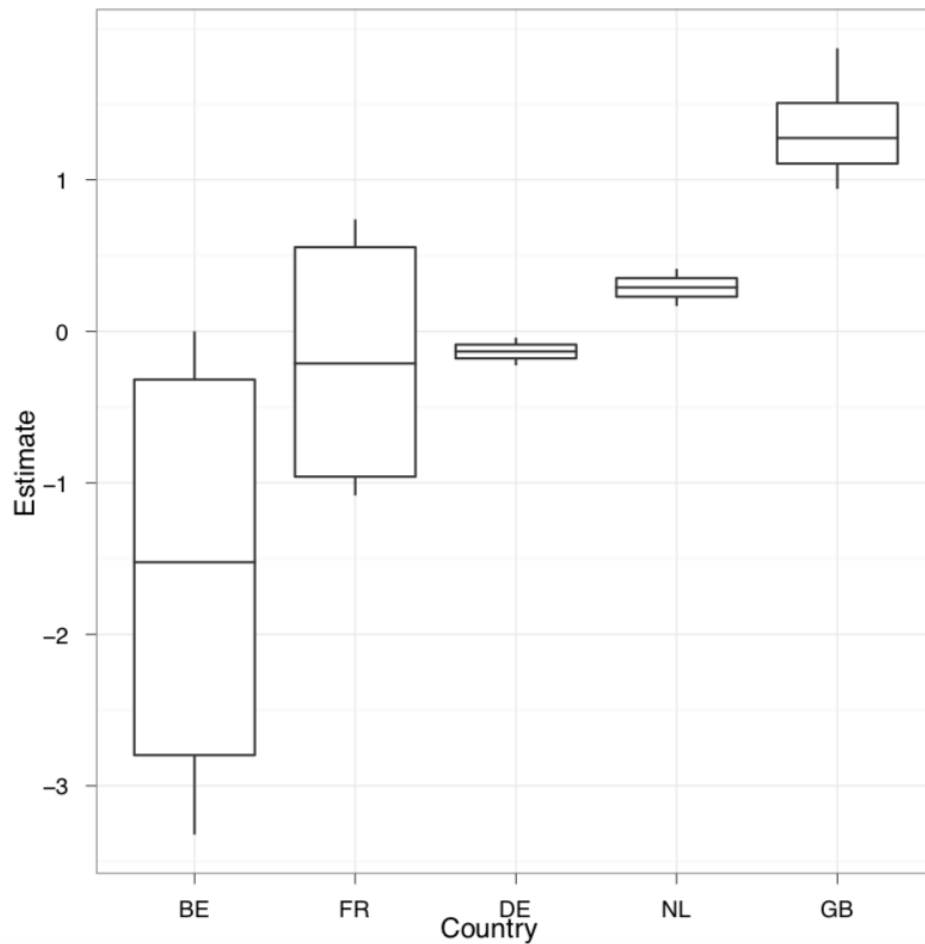
There is a seeming dissonance between international comparisons and domestic views. Further exploring the reasons for this gap seems potentially important with it possible to hypothesise a range of possible explanations. One may note that the data on which the international comparison relies is likely somewhat dated, though it is the best available at the time of writing. In recent times, it may be worth considering whether the potential political challenges to the UK regulatory model are motivated as much by those seeking a change in the objectives (or at least a change in the balance between existing objectives) that regulators pursue as by a sense that the ‘traditional’ objectives of regulation are not being met. Related to this is the possibility that the Financial Crisis and its aftermath have, in the UK especially, resulted in a changed view of regulatory priorities¹⁰ together with reduced confidence (unreasonable or not) among commentators and the population in the competence of technocratic economic bodies. Some respected observers even suggest a repayment of “excess profits”¹¹ which would break the implicit contract set between the government, regulators and regulatees during the last three decades¹².

Figure 1. Regulator perceived quality by country

¹⁰ On both points, see Koop, C & M Lodge (2019).

¹¹ See Citizens Advice (2019) suggesting that a £7.5b “windfall” of “excess profits” by energy companies should be returned to consumers.

¹² The Windfall Tax on privatised utilities from the newly arrived Labour government in 1997 may be an example of breaking this implicit contract, one rationale having been that state-owned assets had been sold at prices that were too low.



Source: Hanretty et al. (2012)

This type of point is also made in some sector-specific studies, such as Edwards and Waverman (2006) which suggests that independent regulation in the UK was seen as a benchmark for telecom regulators in other countries.

O'Mahoney (1998) examines productivity levels between the UK and France, Germany, Japan and the US. She finds productivity gaps narrowed, and that this change was particularly strong in the late 1970s prior to privatisation. The main exception to this experience was in UK the water sector, in which prices rose 40% in real terms for average unmetered bills in the UK, possibly following new investments that had long been delayed and improvements to meet EU regulations.

With respect to some specific elements of performance, RAND (2012) judges that the UK has managed mobile mis-selling better than other countries. RAND also notes that, for access to emergency services over the internet, the UK approach has been followed by the EC.

3.2 Domestic analysis

The domestic analysis focuses on analyses of enhancing competition, consumer benefits, promotion of innovation and facilitation of investment. These are by no means the only objectives that have been posited for regulators. However, they may be considered key traditional economic criteria for assessing whether regulators deliver on their objectives. As political objectives evolve, pressure has been placed on regulators to change their views and approaches. Particularly for questions of distributional fairness, the traditional view is that the key decisions involving distributional value judgements are most appropriately taken by politicians, not unelected regulators who, in the UK at least, do not have a direct electoral mandate to represent the public.¹³

Employing qualitative historical analysis of the national ownership experience after World War Two, Tutton (2019) suggests that regulators have a major role in ensuring the good operations of enterprises whether under private or state ownership, as many governance problems arose with UK nationalised industries in the absence of independent regulators.

3.2.1 *Enhance Competition*

Other key points evolve from the initial setup of the regulatory model during the era of de-nationalisation of the network industries. One major point is that competition has been

¹³ The traditional view merits further research to explore its economic and political economy implications.

a key driver of consumer and productivity benefits in the energy and telecommunications arena. The simple change in ownership arising from denationalisation was perhaps not, in and of itself, a major driver of consumer benefits, though the preparation to make an industry ready for privatisation in many ways was, achieving the initial productivity boost that could have been thought to come after privatising.

Florio (2003) suggests that privatisation was not responsible for improved productivity, but that regulation may have been, as there was no structural break around the time of privatisation. Parker (2004) makes a more subtle assessment of privatisation's impacts, suggesting that the key factor behind success in the privatisations was the extent to which they were followed by an unleashing of direct competitive forces. Markou and Waddams Price (1999) and Parker (2004) suggests that, to the extent competition did not develop, regulation was more crucial to performance improvements than the privatisation per se. At the same time, Parker (2004) suggests that even if there was not a step-change in efficiency following privatisation, this may not be surprising, as the privatised enterprises were groomed for privatisation prior to their sale into the market, with a strong push to improve their performance to make the companies more attractive to private stockholders. Florio and Florio (2013) suggest that within the EU15, "public ownership seems to have capped residential electricity prices more than regulated competition" and that, where the public sector has "a tradition of reasonably effective management", public ownership can still play a valuable role. NERA (2019) in contrast, in a report commissioned by a major energy company, suggests that private ownership in and of itself can be responsible for many improvements, including in operating costs, prices, levels of investment and quality of service. They assemble UK and international evidence for their points, together with case studies from Australia and Germany.

Cave (2016) suggests that competition in mobile telecommunications has largely been achieved, while fixed telecom has “exhibited a different and much more chequered history”. Genakos et al. (2018) finds that more concentrated mobile markets have higher prices and higher investment, emphasising the competition/investment trade-off. Cave (2016) notes that the UK separation model for fixed telecommunications infrastructure has not been followed by other EU countries. Edwards and Waverman (2006) find that independent regulators in the telecommunications sector reduce the price-increasing effect of state ownership of telecom operators, creating an environment more conducive to entry and consequent investment by reducing the price of wholesale access.

More generally, the competition/investment trade-off remains a difficult one in the UK, as elsewhere. One perceived weakness of the system, noted by Koop and Lodge (2019), may be that on some occasions, it could tend to encourage incremental investments even when transformational investments may be what are needed. Having said this, it is clear that transformational investments have been made in a number of cases.

While competition may work in many positive ways for typical or “active” customers, there is increasing concern about what to do about vulnerable and “inactive” consumers. The inactivity, for example, can lead to a “loyalty premium” (see Citizens Advice 2018). A key topic thus becomes how to define fair treatment of customers by companies, particularly to the extent that customers are able to shop around and move if they desire to do so.

There is evidence to suggest that disengaged customers can receive worse deals, much of it developed by Waddams Price and co-authors. A key question for policymakers then becomes whether this is a matter requiring intervention and, if so, what are the impacts of different potential types of intervention.

Littlechild (2017) suggests that regulators may have incorrect views of what constitutes a competitive market; he notes that such markets can admit price discrimination and different levels of efficiency and profitability for different firms. Moreover, to the extent claims are made regard excess profits, for example by Citizens Advice or the CMA, Littlechild argues these claims should certainly not be measured with respect to the lower and hypothetical efficient costs, which may be subject to large measurement error, but to actual costs, if such analyses are made. The implication of his view is that entry is relatively free in the energy market. Customers paying high tariffs, from incumbent suppliers, are doing so by free choice, which should not entail a basis for regulatory intervention. The trade-off between, on the one hand, eliminating cross-subsidies and making customers pay actual private or social costs of production and, on the other hand, ensuring that customers are not made unduly worse off from competition, is one that will involve continuing debate and research in the future.

3.2.2 Promote Innovation

Over the period since privatisation, innovations have, in many ways, been largest in the telecommunications sector while requiring large investments from operators. In some respects, recent regulatory incentives in the EU that push provision towards a fibre-to-the-home approach can generate very high system rollout costs that at least some customers may not value particularly highly and would not voluntarily pay for; similar issues may also apply to some cost increases in the energy sector related to certain policy aspects of decarbonisation. There may be merit to evaluating the extra value derived by consumers from new investments while considering the extra cost of those investments.

Bourreau et al. (2017) provide an excellent qualitative discussion of how technological neutrality by regulators in the telecom area promotes innovation and efficient investment. They raise the concern that EU regulations for very fast internet connections cross the line away from technological neutrality, effectively pushing for fibre to the home, which is both a very expensive technology and one for which customers are generally not willing to pay a much higher price for the service though this is based on past valuations and does not necessarily reflect potential future growth effects. The paper suggests that the different existing infrastructure in different European countries provides different opportunities for increasing speed, and that Belgium and Portugal's cable distribution network led to higher telecom investment, while Italy's absence of cable may have been related to lower investment. This contrasts with Cave and Shortall (2016) who find empirically that there was no systematic association between telecom incumbent investment and cable coverage.

3.2.3 Facilitating Investment

In a broad and authoritative review of privatisation, Parker (2009) finds that the core rationale for independent regulation was "that continued regulation by Government department would deter investors". He further made this point with respect to advice by investment bankers on the flotation of BT. This point is borne out by seminal work by Levy and Spiller (1994) and Majone (1996, 1997) which suggests that the state will commit itself to regulatory regimes and decision-making; the commitment to regulation facilitates long-term investment (and "without such commitment, long-term investment will not take place").

Investment in the energy, telecommunications and water sector has been substantial under the UK regulatory model. The investment climate for regulated companies

has, rather naturally, remained contentious. CMA (2016) examines the fundamental question of measuring profitability. It suggests that return on capital employed (ROCE) is most appropriate for asset-intensive activities, while for asset-light products, a focus on margins (EBIT/turnover) may be most appropriate. The key point for determining the appropriate return on investment in asset-intensive networks, however, is one on which CMA and businesses may differ, with the CMA focusing on the cost of debt for ROCE, in comparison to private enterprises that may often have required rates of return for internal approval of an investment much in excess of the CMA figure. In relation to the CMA's Energy Market Investigation, Littlechild (2017) suggests that the CMA approach excessively relies on comparisons with small companies that might not have viable long-term business models, and it is not the role of government to judge that all providers should have the margins of the lowest margin firms. Citizens Advice (2019, 2015), in contrast, suggests that regulators have systematically overestimated the cost of capital in past price reviews, and that shareholders have consequently been overpaid. They suggest that companies should hand back some proportion of historical overpayments and that regulators should adjust their cost of capital calculations in a specific way. Substantial efforts have previously gone into estimating appropriate costs of capital in a neutral way that follows Treasury guidance; consumer-focused organisations might be expected to argue for allowing lower profits with the expectation that this would lead to lower prices. The suggestion that profits already paid out under an established regulatory regime should be in some sense be returned to customers would break the implicit contract between regulator and regulate, though this would not be the first time this has happened in the UK, considering the institution of the one-time Windfall

Tax in 1997¹⁴. This implicit contract is designed to incentivise cost-reducing/productivity enhancing investments by allowing firms to capture a temporary increase in profits until the next regulatory review. Proposing to 'take back' profits from earlier periods risks introducing uncertainty that could undermine this system of incentives with the potential consequence of reduced future investment as well as criticisms of being an ex post modification of a contract by government fiat.

Cambini and Rondi (2010) examine the impact of establishing independent regulatory authorities on investment in the regulated sectors, finding that both the existence of independent regulation and its extent increase investment. However, they do not look at the more interesting question of whether independent regulators led to optimal investment, albeit a question that is fundamentally more difficult to answer. Abrardi et al. (2017) find that independent regulation is positively associated with more investment, while noting that there is a distinction between nominally independent regulation and genuine independence, with an expectation that genuine independence is more crucial than nominal independence.

Based on a review of the literature covering the water sector, Deller and Ennis (2019) suggest that independent regulators can have a significant role in enabling long-term investment when there is the risk of short-term opportunism by government or firms as the consequences of not investing infrastructure do not lead to an immediate drop off in service performance. Significantly, this argument suggests independent regulation has a useful role under government ownership and operation of the water sector by counteracting political pressures to set low prices that are insufficient to finance investment or, alternatively, a financial preference to limit public borrowing.

¹⁴ Arguably, the Windfall Tax would have been more related to the initial government decisions on privatisation share prices, while CA proposals would be more related to regulatory decisions since privatisation.

Edwards and Waverman (2006) find that independent regulators in the telecommunications sector reduce the price-increasing effect of state ownership of telecom operators, laying a foundation for more investment through a mechanism of access pricing. Briglauer and Cambini (2018) examine Western European experience with next generation network telecommunications infrastructure (NGN). They find that relaxing constraints on incumbent charges for access increases investment in NGN (by reducing the price differential between old and new fibre) and increases coverage. But the policy, while resulting in substantial increases in coverage, does not result in consumer take-up of NGNs to the same degree. This illustrates that one policy instrument (regulated prices for access) cannot easily achieve dual goals of expanding coverage and equally expanding adoption. Cave et al. (2019) note that Germany and the UK imposed obligations on fibre services to provide access via a bitstream equivalent system, which has led to investment by competitors, while France, Portugal and Spain promoted infrastructure competition by making ducts and poles available. In the latter case, primarily the incumbents made investments. Generally, the authors conclude that intrusive regulation of fibre assets deters fibre investment levels.

Nardotto et al. (2015) find that the benefits of local loop unbundling (LLU) may be outweighed by the lowered investment incentives for incumbents, as in the long run, penetration was most increased by cable competition, rather than LLU. Cadman (2010) suggests that functional separation in the UK helped to create “the right conditions for dynamic efficiency gains in access and downstream broadband markets”.

While government typically has not focused on specific technologies, in some limited cases it has held a view. This has applied with respect to ultra high-speed broadband rollout and de-carbonisation of electricity production. One question that can arise from government or regulatory adoption of particular technologies (as opposed to outcome objectives) is the

extent to which either consumers will value the increased system costs from such investments. Bourreau et al. (2017) suggests that consumer valuation of the move to ultra-high speed broadband may not counterbalance the cost of high-speed broadband, and Feasey et al. (2018) suggests that take-up in European areas served by the private sector is below 40%, though these findings may reflect current and past valuations and takeup more than future ones, as well as not fully considering potential growth impacts (Abrardi and Cambini (2019)). The imposition of a government view on investment in specific technologies as opposed to outcomes is debated and raises a potential challenge of whether and how to co-ordinate government strategic investment objectives with sector regulator oversight on investment. The recent NIC (2019) report suggests that governments may produce Strategy and Policy Statements that could help to co-ordinate.

3.2.4 Consumer benefits

Consumer benefits have various dimensions, including quality of supply (partly associated with the level of investment), lower prices and lower state subsidies to previously nationalised industries. Those papers which deal with quality of supply support the proposition that this has increased (showing, for example, that quality-adjusted price reductions have been greater than unadjusted reductions). Several of the studies which focus on price effects relate to the early post-privatisation period - complicated by the government's desire to enhance flotation prices, as well as by, in the water industry for example, the need for substantial post-privatisation investment.

Nonetheless, the extent of quality of service improvements for telecommunications customers, for example, or from reductions in electricity blackouts, or from cleaner water,

have been identified in the past as quite substantial. Measuring the full value of some consumer benefits, such as the availability of the internet via mobile phone, is also difficult to calculate, particularly because of the absence of recent counter-factuals. Markou and Waddams Price (1999) finds that regulators were increasingly drawn into quality issues, with the BT privatisation lacking quality specification in the original flotation, an approach that was not replicated in the later privatisations. Some studies of price impacts seek to take into account quality of service improvements. Nardotto et al. (2015) note the quality benefits (with respect to coverage and speed of internet service) from local loop unbundling and from cable competition, finding that higher quality (in terms of speed) was primarily on the lines of new entrants, not the historical incumbent. Ajayi et al. (2018) find a substantial quality improvement for energy customers.

One may easily forget that prior to the privatisations, the state was subsidising many of the network industries, placing a burden on taxpayers that has now disappeared and been reversed by the tax payments on company profits. For the purpose of this paper, we characterise consumer benefits as arising from factors such as lower prices or better consumer experiences, due to competition or regulation. There is a close linkage between regulation and competition on consumer benefits; separating the respective effects of these two elements can be empirically difficult, to the extent they are both introduced at the same time. A key aspect of regulation is in framing the nature of competition by influencing the institutional rules underpinning the market. In the water sector, regulation may be seen as a substitute to competition. To avoid duplication in this synthesis, beneficial findings related to competition, investment and innovation are sometimes reported in other sections. Recognising this overlap we suggest that the examination of the consumer impacts be read together with that of the competition, innovation and investment sections. We also note that

productivity improvements can increase opportunities for lower prices for consumers and so consider that these would be encompassed by this category.

Since privatisation, the picture is not uniform but tends to show prices falling when competition or regulatory action has been forthcoming. The independence of regulators has been an important factor for achieving such results, with Edwards and Waverman (2006) finding that independent regulators in the telecommunications sector reduce the price-increasing effect of state ownership of telecom operators, arguably creating better pricing outcomes for customers. Domah and Pollitt (2001) and Markou and Waddams (1999) suggest that price reductions became pronounced after the first round of post-privatisation price reviews. The importance of the price reviews is confirmed by Florio (2003) with respect to BT. One helpful tool for regulators has been the presence of multiple companies in a sector allowing for intra-industry benchmarking. However, some prices have also risen as a result of increases in world wholesale commodity prices (as with energy) and as a result of government 'policy costs' (as also notably with energy). These points are expanded below.

Seminal findings on the importance of regulation and competition for generating good results in the infrastructure sectors include Martin and Parker (1997), Markou and Waddams Price (1999), Newbery and Pollitt (1997), and Domah and Pollitt (2001), finding substantial gains in social welfare, with some skew of gains to producers and government (in the form higher tax revenues on profits and lower subsidisation). Littlechild suggests that the decline in prices for domestic energy customers was 26% in real terms between 1990 and 1999 and that commercial customers gained 25-34%. Domah and Pollitt (2001) finds that companies were privatised with limited price controls, resulting in initial gains to companies via profits and related gains to government from the revenues achieved from the sale of state

assets, with consumers not doing so well. Subsequent tightening of price controls from 1995 brought electricity distribution costs down and profits were put under pressure, with consumers faring better.

According to Deller and Waddams Price (2018), electricity prices since the early 2000s have returned to levels approaching those before privatisation. Much of the increase in retail energy prices since the early 2000s is likely attributable to rising global energy prices, outside of regulators' control, and incentives for more renewable production, driven by legislation, but it is unclear the extent to which this explanation resonates with those beyond the regulatory community even if it is a distinction critical in forming a balanced assessment of regulator performance.

After privatisation, while consumer prices declined, at least initially, in the energy and telecommunications sector, even as cross-subsidisation was reduced and prices better approximated marginal costs of production for different customers, the water sector in particular experienced higher prices (see Markou and Waddams Price, 1999). The higher prices in the water sector were not a surprise due to the substantial investments needed in the industry to meet water regulations mandated by the EU, particularly related to handling of effluent. Even with an expected increase in water prices, Saal and Parker (2001) suggest that price indices in the water sector increased at a faster rate than input costs. But the focus on rates of change can be disputed. The authors also suggest that total factor productivity (TFP) increased substantially in the privatised era. To the extent that water may not have experienced the same level of dramatic technological change as in sectors like telecommunications, there is not necessarily a strong reason to have expected changes to continue in the same way that they may have done at the end of the national ownership.

Shaoul (1997), for example, found that in the water industry, there were often significant efficiency gains prior to privatisation. They suggest that consumers might have been better off if profits had been lower. What is difficult to assess is the counterfactual of whether investments would have been at the same level with lower profitability.

Erbetta and Cave (2007) analyse water sector allocative efficiency distortions and find that these declined over time using a data envelopment analysis with a stochastic frontier approach. They suggest that “The regulatory environment set after privatisation seems to have improved allocative efficiency through the elimination of the initial input distortions.” They suggest that these improvements could be a consequence both of the change in ownership and the performance assessment system set up by the regulator after privatisation. In work for Water UK, Frontier Economics (2017) working with Saal, finds that total factor productivity of the water sector improved by 64% between 1994 and 2017, adjusting for quality, and at least 27% when not doing so. The study also suggests that over the post-crisis years of 2009-2017, TFP growth was much more limited than in the prior period. Ajayi et al. (2018) examines productivity changes in electricity and gas networks in the UK since 1990, especially just before privatisation (Waddams Price and Weyman Jones, 1996) and finds that productivity has improved across the networks, with fastest improvement occurring in gas transmission.

Abrardi et al. (2017) find that, over time and across multiple countries, regulatory incentives based on “outcomes” in the energy industry have become more common, with rewards working best for high performing companies and penalties working best for low performers. Citizens Advice (2015) suggests that output incentives in price controls have allowed some companies to achieve significant financial rewards based on their profits and

rates of return. They suggest that incentive payments should be dynamic, and only award exceptionally good performance.

The decline in consumer prices subsequent to privatisations, and coming from competition, may not have been uniform with some consumer types often getting worse deals. This point has been made, in a variety of ways, by Hancock and Waddams Price (1995), Waddams Price and Hancock (1998), Markou and Waddams Price (1999), Florio (2004) and Waddams Price and Young (2003). The worse deals may have been a result of removing cross subsidies and making price signals less distortive. The beneficiaries of such changes may have been especially large-volume customers in contrast to poorer customers who may have been more costly to serve (NAO, 2001). Baldwin and Cave (1999) suggest that “It has not proved possible for regulators to separate the pursuit of economic efficiency from the social consequences of their actions”. Florio goes as far as to suggest that public sector net wealth fell substantially after privatisation, due to under-pricing of the enterprises/assets being sold and suggests the under-pricing was sufficiently large not to be counter-balanced by the ending of subsidies (implying lower tax rates on the general population) or the tax revenues from company profits in the regulated sectors.

4.0 Agenda for future research

This section outlines possible areas for future research, in light of the wide-ranging work summarised in the synthesis.

One of the purposes of the literature review is to identify areas for potential future work, due to the limitations of existing research or the fact that key policy questions evolve

over time so that past research will not always directly address today's challenges. Suggesting areas for future research is inherently a matter that implies professional, and to some extent personal, judgement. Some of the topics identified below come directly from the literature, but a key role of this work is to identify those topics that do not seem to be sufficiently addressed by the existing literature. To some extent, researchers may have focused on performing work in areas which have high quality or easily accessible data, which can divert the body of research away from those areas with poor data or with questions that are difficult to analyse with rigour, even if the answers to the questions are of particular policy importance. Moreover, the inclusion of a topic does not suggest that no research has been performed but that further attention and expansion of work may be particularly merited in the future.

4.1 Focus on efficiency

Continued research focus on efficiency impacts of regulation remains important, with notable recent contributions such as Ajayi et al (2018). After privatisation, the question of whether or not the new regulatory regime and ownership structure was increasing the efficiency of production was central. Cost efficiency must remain a central concern when considering the effectiveness of regulation: the final price that a consumer pays is not only determined by firms' margins but also, fundamentally, by their cost structure. Cost efficiency can be examined particularly usefully in an international setting, although performance in some sectors, such as energy, may be easier to compare across countries than performance in the water sector. Many of the existing findings suggest that privatisation itself was not responsible for more efficient performance. At the same time, it is notable that taxpayer operating subsidies to the main regulated sectors were frequently paid prior to privatisation

and are not paid now.¹⁵ However, one might argue that the subsidies would have disappeared in any case, due to technical developments, and the extent to which this was true is worth investigating further.

4.2 Assessing investment needs

The ability of research to identify actual investment needs, and balance these against expected gains, is a fundamental question of regulation in all infrastructure sectors. While pre-privatisation investment may have been insufficient in some cases (e.g. water) or gold-plated in others (e.g. energy), there is little academic economic research on optimal investment levels (and related, optimal system design). More effort would be valuable to link engineering sector-specific research with discussion of economic costs and benefits, to determine optimum capital and consequent investment or dis-investment to reach these levels. There may be a stronger case for this analysis in sectors for which customers do not have a quality choice (e.g., water) compared to those for which they do have a quality choice (e.g., many telecom products).

4.3 Objectives of regulation

Increasingly, the objectives of regulation have expanded over time, as documented by CCP research.¹⁶ Further analysis appears worthwhile on the consequences of this increase in primary and secondary objectives, from the perspective of board decision making and the legislative direction given to regulatory organisations. On the one hand, adding objectives can

¹⁵ Operating subsidies are distinguished from investment subsidies that may exist for certain rollouts of new investment.

¹⁶ See Harker (2019) “Statutory duties and shaping the decision-making of an economic regulator: a case study on Ofgem”, mimeo and <https://www.nic.org.uk/publications/technical-annex-duties-diagrams-for-water-energy-and-telecoms-centre-for-competition-policy/>

help to ensure that a full gamut of societal concerns are better reflected in regulation. On the other hand, including more objectives in regulation may reduce the clarity of decision-making criteria for board members, in particular, the question of how to balance competing objectives. Providing a large number of objectives, potentially gives board members increased flexibility regarding the path to pursue compared to when there are a smaller number of pre-defined decision criteria.

4.4 Behavioural biases and heuristics

Behavioural research frequently identifies market distortions that may take advantage of consumers' behavioural biases or heuristics leading to potential consumer harm. It is worth recognising that such findings may be used as a basis for expanding the scope of regulation relative to the alternative approach of encouraging market forces to resolve major failings and accepting that markets may not be able to address all policy objectives. Furthermore, even where behavioural issues may be identified, interventions to address them may risk unanticipated consequences linked to responses of market participants to the interventions (see Deller and Vantaggiato (2014), Sugden (2018)). Further attention may be needed to assess where regulation can provide solutions to behavioural failures and where the risks associated with intervention outweigh the often relatively marginal gains. This includes recognising that the regulated utilities, due to the importance attached to them and the existence of the regulatory framework, may be subject to more intervention, for good or ill, on behavioural grounds than companies in less regulated sectors.

4.5 Fairness and vulnerability

In the future, as more attention is paid to the impacts of regulation on sub-groups of the population (e.g. different income groups, disengaged consumers, and/or geographic areas), governing principles will be valuable to judge the appropriate boundaries for pursuing

regulatory responses that help one group but, through perhaps unanticipated waterbed effects, harm other groups. More research attention may be worthwhile to identify the appropriate balancing between winners and losers. To the extent that competition lowers margins overall, the poor are particularly likely to benefit (Ennis et al., 2019). A risk to avoid is a continuous chain of regulatory intervention where lowering prices at one point in a system leads to them rising in another, creating demands for additional interventions to improve the positions of the newly created 'losers'. For example, Cave et al. (2019) finds a waterbed effect: In countries with low mobile penetration, a 10% lowering of mobile termination prices from fixed networks is associated with telecom plan price increases of 5%. In countries with high mobile penetration, and thus more mobile to mobile calling, the effect was smaller. Ennis (2006) finds a waterbed effect, with special calling plans for international long-distance calling segmenting customer groups and leading to lower prices for intensive users and higher prices for low users.

The existence of waterbed effects may be particularly present when the price differences between 'loyal' consumers and those who frequently switch provider come under review. The UK has devoted a particularly large emphasis to vulnerable consumers and regulatory fairness, arguably much more so than other countries. The rural-urban investment divide for telecommunications services could be one feature of this, though much progress has been made to improve rural service since then (Rand (2012)). Additional international comparisons on the types of vulnerability addressed could be valuable, as well as the follow on consequences of interventions on groups beyond the intended beneficiaries, which may otherwise be ignored.

4.6 Cost-benefit

In some areas of policy, the extent of cost-benefit analysis performed for new investments is increasingly weak and costs of political decisions are arguably hidden or simply not calculated. There is very little counter-balancing cost-benefit analysis in sensitive cases, including EU fibre to the home and UK energy supports, carbon targets, and renewable investment. This relative absence may be more related to government and legislative decisions than a challenge for regulators, but merits much deeper focus as predictions or estimates of what is “valued” by existing and future consumers are extremely difficult, absent revealed preference in real spending situations. The valuations of future consumers merit further research. The focus on financial transparency of decision making, that arose around the time of privatisation, and which supported consumer interests, is no longer equally present and is worth revisiting. Further research could look to identify the frequency of cost-benefit analysis across different areas of decision making, together with the quality of analysis performed, and consider whether efforts need to be made to increase its use as well as institutional structures that could address the need for and value of cost-benefit analysis of government, political and regulatory decisions.

4.7 Imposition of costs on the private sector and the public

Increasingly, it seems that government is interested and willing to encourage (or directly take) ‘regulatory’ interventions, i.e. ones involving rules rather than explicit government expenditure, in sectors to address immediate political pressures but which may raise system costs substantially, albeit sometimes only in the long-term. This has arguably been the case in the energy sector and now the telecom sector in the UK. Increasingly, the transparency of these actions in terms of the extent of their cost and on whom these costs may fall is poor, though in one case (universal service obligations) there may be more clarity

about the legal potential for support payments via state aid rules or sector legislation (Harker and Kreutzmann-Gallasch, 2016 and Ennis (2004)). It seems worth research to consider whether systems can be designed that increase the transparency of system costs and assess whether in some instances it would be preferable if the costs were borne explicitly by the state. One might even consider whether mechanisms can be designed where bodies increasing regulation have to compensate those who bear the costs of new regulatory obligations.

4.8 Digitalisation

Digitalisation is creating new and often inherently uncertain impacts in telecommunications and energy (for example, via the new forms of data created by smart meters and by whom, how and whether these datastreams should be exploited) and in the future, more attention would be valuable to the implications and needs of sector regulation with respect to these developments. In particular, a new issue is the desirable split of responsibilities between regulators. Should decisions be taken with an emphasis on sector-specific knowledge? Or based on economy-wide principles? Do the opportunities presented by digitalisation make it more likely that the boundaries between sectors are increasingly blurred?

5.0 Conclusion

This synthesis paper has provided a high-level overview of literature that considers, evaluates or is relevant to the effectiveness of the UK regulatory model, particularly as represented in the energy, telecommunications and water sectors. The paper seeks to present a balanced and broad view of the findings that emerges from these papers, taking account of inherent commercial and non-commercial interests, while also pointing out areas

of weakness and strength. Disagreements over interpretation of evidence are inevitable in the regulated sectors; it is hoped that this review may provide an even-handed synthesis and assessment, stepping back from the intensity of media and political debate while identifying some potential areas for future research. One particularly interesting point emerging from some international studies of regulation is that, despite substantial domestic worries about the UK regulatory system, international perceptions of its quality are high.

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Appendix 1. Literature review

Preamble

The aim of this literature review is to summarise key points of relevant articles to identify the light they provide on the effectiveness of the UK regulatory model, specifically the extent to which it has:

- facilitated investment
- promoted competition
- increased innovation
- protected the interests of consumers

These are the foci used to selecting relevant material from the articles below.

Article assessments

Abrardi, Laura, Carlo Cambini, Laura Rondi (2017), 'The Impact of Regulation on Utilities' Investments: A Survey and New Evidence from the Energy Industry'. *De Economist*, 166(1): 41 – 62.

Relevance of the paper

The paper is mainly relevant to considering the facilitation of investment as a result of both the existence of an independent regulator and the form of regulation applied.

Summary

The paper is both a survey of existing literature on the links between regulation and investment and a paper providing new econometric work undertaken by the authors themselves.

Although the findings are complex (reflecting, as they do, multiple studies, conducted at different times over the last ten or more years), core themes would seem to be the following.

- Independent regulation is associated with increased investment, although it is recognised that some instances of 'formally' independent regulation may, in fact, be not all that independent are not that independent in practice (for example, within the EU it is left to national jurisdictions to comply with EU-wide directives mandating independent regulation).

"Results show that the presence of regulatory agencies that enjoy 'real' independence has a positive and significant influence on investments, even after political interference and state ownership are accounted for."

"Overall, the analysis suggests that the effect of the IRA [Independent Regulatory Authority] is positive on infrastructure investment, but only if it is genuinely independent, so as to effectively ensure its ability to credibly commit to a long-term policy course."

- Incentive regulation or 'hybrid' regulation (involving elements of both cost of service and incentive regulation) tend to mean more investment than pure rate of return regulation, although, "even when incentive regulation is nominally in place, regulatory schemes in recent years seem to be more and more revolving around the cost-plus component, making them de facto hybrid forms of regulation".
- Within incentive regulation schemes, the WACC tends to be a more powerful motivator of investment than X.
- Within the European energy industry (with nominally independent regulators), there is no clear evidence that ownership (whether public or private) makes a significant difference to investment ("we note that government ownership still prevails in most European energy utilities").
- Over time, there has been increased use of output incentives within incentive regulation regimes.

- Within regimes with output incentives, rewards work best for high performing companies and penalties for low performers.

Evaluation and other questions to address

One of the main strengths of the paper is how it highlights the complexities involved: some regulators may be nominally but not genuinely independent; some incentive regulation schemes may have significant cost of service components. Given the difficulties of categorising either some regulators and/or some regulatory regimes, there is a risk that the conclusions are sensitive to the particular categorisation decisions applied. That said, the paper emphasises the value of genuinely independent regulation and gives a broad confirmation that incentive regulation 'works'.

Ajayi, Victor, Karim Anaya, Michael Pollitt (2018), 'Productivity growth in electricity and gas networks since 1990', EPRG Working Paper 1841.

Relevance

The paper is relevant to the question of how has productivity changed in the energy networks since privatisation; it has the high value of adding quality measurement to the analysis. The inherent and unavoidable complexity of the calculations and the problems of multiple outputs (including quality), the degree of capacity utilisation at the start of the analysis and having to deliver on government policy objectives (like delivery of renewable MWh) may mean that policymakers may find it hard to distil clear messages from the analysis.

Summary

This paper suggests that productivity has, by and large, improved across the energy networks over time (when quality of outputs is taken into account). The rate of improvement has been rather slow, albeit faster for gas transmission (possibly reflecting, in part at least, the relatively younger age of the network and the extent of spare capacity at the beginning of the period studied) and faster than for productivity in UK economy as a whole.

Evaluation and other questions to address

It is not obviously clear what messages Ofgem (and other regulators) should be taking from this analysis, given the assumptions that are inherently needed in developing quality indicators needed to generate the results. This is not at all a criticism of the paper but, rather, a reflection of the difficulties of the questions posed, which are highly pertinent and to be preferred over approaches that do not measure quality or do so in overly-simple ways. One lesson, though, is that further work on ensuring comparable and detailed data for international comparisons would be of substantial value.

Bourreau, M., C. Cambini, S. Hoernig, P.L. Parcu, M.A. Rossi, V. Silvestri (2017) “The future of broadband policy, part 2: Technological neutrality, path dependency and public financing.”

Relevance

This report focuses particularly on investment impacts from regulation.

Summary

The primary point of this report is the EU regulations for the regulatory framework on electronic communications in 2016 deviate from the previous EU standard of technological neutrality and seem to advocate (based on the objectives of speed in Very High Capacity 100 Mbps networks) optical fibre solutions for increasing speed of connection to all homes, with a potentially very significant increase in total costs for a result for which consumers have a very limited willingness to pay more. They argue that, through this approach, “investors would be deprived of the necessity to continuously analyse which type of technology best fits the current estimates of the demand for connectivity and, in turn, deciding which technology to use and where to invest, because it appears to be the best option for each business case.”

According to the 2002/21 Regulatory Framework, Member State “national regulatory authorities take the utmost account of making regulation technologically neutral that is to say that is neither imposes nor discriminates in favour of the use a particular technology [...]”.

The study examines substantial differences in infrastructure and technological possibilities by country, with residential distance from street cabinets for distributing calls varying substantially across EU countries, along with cable network distribution, meaning that the possibilities for improving speeds to the residence by different technologies also vary.

Australia’s high speed experiment started with a fibre to the home objective that was then modified to a fibre to the node objective, which was much cheaper and faster to implement. Moreover, experience has shown that 80% of Australian households with very high speed options prefer to purchase under 25 Mbps service, suggesting a low willingness to pay for very high speed service. A US survey found that households were only willing to pay USD 3 per month for increasing to a very high speed objective as opposed to a high speed objective.

Lianes and Poblete (2014) show that market standards lead to the best outcomes when there is substantial uncertainty about the benefits of different technology.

The paper suggests that strong cable network distribution in Belgium and Portugal spurred telecom investment in these countries, the absence may have discouraged investment in Italy, while Cave and Shortall (2016) found in their sample of countries no systematic relationship between NGA investment and cable coverage. They suggest that technological neutrality can be abandoned if it would create a market failure or lead to non-achievement of regulator objectives. Such market failures could arise from externalities or from impacts that damage competition.

The paper notes that access competition may be weakened, as LLU enabled access, but will need to move to bitstream access in large part with rollout of high speed to nodes and street cabinets, making installation of equipment much more distributed and less economic for existing DSL providers and new entrants.

The paper discusses specifics of the broadband paths situation in Belgium, France, Germany, Italy, Portugal, Spain and the UK.

Evaluation and other questions to address

The paper is largely descriptive and summarises many other papers and national situations. Tables containing data are generally not present, though these may not be deemed essential for the purpose of the paper.

The debate over appropriate means of delivering appropriate speeds of broadband to the economy is challenging. To fully address the possibilities, more consideration may be merited of future demand and willingness to pay, though this is clearly more speculative than current willingness to pay. Growth rates of data use may be growing at rates that will challenge other systems. The value that consumers will apply to further increases over broadband speed made possible by fibre to the home remain uncertain, particularly as the difference between takeup and coverage can already be large in many countries including the UK. The growth impacts may be worth considering, though difficult to control for, as noted in Abrardi and Cambini (2019), which also notes that while some sources find decreasing marginal gains from speed, there are potential growth benefits of ultra-fast broadband, at least with partial rollout. Though results are complex.

A key question that is not addressed by the paper is what is the appropriate role of the state when the government, whether directly or via regulators, imposes a substantial and unpredicted new cost on the private sector? This question is all the more important when that obligation also leads to an infrastructure design that limits competition. One possibility is that in the future, when governments select an infrastructure that would not be selected in a competitive market environments, governments should themselves provide full coverage of any increased expenditure above normal competitive expenditure. This would have the advantage of giving governments an incentive to internalise the costs of their decisions.

Briglauer, Wolfgang and Carlo Cambini (2018), 'Does regulation of basic broadband networks affect the adoption of new fiber-based broadband services?', *Industrial and Corporate Change*.

Relevance

The paper is relevant to the regulatory policies which can affect both the building and use of fibre-based networks.

Summary

The paper examines the conditions which (1) drive investment in NGNs and (2) drive customer use of these networks. A number of variables are included which might be expected to influence (1) and/or (2), including: the (regulated) prices charged for access to the legacy network; non-price factors affecting access to the legacy network; the quality and extent of the legacy network; the extent of urbanisation; the extent of competition from mobile services; and the market shares of new entrants in retail broadband.

Focusing on the effects for Western European countries with developed legacy networks, the core result is that relaxing constraints on the prices that the incumbent can charge for network access:

- increases investment in NGNs (through reducing the price differential between old and new fibre);
- increases consumer take-up of NGNs (via the same route) but by less than the impact on supply; leading to
- a widening of the gap between adoption and coverage.

In other words, using one policy instrument (regulated prices for access to the legacy network) cannot achieve the two objectives of expanding NGN coverage *and* proportionately increasing use of the new capacity.

The paper's econometrics show somewhat different results for Eastern Europe, not least because of the less developed legacy networks causing reduced impact from the unbundling regime.

Evaluation and other questions to address

The strengths of the paper lie in, (1) the conclusions in the need for policies to promote the take-up of fibre broadband which complement policies on access to legacy networks and in (2) bringing out of the differences between Western and Eastern Europe in respect of the latter's less developed legacy networks. More generally, the author's point is that EU policies need to take account of the differences between countries.

Cambini, Carlo and Laura Rondi (2010), 'Regulatory Independence, Investment and Political Interference: Evidence from EU', *Journal of Regulatory Economics*, August, 38(1): 1 – 26.

Relevance of the paper

Highly relevant to the issue of the effectiveness of the British regulatory model, given that the core rationale for independent regulation, when the main utility privatisations were being conceived, was to ensure adequate investment incentives for the privatised entities; and investment is one of the key evaluative criteria specified by UKRN.

Summary

This paper estimates the impact of the establishment of Independent Regulatory Agencies (IRAs) on the level of investment by regulated firms. The main independent variables are (1) a dummy variable for whether an IRA exists and (2) a measure of the independence of the IRA (a composite of five variables).

The overall conclusion is that independent regulation (both its existence and its extent) has had a positive impact on the level of investment in the industries concerned, as would be expected from the pre-commitment value for investors of having an independent regulator.

Evaluation and other questions to address

Strong points of the paper include:

- a clear and concise articulation of the relevant theory, clear rationales for the specification of the independent variables and explicit allowance for the potential endogeneity of the existence of an IRA;
- clear conclusions on the empirical impact on investment.

Other points include:

- In assessing the existence of an IRA, the authors lean quite heavily on the idea of a lack of *ex post* interference by a government in regulatory decisions. The focus on the *ex post* is understandable because it would be much harder to measure *ex ante* interference, especially of the more informal kind. Having said this the composite measure assessing the extent of independence tries to reflect some of the formal dimensions which might facilitate *ex ante* intervention. However, given that the EU mandates IRAs in industries like energy and telecoms and given that *ex post* interference would be clear evidence of limited independence, a government wanting to interfere routinely in regulatory decisions may mainly do this informally and in advance of the relevant regulatory decisions being taken. This point also links to a point in the paper by Edwards and Waverman (also reviewed) which makes a distinction between *formal* regulatory independence (as indicated by measurable criteria) and *informal* independence (reflecting broader political culture and institutions). Edwards and Waverman argue that (1) the latter is possibly more important than the former and (2) high informal independence might reduce the need for high formal independence, and vice versa.
- The paper is testing whether independent regulation boosts investment. This is clearly an important issue in some countries and not just developing ones (arguably, a central focus of the NIC in the UK is on boosting investment). However,

if the key question is about identifying and completing the 'optimal' level of investment (however this may be designed), the paper does not address this (much more difficult) question.

Cave, Martin (2016), '40 years on: An account of innovation in the regulation of UK telecommunications, in 3^{1/2} chapters', *Telecommunications Policy*.

Relevance

This survey of telecoms regulation in the UK since the privatisation of BT covers all the criteria specified by UKRN (facilitation of investment, promotion of competition, fostering of innovation and protection of the interests of consumers).

Summary

The history of regulation and competition in telecoms is far more complex than in the other regulated sectors. Major points in the paper include the following:

- Telecoms regulation in the UK has been genuinely independent - unlike in, for example, energy, there has been a clear dividing line between government policy and sectoral regulation in telecoms.
- Competition in mobile telecoms has been largely achieved.
- The progress of competition in fixed telecom has "exhibited a different and much more chequered history".
- Ofcom's compromise with BT over the operational separation of Openreach has not been followed by other EU countries.
- Ofcom continues to grapple with reconciling the promotion of competition with the promotion of investment in ultrafast broadband. Compared with other EU countries, so far this has tended to mean more reliance on incremental improvements to the existing BT network (fibre getting progressively closer to premises but not actually getting there), as against large-scale construction of FTTP (Fibre To The Premises).
- Underlying this grappling has been the conflict between the tendency of facilities-based (or infrastructure) competition to focus on areas with the densest populations and the desire to achieve universal access to the fastest broadband (for example, Australia is re-nationalising and re-monopolising the local loop with the goal of making fibre universal, and other EU countries have placed greater emphasis on policies fostering FTTP).

Evaluation and other questions to address

The strengths of this paper are conveying the complexities of telecoms regulation and the extent to which some of the underlying conflicts in this area remain unresolved. One question implicitly posed by the paper is the extent to which Ofcom's commitment to the promotion of competition has compromised the objective of facilitating investment (most recently, in FTTP). However, as suggested by the Rand Europe paper (reviewed above and addressing an earlier time period), one of the features of telecoms in the UK has been the delivery of quite good telecoms 'outputs' through incremental (and sometimes relatively slow) policies.

This, in turn, raises a more speculative question about the UK regulatory model. Two features of that model are (1) the focus on promoting competition where possible and (2) in relation to networks, a preference for incremental investment/preservation of option values/avoidance of stranded assets over big, potentially transformational, projects. These

features have arguably characterised Ofgem's approach to climate change-related investment in energy networks, as well as Ofcom's approach to investment in fibre. These approaches can be justified, both in principle and in terms of achievements to date, but stand in contrast to those who would like greater commitment to non-marginal/transformational investment in various forms of infrastructure, often carried out in a more centrally-determined way.

Cave, M., C. Genakos and T. Valletti (2019) "The European Framework for Regulating Telecommunications: A 25-year Appraisal" *Review of Industrial Organisation*.

Relevance

The paper is particularly relevant for competition and investment, particularly comparing EU developments to those in the US in the telecoms sector.

Summary

This paper provides an overview of telecommunications developments in Europe over the last 25 years, with some degree of comparison with Asia and the US. The paper focuses separately on fixed line and mobile developments. The telecommunications reforms beginning with the 1998 liberalisation of voice and infrastructure, followed by the 2003 EU(?) framework, were followed by increased competition, increased investment, declines in price and increased penetration.

Challenges highlighted include the substantial differences that still exist between broadband penetration, while "next generation access" lags behind the US with only 54% of EU households having such access compared to 82% of households in the US. Genakos et al (2018) finds that increased concentration in mobile markets leads to higher prices and higher investment, suggesting there is a competition/investment tradeoff.

Germany and the UK imposed obligations on fibre providers to give access via a bitstream equivalent, which has led to less investment by competitors. In contrast, France, Portugal and Spain promoted infrastructure competition, by making ducts and poles available, an access product that is significantly less extensive than the unbundled copper loop. In the first case, primarily incumbents made investments, while in the latter case, investments were more distributed among competitors, including those with a relationship to the consumer. The authors suggest that "studies show that intrusive regulation of fiber assets deters fiber investment."

The paper finds mobile adoption in the EU has outpaced the US. Interestingly, price regulation has complex effects, with a 10% lowering of mobile termination rates (from fixed line networks) seeming to be associated with increases in mobile retail plan prices of 5%, a so-called waterbed effect, in countries with low mobile traffic, but a less pronounced effect in countries where mobile traffic was large, due to the increased volume of mobile-mobile telecoms traffic.

Evaluation and other questions to address

The paper contains relatively little numerical analysis, but integrates the judgements of leading experts who have previously performed substantial empirical work. The paper focuses on identifying substantive questions for the future. The paper says little about the governance structures of different regulatory regimes.

Major questions for the future include: (1) the extent to which oligopolies involving a small number of firms may be a problem that is not addressable by competition law, (2) impending changes in which software/service providers (e.g., Netflix) may rent the part of

the network necessary to deliver their product to the customer, such that a physical network could support multiple “tenants”.

Roaming regulations have much reduced termination and origination charges outside of the home country, but no analysis exists to demonstrate these supposed benefits. There could also be a waterbed effect here, though identification is difficult.

Merger policies for mobile services may have been overly focused on price impacts and insufficiently focused on investment impacts. More thought may be needed about network sharing arrangements that could reduce the need for duplicative investment. More generally, more work is suggested as necessary on the investment/competition trade-off.

Citizens Advice (2015), 'Many happy returns? The consumer impact of price controls in regulated networks. Report.

Relevance

As with the 2019 Citizens Advice (CA) report, this paper is about the returns of regulated networks and falls mainly under the heading of protecting the interests of consumers (although it clearly also touches on the issue of facilitating investment).

Summary

This (rather longer) CA paper covers some of the same ground as the 2019 paper, e.g. the need for recalibration of cost of capital parameters and the greater use of indexation for those parameters. The other main area covered is that of output incentives which offer companies the potential to earn higher rates of return if they meet specified output/outcome targets. CA is not opposed to the use of such incentives but clearly thinks that the past/existing incentives (e.g. those for RIIO-1) have been too generous.

The comments below focus on the incentives issue, as relevant comments on the cost of capital parameters have been summarised in relation to the 2019 CA paper.

Evaluation and other questions to address

It would probably not be a controversial proposition to say that some network companies have done very well out of some of the output incentives in their price controls. This has been true with RIIO-1 (an issue exacerbated by the length of the RIIO-1 price controls), as it has also been, further back, with, for example, the Distribution Losses Incentive for electricity distribution companies. Also, CA accepts that there will be a necessarily iterative aspect to setting incentives and that, in principle, incentives to deliver specific outcomes for consumers are a good idea.

However, CA's underlying point is that incentives should only reward exceptional performance which requires a 'dynamic benchmarking' dimension when setting incentives. Regulators will have their own views as to how far CA's view is appropriate and whether their approaches reflect these ideas. Ofwat's declared aim in PR19, for example, is to do just that.

The main question is whether, in the price controls currently being set or which will be set in the future, regulators have actually achieved CA's objective of only rewarding exceptional performance. There does not seem to be an issue of principle separating CA and regulators on the question of the desirable incentives to create in price controls and what the price controls are meant to achieve.

Citizens Advice (2019), 'Monopoly Money: How consumers overpaid by billions', Report.

Relevance of the paper

This paper falls mainly under the heading of protecting the interests of consumers. Unlike the papers reviewed surrounding the CMA's energy market investigation, this paper mainly concerns the regulation of networks and, specifically, the setting of network price controls. However, one of the (non-core) recommendations of the paper is that more use should be made of competition to deliver monopoly services and, therefore, part of the paper also falls under the heading of promotion of competition. In addition, changing returns to network investment might be expected to have some impact on network investment (although Citizens Advice might not agree with this).

Summary

The paper argues that regulators have systematically overestimated the cost of capital in past network/infrastructure price reviews (albeit it recognises that there are extenuating circumstances for some of the alleged mistakes); that as a result companies/shareholders have been overcompensated and that: (1) companies should voluntarily hand back a slightly unclear proportion of these historical overpayments and (2) in future, regulators should correct their cost of capital calculations as follows:

- index overall debt costs to a relevant 10-year moving average (as currently done by Ofgem);
- index the risk-free rate component of the cost of equity, using a daily spot rate to update capital allowances on an annual basis
- reduce the equity beta from what has been assumed in the past;
- reduce the total equity returns figure also used in the CAPM calculation of cost of equity to 6.5%
- stop aiming towards the top of estimated ranges for cost of capital

In addition, Citizens Advice (CA) want:

- currently listed network businesses to be prevented from exiting public markets, not least to avoid further reducing the range of share prices which can be used for beta calculations; and
- more use of competition to undertake some network activities.

Evaluation and other questions to address

That past price controls have, in retrospect, overestimated actual network costs of capital is not now a particularly controversial position. The size of some of the premia over regulatory value paid in various acquisitions support this position as, implicitly, does the current price control thinking coming out of, for example, Ofgem and Ofwat.

So, broadly, regulators seem to be coming from not a hugely different place than CA in terms of how future price controls should be set, regarding some of the main parameters in the cost of capital calculation and, at least in some respects, with the proposals for

indexation (although this would currently seem to apply more in respect of the cost of debt than the cost of equity).

In addition, both Ofgem and Ofwat have moved to increase the role of competitive provision, at least, for major network enhancements.

In terms of the overall recommendations, the one to prevent currently listed companies from leaving public markets would obviously be a step beyond what regulators have done (except in water, where the number of comparator companies has always been an issue when considering water company mergers).

More generally, there are issues around:

- the desirability of 'aiming up' when selecting point values from a range of values in the cost of capital calculation;
- the internal consistency of the proposals.

As far as aiming up is concerned, CA recognise the reason why regulators have tended to regard the risks of over-estimation or under-estimation as asymmetric but they assert that regulators should follow the evidence, while giving little weight to the possibility that the evidence will not always indicate point values (although the increased use of indexation may mitigate this problem).

As far as internal consistency is concerned:

- CA is quite keen, especially with respect to cost of debt, to disregard historic costs (i.e. the actual costs of embedded debt), even when the regulator accepts that the relevant costs were efficiently incurred - this is on the basis that high historic debt costs would not be remunerated in a competitive market. More generally, CA seems, not surprisingly at a time of low debt costs, to be quite keen on the use of spot values, rather than longer term averages. However, historic betas, which CA *does* want to use, presumably reflect that network companies are not operating in a competitive market.
- More generally, in terms of consistency, there is always a question of what deference should, or should not, be paid to regulatory precedent. However, again, if CA's preference for largely ignoring it is to be followed, it is not clear that this is consistent with using historical betas, given that, in the past, *some* deference has been paid.

Competition and Markets Authority (2016) 'Energy Market Investigation', Appendices 9.10 ('Analysis of retail supply profitability - ROCE') and 9.13 ('Retail profit margins').

We have summarised and evaluated both Appendix 9.10 (ROCE) and Appendix 9.13 (margins) of the CMA's Final Report.

Relevance of the paper(s)

The main relevance of these two papers to the effectiveness of the UK regulatory model is under the heading of protecting the interests of consumers, as one of the core issues in utility regulation is protecting consumers from the exploitation of monopoly power through excessive profits. Beyond this, the two appendices highlight the problems of measuring and comparing profitability in asset-light activities like energy retail, a recurring problem for other regulators. In principle, the CMA has always preferred to measure profitability in terms of return on capital employed (ROCE) because this measure can be compared with the relevant cost of capital and this is why we have included a very brief summary of the ROCE appendix, as well as a summary of the appendix on retail margins. However, as the CMA acknowledges, measuring capital employed in asset-light activities is highly problematic.

Although the reviewed excerpts from the CMA's report relate mainly to the issue of protection of consumer interests, the report as a whole (as one would expect for a CMA report) is also obviously about whether the market arrangements of the time promoted competition (to which their answer was that there were several respects in which arrangements did not do so).

Summary

The CMA's core headline conclusions of the two appendices, taken together, are that:

- the retail profitability of the Big 6 energy suppliers, taken as a whole, was above their cost of capital;
- the margins earned from small/microbusiness customers and domestic customers (these were the reference market for the CMA) could not be justified on the basis of costs or risks, when compared with the margins from I&C customers or with the margins used in other GB regulatory investigations into energy supply.

These findings fed, in turn, into the CMA's overall conclusion that the market under investigation was not a well-functioning market, with EBIT margins well above the figure of around 2% which the CMA thought would be consistent with the characteristics of the market.

Evaluation and other questions to address

The papers are a thorough analysis of what has been accepted by the CMA in other investigations to be a very difficult area - i.e. the assessment of profitability in 'asset-light' activities which do not lend themselves easily to ROCE calculations which can be compared with an estimated cost of capital.

This problem has led to two main approaches, both of which were followed by the CMA:

- Focus on *margins* (e.g. EBIT/turnover) and then compare these margins with margins earned in suitable comparator industries (i.e. industries which ideally have similar cost structures, levels of capital employed and risk profiles and which are also broadly competitive), with all the contentiousness which this implies about the selection of appropriate comparators.
- Make a large number of often contentious adjustments to come up with a figure for capital employed and then compute ROCE.

CMA argues that there is a rough consistency between the conclusions of the two approaches - that, after applying various assumptions and adjustments, the cost of capital for energy supply in GB is consistent with an EBIT margin of around 2%.

The main questions relate to the problems inherent in estimating both actual and normative margins or returns on capital employed. In the case of ROCE, much of the controversy relates to not only the usual issues associated with estimating cost of capital but also with the adjustments which need to be made to compute reasonable numbers for capital employed in asset-light activities.¹⁷ In the case of margins, the main problems centre on finding suitable industry comparators (and around the circularity associated with using previous regulatory decisions in this area). The CMA's Energy Market Investigation will not be the last word on this issue, even for energy supply, let alone for other asset-light activities in regulated industries.

These challenges are before one gets to some of the additional issues (covered in the wider CMA report) of identifying the associated customer detriment resulting from the judgement of limits to competitive pressures. These additional issues have been identified by Stephen Littlechild (see separate review for evaluation of his paper) and Citizen's Advice (two of whose papers are reviewed here).

¹⁷ It may be worth noting that the CMA did not complete equivalent calculations in its more recent market investigations into investment consultants.

Deller, D. and Vantaggiato, F. (2014), "Revisiting the Regulatory State: A Multidisciplinary Review Establishing a New Research Agenda", CCP Working Paper 14-9.

Relevance

This paper identifies areas for future research, including for consumers, governance and assessing regulatory performance after conducting an extensive mapping of the literature.

Summary

With respect to consumers, regulators may perceive themselves as acting for consumers, but the precise ways in which they can measure consumer desires and impacts are often lacking, particularly when consumers do not have a formal representative and assessments of the consumer interest may include a wide variety of perspectives. Consumer switching has been increasingly researched, with findings that consumers have often acted in ways that are not consistent with, arguably, excessively narrow definitions of what constitutes their 'rational' interests. The findings of behavioural economics may be used in arguments for increased regulatory intervention relative to the role of the market. Earlier papers often argued that greater competition may be the best protection for consumers.

Incentive regulation may favour cost minimization rather than large regulation, when compared with rate of return regulation. In the context of political science, regulatory expertise is seen as the key factor legitimising independent regulation when this involves reduced control by institutions with overt democratic legitimacy. Much of the economic analysis described, focuses on how incentives acting on regulators as individuals may impact on the decisions they take and, hence, consumer outcomes. Historically, a key concern has been that regulator might be captured by the interests of those they regulate.

In terms of regulatory governance and institutions, independence is viewed theoretically as a means to address the problem of time inconsistency, in which a political actor may promise private investors a particular return on investment, but are likely to face political pressures to renege on these commitment. However, the relative difficulty of changing regulatory institutions means that independence may also be used more generally as a device by one generation of political actors to constrain the activities pursued by subsequent political actors.

Evaluation and other questions to address

The paper does not include work after 2014. One subsequent piece that is relevant to some of the arguments is Robert Sugden's book *The Community of Advantage: A Behavioural Economist's Defence of the Markets* (2018) OUP. Also, the definition of "vulnerable consumers" requires particular care due to its potentially amorphous nature, the risk of regulators being drawn into value judgements that are better suited to democratically elected individuals.

In all cases, regulators' role in assessing the necessity of investment and predictability in regulators' determinations are critical, and more research is needed about how different regulatory structures and guidance influence investment.

The review identifies a lack of robust research (and data) on individual regulators, their career paths and the regulatory agencies with which they are associated in the European context.

Domah, Preetum and Michael Pollitt (2001), 'The Restructuring and Privatisation of Electricity Distribution and Supply Businesses in England and Wales: A Social Cost-Benefit Analysis', *Fiscal Studies*.

Relevance

The relevance of this paper is somewhat constrained by its date of publication (2001) which means the period that it covers is most of the first decade after privatisation. Nonetheless, in looking at the gains and losses to various groups (the government, producers and consumers) of the privatisation and restructuring of the electricity distribution and supply businesses in England and Wales over that period, makes important points about the separate effects of (1) ownership and (2) policy (including regulatory policy).

Summary

The paper aims to perform a cost-benefit analysis on a part of electricity privatisation for society as a whole, where 'society' is seen as comprising the government, producers (the 'Regional Electricity Companies' or RECs) and consumers. As the paper explains, a considerable number of assumptions need to be made in order to undertake this analysis, not least assumptions about the counterfactual (i.e. what would have happened if the companies had stayed in the public sector).

However, the overall results for the 1990s are fairly clear: the companies were privatised with what in retrospect (and, to some extent, at the time) were seen as undemanding initial price controls. As a result, in the first five years following privatisation, the Government did quite well in terms of privatisation proceeds, the companies did very well in terms of profits and consumers did not do so well. With the re-setting of the (distribution) price controls from 1995 (after two attempts by the Office of Electricity Regulation), electricity distribution costs came down, profits were put under pressure (both by the new price controls and by the Windfall Tax) and consumers did rather better.

Evaluation and other questions to address

The paper makes very clear that privatisation of monopoly businesses may not itself be good for consumers, especially in the short term when government is balancing the interests of consumers against its desire to get a high price for the sale of state-owned companies to the private sector. However, the paper also makes clear that, when put under pressure from tougher price controls (from 1995), companies' reaction in terms of improved cost efficiency was probably greater than if the companies had stayed in the public sector.

What the paper obviously misses out on (because of when it was written) are key parts of the later post-privatisation story. These include the progressive effects of the supply market being opened up (there was a staged reduction in the scope of the RECs' regional supply monopolies through the 1990s) and the continuing squeeze on distribution prices from later price controls (a process which itself was somewhat rebalanced, between operating cost reductions and increases in capital expenditure from the mid-2000s, in the wake of a strongly worded Select Committee report on Network Resilience).

Edwards, Geoff and Leonard Waverman (2006), 'The Effects of Public Ownership and Regulatory Independence on Regulatory Outcomes', *Journal of Regulatory Economics*, January, 29(1): 23 – 67.

Relevance

This paper is concerned with the general effectiveness of regulatory independence (across the EU) on a specific regulatory outcome - the interconnect rates charged by the incumbent public telecoms operator (PTO) to other telecoms providers. As such, it is not concerned directly with the UK but, in so far as lower interconnect rates can be expected to be favourable to investment by challenger telecoms providers, the paper has relevance to the impact of independent regulators (including in the UK) on both investment and on competition (and thus on consumers of telecoms services).

Summary

The paper is concerned primarily with the interaction between (1) the extent of public ownership of the PTO and (2) the independence of the telecoms regulator - the hypothesis being that state ownership of the PTO would tend to raise interconnect charges (the state being the beneficiary of such charges), while independent regulation might mitigate this effect (with the regulator not getting any benefit from higher charges).

The study uses a sophisticated database which aggregates 12 measures of regulatory independence to give an index of independence for each country. The econometrics in the paper has interconnect rates as the dependent variable and, as the independent variables: the index of regulatory independence; the extent of state ownership of the PTO; and variables which proxy for the underlying costs of the PTO.

The main findings of the paper are that:

- state ownership of the PTO *does* tend to raise interconnect rates;
- in the presence of state ownership of the PTO, this effect is mitigated by the independence of the regulator;
- when there is no state ownership in the sector, the independence of the regulator has no effect on interconnect rates.

Evaluation and other questions to address

The strengths of the paper include:

- the nuanced, and not totally predictable conclusion about the effects of ownership of the PTO and the impact of regulatory independence on a particular regulatory outcome, emphasising the value of independent regulation as a commitment where government has conflicting interests (in this case, as a result of ownership of the PTO), but the value of this commitment is reduced when the conflicts do not exist;
- the sophistication of the measure of regulatory independence, although that this needs to be qualified, as is done in the following sub-section.

One of the main questions with the paper is, in fact, raised explicitly in the paper itself. This is the question of the relative role of, first, 'macro-political' institutions and culture and, second, the sort of 'micro-political' institutional arrangements represented by an independent telecoms regulator. The authors point out that, for example, the UK only ranks

moderately on the formal index of regulatory independence while, at the same time, being generally seen as the benchmark for independent telecoms regulation (the paper was published in 2006). The authors go on to speculate that the value of formal independence, as a commitment device, may be particularly beneficial in countries where the general macro-political environment is viewed as less favourable, i.e. where *informal* independence is less well established.

Ennis, S. and D. Deller (2019) “Water sector ownership and operation: an evolving international debate with relevance to proposals for nationalisation in Italy”, CERRE Report, July.

Relevance

This report is particularly relevant to the overall questions of governance and investment levels in the water sector.

Summary

This report suggests that independence of water regulators is particularly crucial when investment in water systems is needed. The operational risks for water systems are that, when under direct political control, there is a temptation to keep prices lower than long-run cost for political reasons potentially achieved by deferring investment to subsequent years¹⁸. This emphasises the benefit of independent regulation as a commitment device under public ownership. In contrast, under private ownership where private companies can benefit from the revenue stream, there is generally a view that regulation is needed to control potential monopoly pricing. Also, private involvement network industries will generally be limited in the absence of an independent regulator that can reassure investors that future political administrations will not renege on promises made by the current political actors.

Equally there is a risk that, under rate of return regulation, investment may be higher than optimal, if the allowed returns on investment are higher than the cost of capital. This duality of risks suggests that while the regulatory focus may vary based on the type of ownership, water systems can benefit from the presence of independent regulators both when there is private and public ownership.

The report provides an overview of evidence on productivity, pricing and investment across countries. It finds that in some countries soon after the establishment of independent regulators, investment levels seem to have risen. There is a substantial variation across EU states in the degree of sewage treatment, the extent to which water is lost in the system and the overall costs of the system. The quality of water is relatively uniform across the countries considered, probably due to EU water directives. Overall the UK appears a reasonably strong performer that appears to take a relatively balanced position between competing objectives.

Evaluation and other questions to address

The report does not draw any conclusion on which ownership systems may be most appropriate. However, it does suggest that there can be a relationship between the form of system management and the immediate needs of the municipalities that largely run water systems. The report suggests the value of further work on the relationship between independent regulation and investment in the water sector.

¹⁸ An alternative driver of limited investment when under political control may be a desire to limit overall state borrowing.

Erbetta, F. and M. Cave (2007) "Regulation and efficiency incentives: evidence from the England and Wales water and sewerage industry", *Review of Network Economics*, 6(4):1-28.

Relevance

This paper is focused on productivity performance in the UK water and sewerage industry.

Summary

The paper reports results of a Data Envelopment Analysis, in the first stage, and the Stochastic Frontier Approach, in the second. The subject is whether incentive regulation resulted in improved performance. The data comes from 10 water and sewerage companies for the period 1992-93 to 2004-05. The methods advantages are outlined, including that it can incorporate environmental effects and statistical noise into the model. It also allows an evaluation of the impact of both the operational and regulatory environment on technical and allocative efficiency.

The main conclusions are:

- The 1999 price review showed significant improvements in technical efficiency (notably compared to that of 1994)
- Allocative efficiency improved and "input-specific allocative distortions" declined over time, with over-utilization of labour and under-utilization of capital being remedied.
- The "trend of managerial efficiency shows evidence of a significant improvement in managerial capacities during the observed period"
- "The regulatory environment set after privatisation seems to have improved allocative efficiency through the elimination of the initial input distortions."
- "In terms of both technical and allocative efficiency, there is evidence of improving managerial performance. This may be seen as consequence of the change in ownership, as well as of the system of performance assessment set up by the regulator after privatisation."

Evaluation and other questions to address

The paper uses a more complex methodology than many older techniques for productivity analysis, and potentially a much richer one.

Florio, Carlo V. and Massimo Florio (2013), 'Electricity prices and public ownership: Evidence from the EU over thirty years', *Energy Economics*.

Relevance

One of the main reasons why this paper is relevant is its explicit attempt, within the electricity sector of the EU15, to disentangle the effect of ownership on consumer prices from the impact of other factors (like vertical unbundling and independent regulation etc.),.

Summary

The paper attempts, in various ways, to break out the impacts of different factors affecting domestic electricity prices. In particular, it tries to separate out the effects of the different components of a 'British-style' reform package (privatisation, vertical unbundling, reducing barriers to entry and price capping by an independent regulator). It also attempts to control various other cost and demand factors. Two conclusions stand out:

- "Public ownership seems to have capped residential electricity prices more than regulated competition in Western Europe, probably because of illiquid markets, inadequate regulation or both."
- "In terms of policy implications, this suggests that when there is a tradition of reasonably effective management in the public sector, for example in the Scandinavian countries, or in France, public ownership can still play a role in protecting consumers from oligopolistic competition in electricity supply."

Evaluation and other questions to address

One could probably spend a lot of time reviewing the econometrics of this paper and the adequacy with which it captures 'reform' variables, as well as all the other variables which can be expected to affect domestic electricity prices.

However, one of the more obvious questions raised by the paper is in relation to its exclusive focus on domestic electricity prices. In other words, there is nothing on how those prices have been achieved.

- Have they, for example, in some cases been achieved by cross-subsidy between domestic and commercial consumers (the likelihood of this may be higher when there is political control of prices)?
- Have domestic prices been held unwisely low, for example, by limiting long-term investment that ultimately needs to occur?

Florio, Massimo (2003), 'Does Privatisation Matter? The Long-Term Performance of British Telecom over 40 Years', *Fiscal Studies*.

Relevance

The paper, published in 2003, tries to separate out the effects on BT's performance of: (1) privatisation, (2) regulation via price controls, and (3) liberalisation of the telecoms market. From the viewpoint of the questions posed by UKRN, the most relevant issue is the combined and separate impacts of (2) and (3).

Summary

The overall conclusion of the paper is that there was little observable impact on BT's performance (productivity, in particular) from privatisation per se. The changes that did occur post-privatisation are attributed to regulation (particularly the impact on reducing workforce size when the price control regime was tightened some years after privatisation). Overall, the paper suggests that BT's performance over the period was consistent with 'satisficing', i.e. maintaining a target rate of return and only pursuing efficiency savings when prices were progressively squeezed by price controls.

Evaluation and other questions to address

What clearly emerges from the paper is the lack of any clear structural break in performance which can be associated with privatisation. One possible implication is that, in the absence of strong competition, a single company can get away with satisficing behaviour in a way that is more difficult in a multi-company industry (gas and electricity distribution, water), where there is increased scope for benchmark competition/regulation.

Since the paper was published, it is arguable that the main pressures on BT have come from competition and it would obviously be interesting to know whether this competition has produced the performance improvements which this paper suggests did not follow from privatisation and followed only to a rather limited extent from regulation, at least through to 2000.

Frontier Economics (2017) “Productivity improvement in the water and sewerage industry in England since privatisation.”

Relevance

This report focuses on productivity levels in the water and sewerage industry, which can ultimately be related to consumer prices.

Summary

This report updates Saal and Parker (2001) with more recent data on the water and sewerage industry. They use an index based approach to measuring total factor productivity with quality aspects separately adjusting the output indices, rather than serving as outputs.

Annual total factor productivity (TFP) is estimated to have grown, after quality adjustment, by 4.5% from 1996-2000, then at 2.0% from 2001-2005 and 2.2% from 2006-2010. Over the business cycle period 2009-2017, the estimated TFP growth is much lower, 0.1% (and -0.1% when not adjusted for quality). The cumulative increase in TFP since 1994 is 64% including quality adjustments and 27% when not doing so. They suggest annual costs in 2017 would be £2.72b higher than the actual £9.98b, absent the TFP improvements. This

Evaluation and other questions to address

This study does not adjust for all measures of output, with quality measures, in particular, being notoriously difficult to measure. For example, drinking water safety from chemical composition or impact of sewerage treatment on river and bathing or the frequency of sewer flooding are not measured.

Unlike Saal and Parker, operating expenditure is not broken down into labour and other inputs costs but rather treated as the union of both. The reason for this is to ensure greater data availability.

The authors suggest that Data Envelopment Analysis and Stochastic Frontier Analysis could be successfully and usefully applied, though UK regulators have generally preferred to avoid these, while Australian regulators have done so.

Hanretty, C., P. Larouche and A. Reindl (2012) "Independence, accountability and perceived quality of regulators," A CERRE Study, 6 March.

Relevance

This report is relevant to examining the overall quality of regulators, thus including all the impacts that are desirable from regulation.

Summary

This report examines independence, accountability and quality of regulators and competition authorities across 5 countries (BE, DE, FR, GB, NL) and four types of regulators (rail, energy, telecoms and competition authorities). The report focuses in particular on perceptions of regulatory quality, using pairwise comparisons as a route to determine an overall perceived quality ranking. The report finds that more independent authorities are also have higher levels of accountability. Most significantly, the quality measures between countries suggest that of the five countries surveyed, which include leading EU countries, the UK is rated as having the highest perceived quality of regulators, with a significantly higher perceived quality compared to every other country.

Evaluation and other questions to address

The typical route for establishing causality between regulatory governance and outcomes looks at particular outcomes, such as interconnection rates, and outcomes, controlling at the same time for a number of other potential factors that could affect interconnection rates. The accuracy of estimates then becomes dependent on the extent to which researchers have controlled appropriately for these other factors. This research takes a more direct route at assessing quality, though the assessment is based on perception.

34 respondents from regulators, regulatees and academia made 399 pairwise comparison. For example, a regulator from the telecom sector in Belgium would compare the quality of the Belgian telecom authority to other regulatory bodies in Belgium and other telecom regulators in the four other countries in the study. Consistency and reliability were found to be high, including across types of respondent.

The authors further developed a measurement technique to assess independence and accountability of regulators.

The research method is necessarily conditioned on the expertise and judgment of the people surveyed. Given that those surveyed were brought together at the leading independent European centre on regulation and that the response came from three different types of experts, there is good reason to hope that the responses were from experts with both a good basis for judgment and accurate judgements.

The research method is also based on perceptions, and subject to bias to the extent that perceptions are biased. The route of allowing experts only to express views either on their own country's regulators or internationally in their own area of regulation helps to limit such potential bias.

Koop, C. and M. Lodge (2019) "British economic regulators in an age of politicisation: from the responsible to the responsive regulatory state" (mimeo)

Relevance

This paper is of particular relevance for its comments on the changes in regulatory focus over recent years, particularly after the financial crisis, and discussion of consumer pricing.

Summary

Based on interviews with current and former senior regulators, the authors suggest that regulation has become more politicised since the Great Recession, as a result of worsening economic conditions bringing regulatory outputs under question, reduced belief in markets that pressures politicians to intervene more frequently and the impact of regulation on low-income households.

These impacts were particularly felt in energy, with the price caps discussions, Ofcom around the time of the Leveson inquiry and water with impacts of water bills and profits of water companies.

Regulatory decision making was felt to have shifted attention from ensuring investors were adequately compensated towards focusing on consumer impacts, particularly "vulnerable consumers". Such a focus was perceived as a way to restore or enhance trust in both regulators and regulation.

One their key concepts is the distinction between 'first-order' and 'second-order' adaptations by regulators to political pressure. In the former, the regulator changes some techniques (like its communications strategy) but does not really change its fundamental world-view. With the latter, there is a more fundamental change in approach.

One reason why this looks so relevant to the current effectiveness of the UK regulatory model is that it could be argued that Ofgem sits in the first category (being unwilling to shift from its focus on supplier competition, even in the face of pressure to deliver for 'vulnerable' and other disadvantaged consumers - whereas Ofwat would seem to have really rethought key areas of its fundamental approach, mainly in order to help restore 'legitimacy' in the sector.

Evaluation and other questions to address

The questions to answer include the extent to which a consumer welfare standard was a sufficient objective for policy or whether this treated consumers too homogeneously. Loyalty penalties were also felt to have distributional implications that required exploration. More generally, fairness has become a new focus of discussion. Whether this is appropriate for regulators, as opposed to politicians, is a key question of focus for the future, particularly to the extent that precise definitions of fairness are currently lacking (though one is forthcoming in ongoing work by Lyons and Sugden). Research on the effectiveness of consumer engagement by regulated companies and regulators is needed. Regional variations are also an increasing source of regulatory attention.

International comparisons would be of great value to extend this work.

Littlechild, Stephen (2017), 'The CMA's analysis of the retail energy market: an examination using textbook economics', EPRG Working Paper 1703, Cambridge Working Paper in Economics 1707.

Relevance of the paper

The relevance of this paper is on a similar basis to that of the CMA's profitability/margins analysis in retail energy supply (see above). Both are concerned with whether the market is adequately protecting consumers from the exercise of market power. In that regard, the relevance of the Littlechild paper is that it argues that at least one of the methods used by the CMA to estimate the detriment from the exercise of market power is wrong. However, Littlechild's other underlying point, spelled out elsewhere as well, is that the CMA (and, by implication, other UK regulators) have an incorrect perception of what a well-functioning market looks like - and that such a market is consistent with price discrimination and with the survival of firms with different levels of efficiency and profitability. (The CMA calculated the customer detriment of the retail energy market on the assumption that in a well-functioning market all firms operated at near the efficiency level of the most efficient, on the basis that well-functioning competition would have driven out the inefficiencies actually observed.)

Summary

As implied above, the Littlechild paper makes two main points. The one forming most of the paper is that the CMA mis-estimated the customer detriment resulting from the pattern of retail energy prices observed. The CMA quotation which, for Littlechild, encapsulates the problem is as follows:

"A large part of the detriment we have observed in the form of high prices is likely due to inefficiency rather than excess profits, such that if we were to eliminate the entirety of the detriment we have observed through a price cap it would create substantial losses for the sector as a whole."

Littlechild's core point is that any excessive profits, due to the exercise of market power, should be judged relative to actual costs, rather than in relation to some (lower) hypothetical level of efficient costs. The CMA's view, on the other hand, is that the weaknesses in the market (notably a lack of engagement/switching by some consumers) has allowed inefficiency to survive in a way which would not happen in a truly competitive market.

Littlechild's other main point is that CMA simply has an incorrect view of how competitive markets operate. His more 'Austrian' take is that competitive markets are a continuous rivalrous process which, at any one time, will still be working itself out. Apparent inefficiencies amongst the major energy retailers may, in part, reflect the fact that improving efficiency is difficult and takes time. He makes the specific point that the CMA's benchmarking against the costs of some of the smaller energy suppliers may be invalid when some of those suppliers may not survive in the longer term (a point at least partly borne out by subsequent events).

Evaluation and other questions to address

The paper's main strength is in highlighting:

- the different components of the CMA's detriment calculation - the separation between the element that is due to pricing above costs (including a normal rate of return) and that which is due to alleged cost inefficiency; and
- the extent to which the CMA seems to assume that a 'normally competitive' market would have flushed out the observed differences in costs between companies.

Following the approach of this paper would obviously raise issues in relation to some of the pressures that UK regulators currently face. The Littlechild logic is, in effect, that:

1. The GB retail energy market has been characterised by relatively free entry on the supply side.
2. To the extent that lack of engagement by some consumers with the market leaves these customers with demonstrably high tariffs, charged by incumbent suppliers, the customers involved are making a free choice and, hence, the price differences do not warrant regulatory intervention.

This position does not mesh easily with the normative view that utility regulators should protect 'vulnerable' customers even when supply-side criteria alone might appear relatively competitive.

Markou, Eleni and Catherine Waddams Price (1999), 'UK Utilities: Past Reform and Current Proposals', *Annals of Public and Cooperative Economics*.

Relevance

This paper is, in the main, a stocktake on where privatisation/regulation had reached in the run-up to the Utilities Act 2000. As such, it covers all of the four dimensions of regulatory effectiveness in which the UKRN is interested.

Summary

The paper covers similar ground to some of the other papers on the UKRN list, although, it was written before several of the others. In brief, it surveys the impact of privatisation/regulation on productivity, investment, quality of supply, average prices, the structure of prices and on distributional issues. Like some of the other papers, it also seeks to disentangle what was due to privatisation itself, what was due to changes in market structure implemented as part of the privatisation process and what was due to subsequent regulation.

The main conclusions are as follows:

- Overall, labour productivity increased, although, as noted by others, some of the most rapid improvements were achieved in the run-up to privatisation.
- Apart from for water, average prices eventually and broadly fell (after the increases entailed by the initial price controls). Average price falls occurred more in areas exposed to competition than in those just exposed to regulation, although, increased competition also triggered a rebalancing of prices, to the detriment of particular groups of consumers.
- Regulators were increasingly drawn into quality issues. One of the underlying themes of the paper is the increasingly elaborate specification of what companies had to deliver in return for regulated revenue (BT being a particularly egregious example of quality being left unspecified in the original flotation - subsequent privatisations did more in this area).
- Regulators were increasingly drawn into scrutinising investment programmes, not least to enable regulators to separate genuine 'capital efficiencies' from artificially ambitious investment plans proposed at price reviews.
- A general belief that the distribution of the gains of privatisation had been inequitable with too many gains going to shareholders and senior executives relative to consumers. This view underlay the planning for the Utilities Act 2000 which was occurring when the paper was written.
- Overall, it is hard to disentangle the effects of privatisation from the effects of regulation and liberalisation/competition, although, average "costs and prices have fallen much faster where competition was introduced".

Evaluation and other questions to address

One of the strengths of the paper is how well its overall conclusions have held up over the twenty years since the paper was published. One of the strongest underlying themes of the paper is the extent to which post-privatisation regulation has had to elaborate on the

'regulatory contracts' put in place at the time of privatisation. Initially, this involved a more detailed articulation of what companies had to deliver in return for their regulated revenue and, in some cases, the introduction of penalties for a failure to deliver. More recently (and notably with Ofgem's RIIO framework), it has taken the form of a more complicated monetisation of companies' success *and* failure in delivering defined outputs.

Nardotto, M., T. Valletti, F. Verboven (2015) "Unbundling the incumbent: Evidence from UK broadband", *Journal of the European Economic Association*, 13(2): 330-362.

Relevance

This paper is of particular relevance to consumer access and the quality of a key telecommunications product, namely broadband.

Summary

This paper combines datasets in a unique way to examine entry from Local Loop Unbundling (LLU) that permits entrants to use last mile facilities of incumbents, and ultimately to examine quality of service and competitive effects from cable presence.

The researchers assemble quality data from users to calculate quality, adjusted for plan type, by local exchange. They find that in the initial period of LLU, broadband penetration increased substantially, however this impact did not continue in later years. Penetration was increased, including in the long-term, by cable competition with the telecom provider. This could suggest the benefits of LLU are outweighed, in the long-run, by the benefits of facilities-based competition. Having said this, the LLU competition did increase the quality of service, however, and the higher quality was entirely on the entrant lines.

Evaluation and other questions to address

The paper performs a detailed analysis of the UK market and finds benefits from the existence of LLU regulation for speed, though not for penetration. Regulators could benefit from further work to compare the impacts. A cross-country approach would be particularly helpful for informing the debate about the appropriate regulatory approach to encourage both investment and penetration.

NERA (2019), 'A comparison of the performance and efficiency of public- and privately-owned energy networks', report commissioned by SSE.

Relevance

The paper is overwhelmingly about the impact of ownership - whether public or private - and discusses only in passing the impact of independent regulation on the performance of energy networks.

Summary

This paper is seeking to answer the question of whether privately owned energy networks deliver better performance than ones which are state-owned. It does this through: (1) an examination of the performance of the privatised networks in the UK, (2) analysis of some general international evidence, and (3) case studies of Australia and Germany. These latter two countries are characterised by a mixture of publicly and privately owned networks and, in the case of Germany, by some re-municipalisation of hitherto privately operated networks.

The report suggests that each set of evidence supports the case that privately owned networks perform better than publicly owned ones, whether in respect of operating costs, prices, levels of investment or quality/reliability of service.

Evaluation and other questions to address

The paper pulls together quite a bit of evidence from a variety of sources to support its central conclusions. Nevertheless, two questions arise:

- The paper suggests that the international data "indicates that effective independent regulation is central to ensuring that the private management of utilities results in positive outcomes for customers". However, it is interesting that the Edwards and Waverman 2006 paper (reviewed here) suggests that, in the specific area of telecom interconnection rates, ownership makes little difference in the presence of independent regulation (this begs the question of whether it is easier to have independent regulation when the state is not conflicted by ownership of the regulated utilities in question). Florio and Florio 2013 (reviewed below) suggests that, across the EU15 as a whole, it is *public* ownership which has been more effective in holding prices down to domestic consumers.
- The conclusions on remunicipalisation in Germany are somewhat weaker than some of the other conclusions: "remunicipalisation has failed to achieve the anticipated improvements in price and performance" - possibly implying that the remunicipalised networks have at least held on to the efficiencies realised when they were in private hands. The section on Germany also notes that "we find no discernible differences in service quality between predominantly privately and publicly-held companies".

Overall, these two findings suggest two possible conclusions. First, renationalisation might not necessarily lead to renationalised companies going backwards on performance, especially if supported by independent regulation. Second, the German evidence could be seen as consistent with the other papers

which downplay the role of ownership per se, relative to other factors like genuinely independent regulation.

Parker, D. (2004) "The UK's privatisation experiment: the passage of time permits a sober assessment." CESifo Working Paper no. 1126.

Relevance

This research is particularly relevant to the question of the relationship between competition and regulation, as well as consumer impacts.

Summary

This paper examines the nationalisation experience of the UK, summarising studies that have examined performance changes in privatised companies in the UK and seeking to derive general conclusions from the assembled evidence. The paper broadly concludes that ownership in and of itself may not be key to economic performance, finding that the main impact of privatisation would come from first, increased competition and, failing that, good regulation. The conclusion is not that privatisation has no impact however. The paper notes that the preparation for privatisation and the subsequent reduced financial stake of government in the industry could both create more efficient production (particularly as companies improved their performance prior to privatisation) and that governments would then be less inclined to prevent competition in the privatised industries, due to the lower financial stake in the outcome for government enterprises that might have benefitted from monopoly.

The paper focuses not only on the history of the financially most significant privatisations but also the broader history of de-nationalisation. Many of the privatisations did not involve public utilities and consequently did not involve subsequent regulation. For example, Rover's sale to British Aerospace (after British Aerospace's privatisation) is an example of a sale of a company that did not require regulation.

The Telecommunications Bill that privatised British Telecom included the creation of a regulator OFTEL, after the Office of Fair Trading had suggested that regulating BT using pure competition law would encounter difficulty, in light of the need for specialist telecommunications knowledge and a high workload.

Productive efficiency has been the most common focus of studies performed, with a preference for examining productivity and changes in cost of production, owing to the potential ambiguity in which profits can reflect higher prices or more efficient production.

Seminal studies finding the importance of regulation and competition for generating good results from privatisation include Martin and Parker (1997), Newbery and Pollitt (1997) and Domah and Pollitt (2001) that find substantial gains in social welfare, with some skew of gains to producers and government (from higher tax revenues and lower subsidisation). Littlechild (2000) finds that the decline in prices for domestic customers was 26% in real terms between 1990 and 1999, while that for industrial and commercial customers was 25-34 %.

In the water industry, Shaoul (1997) found that prior to privatisation, there were significant efficiency gains. Saal and Parker (2000, 2001) suggest that "lax regulation at the outset plus a lack of competition combined to keep efficiency incentives weak in the early years."

O'Mahoney (1998) compares productive levels between the UK and France, Germany, Japan and the US. She finds that productivity gaps narrowed, particularly in the late 1970s prior to privatisation. The main exception to the lowering of charges in privatised utilities was in water, in which real prices for water rose 40% in real terms for average unmetered bills, arguably necessary in order to fund large improvement programmes after "years of underinvestment by the state sector and to meet the requirements of EU water quality regulations."

The impacts on charges reported above are average results that may not emphasise differences for different groups, with the distribution of welfare gains in different groups addressed in Hancock and Waddams Price (1995), Waddams Price and Hancock (1998), Markou and Waddams Price (1999), Florio (2004) and Waddams Price and Young (2003). While state ownership was associated with uniform pricing and cross subsidies, privatisation would lead to prices more associated with marginal costs of serving different groups. UK regulators have generally accepted the need for removing the cross subsidies, to make price signals less distortive. The beneficiaries are often large customers, with lower marginal costs, who would receive larger reductions in price than poorer consumers who may be more costly to serve (NAO, 2001). "It has not proved possible for regulators to separate the pursuit of economic efficiency from the social consequences of their actions (Baldwin and Cave, 1999). Florio (2004) suggests that the public sector net wealth fell substantially after privatisation, due to under-pricing, and suggests this was not counter-balanced by the likely fiscal dividend from lower subsidies and taxes on profits.

One key result of the privatisations has been regulation that improved and popularising of certain tools, "most notably the price cap" (Littlechild, 1983; Parker, 2002).

Evaluation and other questions to address

The wide-ranging review of research on privatisation focuses on the period that is perhaps most relevant for evaluating the possible productivity effects related to privatisation. The results of the studies may have been affected by technical change, particularly for electricity and telecommunications.

Parker, David (2009), 'Official History of Privatisation', Volume 1 Chapter 16 pages 438-440 and Volume 2 Chapter 18.

Relevance of the book excerpts

These are excerpts from what is the official history of privatisation and, as of now, the standard work on the subject. As regards the relevance to the question of the impact of the UK regulatory model, the excerpts relate to, in particular, the independence of regulators in the UK, the original core rationale for independent regulation in terms of underpinning investment in the privatised utilities and, perhaps less relevant to UKRN's specification, the overall impact of privatisation more generally on different aspects of the UK economy (although, in trying to assess the effectiveness of regulation, one needs to identify the extent to which effects are attributable to other factors, like ownership).

Summary

Pages 438-440 provide a very brief summary of various points about economic regulation in the early days of privatisation in the UK (Volume 1 covers the period up to 1987). Key points in this summary are:

- the core rationale for independent regulation "that continued regulation by Government department would deter investors". This is a point which Parker had made much earlier in Volume 1, where he documents the impact of the influence of the advice of Kleinwort Benson (the Government's financial advisers) in relation to the flotation of BT;
- the perceived success of Bryan Carsberg (at OFTEL) and James McKinnon (at OFGAS) in establishing the independence of their agencies;
- the effect of privatisation in removing the conflict of interest between Government as owner and Government as regulator;
- the judgement that it was unlikely that competition in telecoms and gas would have developed as quickly as it did if BT and BGC had stayed in state hands (and this judgement relates to a period where competition in the telecoms and gas industries had barely begun, when viewed from later).

Noteworthy points in Chapter 16 of Volume 2 include:

- the new duties on regulators imposed by the Labour Government (not least through the Utilities Act 2000);
- a fairly nuanced assessment of the impact of privatisation:
 - clear impact on the pay of senior managers in the privatised utilities;
 - less clear impact on workers and on productivity, although acknowledgement that clear productivity improvements in some industries in the run-up to privatisation may well have been stimulated by the prospect of privatisation.

This qualified assessment is summed up thus: "On balance, it seems fair to conclude that the strident claims of ministers during the 1980s and 1990s about the benefits of privatisation were exaggerated and the true picture is more of a mixed one."

Evaluation and other questions to address

Parker's book is primarily a work of history (and a much praised one), based on documentary evidence and interviews. It is not, in the main, an economics book nor a

quantitative book (its assessments of the impact of privatisation are mainly high-level and qualitative). It is largely about the process of privatisation, the decisions made and the reasons for those decisions. However, one of the key points (the main reason why independent regulation was adopted, in the face of some opposition within Government) - i.e. the importance of independent regulation to investors - has obvious relevance to any continuing assessment of that model, at least as long as the industries in question remain in the private sector (and potentially beyond that).

Rand Europe (2012), 'Ofcom: the Effectiveness of Converged Regulation', Rand Technical Report.

Relevance

The report is focused on regulatory outcomes (in five areas). As such it is highly relevant to the fundamental question posed of whether the UK regulatory model is producing desired outcomes. In terms of the UKRN's particular focus, the RAND report focuses explicitly on five case studies which cover specific aspects of investment, competition and consumer protection.

Somewhat reducing the relevance of the report is that Ofcom regulates a rapidly developing area. The Rand report was published in 2012 and already feels quite dated.

Summary

The report covers Ofcom's performance in five areas:

- Next Generation Access Networks (NGAN), i.e. fibre-based broadband access. In this area, the report contrasts the UK's broadly market-led approach with the explicitly planned strategies followed by, for example, France and Sweden. Overall, the report judges that the UK has not been disadvantaged by this approach, but the report also worries that the market-led approach may lead to a growing digital divide between urban and rural areas. This seems highly relevant given current concerns about whether regulation is working for particular groups of consumers, as well as for consumers *on average*. Although, since the report the UK government has put in place a subsidy regime for rural broadband.
- Access via Local Loop Unbundling (LLU). Rand notes that the UK was relatively late in enabling LLU but that late adoption has worked well in terms of both broadband penetration and price (and in terms of the number of providers taking advantage of LLU). Rand worries more about the implications for longer term investment, not least in the context of reduced incentives to invest in infrastructure as a result of requiring third parties to be able to access that infrastructure.
- Access to emergency services over voice-over internet protocol (VOIP). Rand judges that Ofcom had performed well in planning for emergency access over VOIP and notes that its approach has been followed by the European Commission.
- Spectrum planning for the 2012 Olympics. The Olympics had not yet happened when the report was written but Rand comments that Ofcom has "learned where possible from previous Games"
- Management of mobile mis-selling. Rand judges that UK has done better than other countries and has successfully reduced the problem at a time when some other countries had not even accurately defined or measured the problem.

Evaluation and other questions to address

The paper's strength is that it focuses on five areas which were important for wholesale and retail consumers (and citizens) at the time that the report was written. In terms of the areas of interest to UKRN, Ofcom clearly gets high marks at that time in areas like *overall* broadband access and price, access to emergency services over VOIP and the policing of mobile mis-selling.

It also highlights some issues which are still important, including:

- the question of whether a market-led approach will deliver for all consumers and not just for the generality of consumers - not least, the question of rural broadband and a digital divide between urban and rural areas (or even between different urban areas);
- protection against mis-selling in a relatively cutthroat market like mobile.

Against this, some things would seem to have moved on somewhat since the report was written. For example:

- facilities-based competition has become more important in broadband, at least in urban areas;
- various Government policies have sought to increase investment in rural broadband.

Probably the biggest single question posed by the report is whether a market-led approach will deliver for all consumers at a time when political and regulatory debate is becoming more focused on whether the current regulatory model work for particular groups of disadvantaged or vulnerable consumers, although, the report only considers this issue in terms of the potential digital divides between geographic areas.

Saal, D. and D. Parker (2001) "Productivity and price performance in the privatised water and sewerage companies of England and Wales", *Journal of Regulatory Economics*, 20(1): 61-90.

Relevance

This paper is relevant to productivity and price in UK water and sewerage over different periods of regulation.

Summary

The paper examines productivity and pricing since the privatisation of UK water and sewerage. The paper finds that labour usage declined, yet total factor productivity growth, as estimated from quality-adjusted output indices, has not improved since privatisation.

The paper further suggests that price performance indices have grown at higher rates than input costs. This is partly responsible for the increase in profits since privatisation.

One reason hypothesised for the relatively poor performance after privatisation is the limited real competition that has occurred, even if benchmark competition has been important.

Evaluation and other questions to address

The question is whether to focus on rates of change (growth) or levels, as total factor productivity is estimated to have improved substantially in the regulated era. There is no default reason to expect growth or rates of change to continue as they have. For example, a company reorganisation may yield an immediate improvement in productivity, but there is no default reason to expect continual productivity improvements after the first benefits. So the focus on growth in the presentation of the results may be questioned, particularly since this focus leads to an assessment that might be different from that focusing on levels.

Having said this, if technical progress is relatively continual, focusing on growth rates may be appropriate.

Profits after privatisation were a necessary condition for private sector to make major investments in the water sector, which were indeed made, with investment levels having increased substantially after privatisation. The question of whether overall profits were too high to motivate the needed investment is one that is structurally difficult to answer but continually merits review.

Tutton, T. (2019) "Political control of state-owned utilities in the UK" (mimeo)

Relevance

This paper is relevant for its analysis of the role of independence by regulators in achieving desired outcomes.

Summary

A key message of this paper is the continuing relevance of, and need for, independent bodies (called 'regulators' or something else) to sit between ministers and the utilities. The paper focuses especially on the experience of nationalisation of network industries after WWII and through to the era of privatisation.

The interesting point that arises is that the initial rules that led to running companies with boards that were populated by civic-minded people was not sufficient for generating all the needed technical and operational outcomes.

As a result, regulators continue to have a role in a world of state-owned industries, as indeed they currently do with Scottish Water and with Network Rail. Intermediaries between politicians and public companies help to ensure good outcomes and State owned enterprise operating efficiency.

Evaluation and other questions to address

The paper is primarily based on review of literature, not data analysis. It would be valuable to gather data from the pre- and post-nationalisation period to further test the hypotheses.