



**Economic
and Social
Research Council**

Rebuilding Macroeconomics Working Paper Series

Shapeshifting in UK Infrastructure Finance and the Limits of Regulation

ELISA VAN
WAEYENBERGE*
*SOAS University of
London*

KATE BAYLISS
*SOAS University of
London*

BENJAMIN BOWLES
*SOAS University of
London*

Working Paper No. 61

Date Published: 12. 05. 2021

<https://www.rebuildingmacroeconomics.ac.uk/publications>

National Institute of Economic and Social Research
2 Dean Trench Street, Westminster
London, SW1P 3HE

This Working Paper is issued under Macroeconomic Institutions Hub of the ESRC's Rebuilding Macroeconomics network. One or more of the authors of the Working Paper has received support from Rebuilding Macroeconomics or been an active participant in its research hubs and events.

Rebuilding Macroeconomics is funded by the UK's Economic and Social Research Council (ESRC). Our aim is to transform macroeconomics back into a policy relevant social science. We bring together scholars of from many disciplines, policy makers, representatives of civil society and interested members of the public. We are particularly interested in interdisciplinary research and bringing new methods into macroeconomic analysis.

Working Papers may include preliminary or incomplete work and they are circulated to encourage discussion and comment. Citations and use of such papers should take this position into account.

* Corresponding author: ew23@soas.ac.uk

Shapeshifting in UK infrastructure finance and the limits of regulation

Working Paper submitted to Rebuilding Macroeconomics

Elisa Van Waeyenberge, Kate Bayliss, Benjamin Bowles

April 2021

Executive Summary

This Working Paper presents findings from research by an interdisciplinary team, across anthropology and political economy investigating the financing of infrastructure in the UK. The research was funded by the Institutions Hub of the Rebuilding Macroeconomics (RM) Network and focuses on infrastructure, as an important element of macroeconomic policy-making. In our analysis, infrastructure financing policy serves as an index for understanding the role of the state, beyond the narrow prism offered by traditional macroeconomic analysis. This allows to reveal a blind spot of mainstream macroeconomics in its failure to situate financialisation as core to contemporary state-economy relations, with important analytical and policy implications. The project started in May 2019 and formally concluded in October 2020 (although this working paper reflects on policy developments since then).

The project was initiated in response to the UK government's withdrawal of the established private infrastructure financing instrument, the Private Finance Initiative (PFI) (and its short-lived successor, PF2) which had been an important tool to draw private finance into (new) infrastructure assets, particularly in the health, defence, education and transport sectors (HM Treasury 2019). We scrutinise the dynamics bearing on the redefinition of the UK infrastructure financing landscape as policymakers indicated their desire to come up with new institutional options to crowd in private finance (HM Treasury/IPA 2019). Our aim is to draw attention to the way in which underlying economic, financial, political and cultural realities affect infrastructure financing policies, practices and outcomes.

As such, the project seeks to make sense of the changing contours of the UK's infrastructure financing policy landscape and to examine whether new forms or "instrumentalities" of private finance in the UK have emerged (or are emerging), as tensions in their original (UK) forms have become increasingly apparent, emblematically – but not solely – with the abandonment of the PFI (and PF2) for new "ostensibly public" (Langley 2018) infrastructure investments. In the context of the Institutions Hub of the RM Network, we have a particular interest in understanding the cultures of expertise that prevail as the infrastructure financing landscape is redesigned and to examine how these cultures interact with changing norms and practices in (private) infrastructure finance. Our analysis bears relevance beyond the UK as different forms of private finance in infrastructure have been increasingly promoted in global policy spheres (Bayliss and Van Waeyenberge 2018; Gabor 2021a; G20/OECD 2020; World Bank 2020).

This Working Paper makes a set of points. First, it highlights how a particular institutional order that had been carefully crafted since the late 1980s/early 1990s came up against a set of contradictions leading to the demise of PFI/PF2 in 2018. Second, since the demise of PFI/PF2, there has been a lack of clarity regarding the government's preferred governance framework for private financial involvement in new infrastructure assets across sectors. At the same time, and third, the paper reveals how this (policy) state of flux has not prevented core private sector players from

strengthening their position in the UK's private infrastructure landscape, as they seamlessly shift their involvement from one sector to another despite a poor track record in the sectors from which they migrate. Fourth, this is facilitated by bespoke institutional arrangements crafted by policymakers strongly committed to maintaining private finance at the heart of the UK's infrastructure financing landscape, as was the case for the creation of a new ("greenfield") complex infrastructure asset like the Thames Tideway Tunnel (see Loftus and March 2019; Bowles et al. forthcoming). Fifth, these arrangements tend to put regulation at the heart of the way in which private finance is drawn into infrastructure. Yet, and sixth, we point to a set of fundamental inadequacies (or impossibilities) of the regulatory framework within which financialised infrastructure takes shape, as this remains focused on a narrow set of sectoral performance indicators. Regulatory interventions in practice fail to limit the full extent of rent capture by private finance as it roams the terrain of essential service provision. Finally, these regulatory inadequacies tie back to some of the fundamental tendencies of financialised capitalism in terms of the continuous search for opportunities for value capture through financial means (to the detriment of investment in productive activity). In the longer term, such tendencies risk further consolidating the conditions that underpin poor UK economic performance (including worsening inequalities and failures to invest in productive upgrading).

We make these points by focusing on the activities of a major UK infrastructure investor, the Australian investment bank, Macquarie. This company has an extensive global network of infrastructure investments and has been operating in the UK for several years including in both energy and water. The case study shows that the company has been adept at extracting value for shareholders, often via complex offshore corporate structures, and we highlight the reasons why such financialised structures are problematic.

This brings us to the role of the state, notably the economic regulators in water (Ofwat) and energy (Ofgem), and their intersections with the extractive practices of financial investors. Regulation does not take the form of static external rule-setting but is constantly changing in response to activities of investors as well as political imperatives and is also reflective of changing norms and practices. Attempts to curtail the activities of investors result in increasing regulatory intervention. Even then, it is not clear that consumers can be insulated from the extractive practices of global finance, and we argue that this fundamental shortcoming of regulation cannot be overcome simply by seeking to address certain conditions, such as information asymmetries.

In conclusion we reiterate that there is obviously a clear need for large-scale investment to address the multiple challenges that face the UK, including the urgent decarbonisation of the economy and persistently low productivity. This is widely recognised. Our inductive and qualitative political economy analysis, however, draws attention to concerns regarding the heavy reliance on private finance in attending to these major infrastructure challenges in the context of late-stage financialised capitalism. These include equity issues as well as the watering down of direct state authority (and strategic direction) in infrastructure investment practices. In the end, with infrastructure finance in the UK as a nexus of conflicting interests, the question of where is the public interest remains open and infrastructure financing an imbroglio of unsolved oversight problems.

1 Introduction

1.1 The issues

Against the backdrop of the Covid-19 pandemic and its dramatic threats to economic life in the UK, the Prime Minister, Boris Johnson, announced on 30 June 2020 A New Deal for Britain.¹ He promised to rebuild the country and fuel recovery across the UK and use the Covid-19 crisis to “tackle the country’s great unresolved challenges of the last three decades”. He set out ambitious plans to build homes, fix the NHS, tackle the skills crisis and “mend the gap in opportunity and productivity and connectivity between the regions of the UK”. The UK government was going to build back “better, greener, faster”. To that purpose it was going to accelerate infrastructure investment across the UK by “cutting down the time it takes to develop, design and deliver vital infrastructure projects”.²

“Project Speed” came on the back of an ambitious Spring Budget (March 2020) which promised the largest investment in infrastructure for decades, pledging record amounts in roads, railways, broadband, housing and research, to add up to £640 billion over the next five years and for net infrastructure investment to reach triple the average of the last forty years in real terms by the end of the current Parliament.³ In June 2020, the Infrastructure Project Authority (IPA) published a pipeline of infrastructure projects of between £29 billion and £37 billion to be implemented (described as “to be brought to market”) during the next year. In July 2020, as the UK economy recorded its largest quarterly drop in output (for Q1 of 2020) since 1979, the Chancellor added Coronavirus “bounce-back” investments to the total value of £5 billion, earmarked for transport, schools, housing and other key infrastructure across the country. In November 2020, the long-promised National Infrastructure Strategy (NIS) was finally released and the creation of a UK Infrastructure Bank (UKIB) was announced.⁴ The Spending Review 2020 provided £100 billion of capital investment for the next year, a £27 billion real terms increase compared to 2019/20.⁵ And, for the occasion of the March 2021 budget, Build Back Better (HM Treasury 2021) re-asserted the delivery of historic levels of infrastructure investment.

These proclamations follow previous government pledges on infrastructure, including the publication of a first National Infrastructure Plan in 2010, the creation of a National Infrastructure Commission in 2015, and a £600 billion ten-year infrastructure pipeline set out in 2018. But, while recent announcements evoke images of large spending envelopes on infrastructure, they do not

¹ See Press Release, Prime Minister’s Office “Build build build: Prime Minister announces New Deal for Britain” 30 June 2020, <https://www.gov.uk/government/news/build-build-build-prime-minister-announces-new-deal-for-britain>

² And putting actions to words, a few weeks after the announcement of Project Speed an Acceleration Unit was created in the Department for Transport, the Department benefiting from a large share of reinvigorated infrastructure drive (see “Acceleration Unit set up to ‘unblock’ infrastructure projects”, Construction News, 21 August 2020, <https://www.constructionnews.co.uk/civils/acceleration-unit-set-up-to-unblock-infrastructure-projects-21-08-2020/>).

³ “Budget 2020: What you need to know” HM Treasury, 11 March 2020, <https://www.gov.uk/government/news/budget-2020-what-you-need-to-know>

⁴ This highlights the institutional gap once access to the European Investment Bank (EIB) disappears in a post-Brexit landscape – including in support of the Government’s (regional) “levelling up” agenda. It responds to explicit calls by the House of Lords Select Committee for a National Infrastructure Bank, see <https://publications.parliament.uk/pa/ld201719/ldselect/ldecom/269/26903.htm>

⁵ See Spending Review, December 2020, <https://www.gov.uk/government/publications/spending-review-2020-documents/spending-review-2020>

necessarily translate into public expenditure commitments.⁶ Indeed, currently, roughly half of the UK's infrastructure investment (and stock) is privately financed and it is expected that private finance will remain at the heart of UK infrastructure financing, especially in light of the fiscal response to the pandemic. With the public deficit estimated possibly to reach 18 percent of GDP in 20/21, its highest level in over 300 years (excluding periods of war), and public debt (at just over £2 trillion) in excess of 100 percent of GDP for the first time since the early 1960s,⁷ the Chancellor has started to talk about the "hard choices" ahead,⁸ reclaiming the Conservative Government's "sacred responsibility to future generations to leave the public finance strong".⁹ This will have significant implications in terms of how the government delivers on its infrastructure pledges. The Confederation for British Industry (2020, p. 5) puts this clearly:

While the UK government's commitment to delivering infrastructure remains undeterred, it is important to note that the country's fiscal position has substantially worsened as a result of the Covid-19 crisis. In this context, the private sector has a key role to play in helping to bridge the funding gap needed to deliver the government's infrastructure vision ... While businesses welcome this commitment to infrastructure delivery in the UK and across the world, the scale of the finance required highlights the critical role that private sector investment will have to play if this gap is to be filled, and if the UK government is to successfully implement its ambitious infrastructure agenda.

Indeed, the NIS, finally released in November 2020, reveals a persistently strong commitment to private finance at the heart of the government's infrastructure pledges: "The government remains strongly committed to supporting private investment and maintaining the UK's status as a leading global destination for private investment" (HM Treasury 2020a, p. 68). This follows on from a longstanding commitment to private finance in infrastructure in the UK, in particular since the early 1980s, when the country embarked on widespread privatisations (see Helm 2013). As a result, the UK has one of the largest shares of private finance in infrastructure across its OECD peers and plays a

⁶ For instance, projections released by the Infrastructure Project Authority (IPA) for infrastructure spending for the 2020/21 financial year include a significant proportion to be financed by the private sector (like earmarked private investment in water infrastructure as part of the PR19 determinations), see <https://www.gov.uk/government/publications/national-infrastructure-and-construction-procurement-pipeline-202021>

⁷ While borrowing is at its highest peacetime level, it is contracted on very cheap terms with negative yields on 10-year gilts and debt interest as share of tax revenues standing at a 320 years low (OBR 2020). Lazard (2020) draws on Blanchard (2019) referring to the "anesthetic effect" of near-zero interest rates. See also: <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/publicsectorfinance/bulletins/publicsectorfinances/july2020#the-impact-of-the-coronavirus-on-the-public-finances>

⁸ "Rishi Sunak commits to strong public finances and warns of 'hard choices'", Financial Times, 5 October 2020, <https://www.ft.com/content/fde4b931-6cd9-4cb2-8cec-89b3ac876b88?desktop=true&segmentId=d8d3e364-5197-20eb-17cf-2437841d178a#myft:notification:instant-email:content>. This comes on the back of a

tumultuous year for the government in terms of deciding whether there should be new fiscal rules and if so what form these should take – after the former set of rules had been formally abandoned and Sunak's predecessor, Sajid Javid, was removed as he tried to insist on some form of fiscal discipline early on in 2020.

⁹ See also the 2020 Spending Review (updated 15 December 2020): "The increase in borrowing and debt over the near term to fund the spending at SR20 is both necessary and affordable. It is the government's responsibility to ensure that the next generation will inherit a strong economy backed by sustainable public finances and that the country will continue to have the space to fund vital public services and prepare for future shocks. Therefore, over time, and once the economic recovery is secured, the government will take the necessary steps to ensure the public finances are on a sustainable path. In the meantime, the government will continue to make responsible spending decisions that do not make that process harder than it needs to be". Available at: <https://www.gov.uk/government/publications/spending-review-2020-documents/spending-review-2020>

prominent role in promoting private finance in infrastructure globally (ONS 2017; Grice 2016; HM Treasury 2020a).

Yet, the UK private infrastructure financing landscape has recently seen significant disruption. Across sectors, the models that have dominated UK private infrastructure since the 1990s have encountered important challenges. First, in late 2018, the Chancellor announced the end of the PFI and its short-lived successor, PF2, for new investments (mainly in social infrastructure) (HM Treasury 2018a) following extensive critique of the model, including high associated costs (NAO 2018a; NAO 2020).¹⁰ The PFI/PF2 had been an important tool to draw private finance into (new) infrastructure assets, particularly in the health, defence, education and transport sectors. Second, early 2019 saw the suspension of work at three planned nuclear power plants as Japanese companies withdrew from the projects.¹¹ This followed botched attempts by the government over the last decade to lever international private finance to launch a new nuclear programme, resulting in massive budget overruns and delays at Hinkley Point C – the only new nuclear power station currently under construction.¹² The investors who withdrew cited lack of government clarity on what the funding model of new nuclear plants would look like.¹³ Third, a string of “ostensibly public” services have been taken back into government ownership. In mid-2019, the probation services were renationalised after massive failures of its chaotic part-privatisation in 2015 which had put “public safety at risk”.¹⁴ In June 2018, the East Coast railway line was taken into public ownership (to be joined by the Northern Rail franchise in early 2020 – implying that for the first time since railway privatisation more than thirty years ago, two franchises were in government hands). This preceded de facto nationalisation of the railways as a result of the Covid-19 emergency measures.¹⁵ Mid-March 2021, the government announced a review of England’s bus network, deregulated since 1986,¹⁶ and a few weeks later, Andy Burnham, mayor of Manchester, announced the city’s intention to bring its buses back under public control upon his much-anticipated re-election.¹⁷ Finally, for the networked utilities that are privately financed, high rates of leakage and pollution sit alongside

¹⁰ 2018 had been particularly tumultuous for PFI/PF2 with the collapse, in January 2018, of Carillion, an important player in the PFI world, and a report by the House of Commons Public Administration and Constitutional Affairs Committee (July 2018) emphasising that the advantages of PFI/PF2 remained unproven (NAO 2020, p. 15).

¹¹ “Mind the gap: Challenges for future UK energy policy”, House of Commons Library, 29 January 2019, <https://commonslibrary.parliament.uk/science/energy/mind-the-gap-challenges-for-future-uk-energy-policy/>

¹² “Hinkley Point C” NAO Report, <https://www.nao.org.uk/report/hinkley-point-c/>; see also more recently on a further increase in construction cost and a further delay in the expected completion date: “Hinkley Point C nuclear power station cost rises by £500m”, Financial Times, 27 January 2021, <https://www.ft.com/content/fbc43de5-d3ae-49fd-9f5f-9e84f1db508d?desktop=true&segmentId=d8d3e364-5197-20eb-17cf-2437841d178a#myft:notification:instant-email:content>

¹³ “Hitachi preparing to pull out of nuclear project in blow to UK climate ambitions”, Financial Times, 15 September 2020, <https://www.ft.com/content/1a079f1e-6cfe-4d27-ab8f-df3b5b93e198?desktop=true&segmentId=d8d3e364-5197-20eb-17cf-2437841d178a>; see also <https://www.placenorthwest.co.uk/news/horizon-pulls-wylfa-nuclear-plans/>

¹⁴ “Probation service to be re-nationalised from 2020”, The Parliamentary Review, 17 May 2019, <https://www.theparliamentaryreview.co.uk/news/probation-service-to-be-re-nationalised-from-2020> and “Probation services renationalised after chaotic privatisation”, Financial Times, 16 May 2019, <https://www.ft.com/content/c5935758-7730-11e9-bbad-7c18c0ea0201>

¹⁵ “ONS recognises full nationalisation of the UK railways”, 31 July 2020, <https://www.ft.com/content/1baa6b50-47ba-416e-b172-90a77a34c19d>

¹⁶ “Boris Johnson to announce £3bn shake-up of England’s bus network”, Financial Times, 15 March 2021, <https://www.ft.com/content/4f29e936-a08f-4ceb-ac6a-25337d287db4>

¹⁷ “Thatcher’s legacy put in reverse by new plans for buses”, Financial Times, 30 March 2021, <https://www.ft.com/content/40be7f5c-5e60-4c3a-abaa-31825e7de5d9?desktop=true&segmentId=d8d3e364-5197-20eb-17cf-2437841d178a#myft:notification:instant-email:content>

excessive executive pay and shareholder dividends in the water sector,¹⁸ while in the energy sector, companies running transmission and distribution networks have made considerably higher than expected profits.¹⁹

In response to these challenges, since early 2019, the UK government has commissioned multiple reviews (HM Treasury/IPA 2019; BEIS 2019; DfT 2018). Our research engages with this moment of policy flux and tries to make sense of the evolving contours of the UK's infrastructure financing policy landscape. It examines whether new forms or "instrumentalities" of private finance in the UK are emerging, as tensions in their original forms became increasingly apparent. Our aim is to open up the black box around infrastructure financing policy to consider how does this come about and whose interests prevail, and to examine implications of different financing modes of infrastructure investment. These findings have relevance beyond the UK given the strong promotion of private finance in infrastructure in global policy circles (Bayliss and Van Waeyenberge 2018; Gabor 2021a; G20/OECD 2020; World Bank 2020).

The specific questions animating the research project are:

- What drove the demise of PFI?
- How do newly emerging forms of infrastructure financing address or move away from shortcomings that have surfaced most emblematically in the context of PFI/PF2?
- In the context of mutations or shifts in the infrastructure landscape, whose interests prevail, and to what effect: who gains, who loses, why and how?

1.2 Political economy to rebuild macroeconomics

Within macroeconomics, over the last decade, there has been an important revival of interest in infrastructure, not least as part of the arguments around how to address "secular stagnation" (Summers 2013; Perraton 2018).²⁰ Following the global financial crisis (GFC), there were intense contestations around the role for fiscal policy, with arguments coming to a head as the Covid-19 pandemic erupted. After nearly a decade of endless wrangling over the size of fiscal multipliers (Christiano et al. 2011; Coenen et al. 2010; Blanchard and Leigh 2013), debt overhang (Delong and Summers 2012) and whether or not the benchmark models, with Ricardian Equivalence at their heart, are useful in appraising fiscal policy (Wren Lewis 2016), the pandemic put fiscal policy centre stage. The scale of the fiscal policy response to the pandemic surpassed the response to the GFC and has not been witnessed since World War II across the capitalist core countries. Low interest rates (and hence cost of fiscal policy) have become explicitly embraced by policymakers as providing the

¹⁸ "England's water companies receive worst pollution ratings for 8 years", Financial Times, 2 October 2020, <https://www.ft.com/content/e1de2f77-0cea-42a7-8344-038bcc6a532e>

¹⁹ "UK electricity and gas networks making 'unjustified' profits", Financial Times, 12 July 2017, <https://www.ft.com/content/cd179a4e-6629-11e7-8526-7b38dcaef614>

²⁰ See, also for instance, "Debate: Providing infrastructure investment in a post-COVID-19 economy", McKinsey, January 2021, <https://www.mckinsey.com/business-functions/operations/our-insights/debate-funding-infrastructure-investment-in-a-post-covid-19-economy>, for a recent summary restatement of Summers' arguments around the role of infrastructure investment in recovery efforts, once more relevant in the context of the post-Covid19 agenda.

rationale for fiscal policy efforts (Blanchard 2019). As clearly stated by a member of the European Central Bank's Executive Board:²¹

fiscal policy has become more important as a macroeconomic stabilisation tool. When natural rates are low and policy rates are constrained by the lower bound, a more accommodative fiscal policy is needed to lift the economy out of a low-growth, low-inflation trap. The current pandemic crisis is a case in point. Fiscal expansion is indispensable at the current juncture to sustain demand and mitigate the long-term costs of the crisis. Monetary policy can complement these efforts. But by itself, it may not be sufficient to stabilise the economy. This is all the more true if different sectors, or regions, of the economy are affected in different ways.

And again (ibid):

secular trends have changed the interaction between fiscal and monetary policy. Years of weak aggregate demand and a reduction in conventional monetary policy space on the back of the long-term decline in the real natural interest rate have made fiscal policy more important, and more effective, as a tool of macroeconomic stabilisation.

Within macroeconomic theory and practices, infrastructure is conceptualised from within the fiscal policy frame, with a strong emphasis on its multiplier effects. The analysis is often conducted in quantitative terms, with an interest in the implications of additional infrastructure investment for levels of output and employment. More meso-type analyses take this further in attempts to understand the interactions between infrastructure investments and productivity (see Dymski 2020). Our own intervention, which draws on political economy traditions, proposes a different approach to reveal particular complexities around infrastructure financing and its implications. Infrastructure policy and practices are not just a matter of how much (infrastructure's quantitative dimension as an additional source of demand creating employment and output), but also of what (infrastructure's links to productivity and growth), and, crucially of how (capturing processes of financing and delivering infrastructure) and with what effect (who gets access to what and on what terms).

The limitations of macroeconomic understandings of infrastructure have been illustrated by other disciplines. Anthropologists Appel et al (2018, p. 2) insist: "infrastructure is a terrain of power and contestation". Infrastructure is a means by which political and social relations are articulated. Contrary to traditional macro understandings, infrastructure, and the financing thereof, is never politically neutral or simply "technocratic." Decision-making regarding its policy and practice effectively and inevitably promotes some interests over others. For geographers, infrastructure relates to spatial dimensions, and the flows that are created by physical assets, of which financial flows are one form (Pike et al 2019). This combines with a rich literature across disciplines (beyond economics) on the financialisation of infrastructure that has sought, among other things, to draw attention to political economic realities of financialised infrastructure provision, including examination of the implications of who owns, controls, manages, prices and governs infrastructure for: conditions of access to it (Pike et al. 2019; O'Neill 2010; Hebb and Sharma 2014; Allen and Pryke 2013; Desai and Loftus 2012; Bayliss et al. 2020); socio-technical interactions (Mazzucato and Semieniuk 2018; Webb 2019); and discursive and cultural shifts in policymaking (Langley 2018).

²¹ Speech by Isabel Schnabel at the Centre for European Reform and the Eurofi Financial Forum, Berlin 11 September 2020, <https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200911~ea32bd8bb3.en.html>, but see also Gabor (2021b) for a more nuanced interpretation of the interactions between monetary and fiscal policy in late stage financialised capitalism.

We propose an interdisciplinary political economy analysis that focuses on the structures, agents and processes of public provisioning to unpack issues pertinent to infrastructure financing and the cultures and norms they give rise to (who gets what, under what conditions, with what effect etc.). Our own analysis is informed by an understanding of private infrastructure finance as a contested field where the objectives and priorities of investors may diverge from those of the state, which may be different again from those of consumers. For example, while ultimately all parties can benefit from the construction of a power plant, the details of the financial flows over the project lifetime have distinct implications for the different agents involved in the process. Such a perspective allows for an appreciation of the challenges and tensions that the state faces in attracting private investment in a way that meets social needs. This understanding draws on the Systems of Provision (SoP) approach, which, originally developed by Fine and Leopold (1993) and reviewed in Bayliss and Fine (2020), allows to highlight how the systems or chains of provisioning around infrastructure in the UK, and hence the different financing arrangements to which these give rise, are in part constituted by different agents with contested and competing interests.

In our analysis, infrastructure financing policy then serves as an index for understanding the role of the state in a qualitative sense, beyond the prism offered by traditional macroeconomic variables. This allows to reveal a blind spot of macroeconomics in its failure to situate financialisation as core to contemporary state-economy relations. Indeed, the broader (financialised) realities within which infrastructure financing policy takes form, have important implications for the way in which infrastructure policy proceeds, is delivered and takes effect. Pike et al. (2019, p. 3) neatly articulate that how infrastructure is owned, run and funded, reflects the nature of the national political economy, particular variegated forms of capitalism (in particular in its financialised forms), and the “state’s settlement with its citizens and its commitment – or lack thereof – to the common weal of collective provision”.

1.3 Context, process and methods

Our research draws on inductive and qualitative methods that draw attention to real-world developments and relationships that are relevant for macroeconomic outcomes. This Working Paper joins another publication (Bowles et al forthcoming) in which we elaborate further on the interdisciplinary practice of our approach.

Our research unfolded in the most tumultuous political and economic circumstances the UK witnessed in decades. In one year, we saw multiple votes of no confidence in a sitting government, stalling Brexit negotiations, a change of Prime Minister, an election, Brexit, three Chancellors, a pandemic, the onset of a recession, and the deployment of monetary and fiscal policy tools on scales not seen in peace time (see Bailey 2020). Furthermore, the government’s response to the IFR as well as the government’s long-promised NIS was much delayed and delivered more than a year overdue in late November 2020. This was complemented by the release, late 2020, of a flurry of other relevant government documents, including a response to the consultation on RAB for Nuclear (BEIS 2019), the long awaited Energy White Paper (HM Government 2020), and an Interim Report by the Treasury on Net Zero (HM Treasury 2020b). Thus, our original work programme was disrupted by a turbulent period of infrastructure financing. However, our inductive approach led us to move forward by addressing the issues that emerged as areas of importance as our research progressed, driven by the SoP framing of contestations between agents.

Our analysis is the result of interdisciplinary inference across different forms of data and evidence, including 24 semi-structured interviews with key stakeholders from the infrastructure financing world, drawn across investors, government staff, consultants, academics and NGOs.²² These took

²² Our meetings were mostly held under the Chatham House Rule.

place between May 2019 and September 2020. We also attended four large infrastructure events. In addition, we consulted a large swathe of policy documents, newspaper articles, industry press, and an infrastructure financing database (IJGlobal).

1.4 Structure of the WP

The structure of the Working Paper reflects the project's core concerns, inspired by the Systems of Provision approach. Our overall aim was to consider private finance from the political economy perspective of contestation among agents. Hence there are three broad sections to this Paper. In Section 2 we consider the perspective of the state in the form of high-level policy. Section 3 looks in detail at the operations of an example private investor and Section 4 turns to the role of the state as economic regulator.

In more detail, Section 2 starts, in Section 2.1, with an overview of the different governance forms in the UK private infrastructure financing landscape. This is followed, in Section 2.2, by an account of the demise of PFI and, in Section 2.3, a review of recent government proposals with regard to infrastructure financing. We demonstrate how, despite obvious failings, the government repeatedly attempted to save the PFI, and we argue that, when the latter efforts failed, the government instead shifted to promoting governance modes of private finance in infrastructure that move away from tax-funded private financial interventions in the delivery of "ostensibly public" services in favour of customer-funded private financial involvement in infrastructure (as currently prevail in the water and energy sectors). Thus, the demise of PFI/PF2 can be seen as a shift from state-funded to state-facilitated (and customer funded) private financial involvement in infrastructure, rather than any broader reorientation away from private finance in infrastructure. The overarching policy imperative remains to look for solutions that keep infrastructure off the government's books but without the visible attributes of the much-documented flaws of PFI, most significantly in terms of its fiscal risks. This policy stance persists despite the dearth of evidence supporting private over public finance in infrastructure and ambiguities regarding what constitutes "Value for Money" (VfM). It also puts regulation at the heart of the infrastructure financing landscape despite its multiple challenges.

Section 3 takes these issues forward in the context of a case study investigation focused on an important agent in the UK private infrastructure finance landscape, Macquarie. This company has an extensive global network of infrastructure investments and has been operating in the UK for several years in energy, water and other sectors. The case study shows that the company has been adept at extracting value for shareholders, often via complex offshore corporate structures, and we highlight the reasons why such financialised structures are problematic. Section 4 turns to the role of the economic regulators in water (Ofwat) and energy (Ofgem) in curtailing extractive practices of financial investors. Regulation is continually changing in response to activities of investors as well as political imperatives and is also reflective of changing norms and practices. Attempts to restrict the (dysfunctional) activities of investors draw in increasing regulatory intervention. Even then, it is not clear that consumers can be insulated from the extractive practices of global finance, and we argue that, in the context of late-stage financialised capitalism, this fundamental shortcoming of regulation cannot be overcome simply by seeking to address certain conditions, such as those perceived to be informational asymmetries. Section 5 concludes by highlighting the ways in which our political economy approach reveals the continuing contradictions that remain lodged within the UK government's commitment to maintaining a central role for private finance at the heart of UK infrastructure.

2 Farewell PFI. What next for infrastructure finance in the UK?

Across the globe (although particularly so in Europe, Australia and the Americas) infrastructure (has

been and) is being transformed into a financial asset, with revenue streams from relatively low risk and financially secure operations entering into the speculative world of global financial capital. Academic research in this field ranges from water in California (Pryke and Allen 2019) to a Brussels airport (Deruytter and Derudder 2019) railways in India (Bear 2020), roads in Australia (McManus and Haughton 2020), social care in Britain (Bayliss and Gideon 2020) and housing in different parts of the world (Aalbers 2016) – to name just a few. Infrastructure has become a generic “asset class”, which means that, for investors, it can be understood in terms of an income stream decoupled from the underlying social relations and materialities of provisioning (see O’Neill 2019). O’Neill (2013, p. 451) lays out clearly how:

Infrastructure has been increasing the subject of a range of financialisation processes, but in unique ways ... Thus, airports, motorways, telecommunications, electricity grids and water supplies are no longer just a city’s passages for the flow of people, objects and energy. They have become arterial routes in the circulation of finance and, in turn, leverage-able assets in a territorial competition for access to globally mobile financial capital ... Put another way, privatised urban infrastructure items have become the means for the capture and (re)distribution of surplus values generated elsewhere, while competing for consumption expenditure in the same urban markets where they are expected to ensure the efficiencies of the daily flows and connections of a city and the long term territorial growth of the markets of its domestic enterprises.

The state is acknowledged as an architect and facilitator of infrastructure financialisation, for example, in the way that revenue streams and property rights are created and protected (Ashton et al. 2012; O’Neill 2013; O’Brien et al. 2019).

While infrastructure financialisation is a feature of footloose global capital, the ways in which the state creates the context for infrastructure financialisation is highly (nationally) localised. Deruytter and Derudder (2019, p.1351) cite Engelen et al (2010) who argue that:

national institutional frameworks do not merely function to alter, resist, or mediate the effects of financialization but, rather, have a constitutive role to play in the mutual interaction between global markets and local financial change and hence determine the shape that financialization takes in different political economies.

For Whiteside (2019), infrastructure is much more than bricks and mortar or an asset class for institutional investors. She points to the importance of linking infrastructure financialisation to social relations (p. 1481):

To ignore the social relations associated with urban infrastructure financialisation is to decapitate capital through reference to finance without agency or class, exonerated from gendered and racialised structures of power, dialectical relations, the imperatives of production and social reproduction and the inter-generational politics of public infrastructure. Studies of infrastructure financialisation offer opportunities to probe the burdens/benefits of debt and infrastructure commitments by following the money and charting the social relations within investor categories and creditor relations.

The UK has been something of a pioneer in engaging private finance for infrastructure with an evolving set of mechanisms and approaches, reflecting changing institutional parameters and shifting social relations. The next section provides an overview of the different governance forms that characterise the UK private infrastructure financing landscape, highlighting some of the main issues that these raise. This is followed by an account of the way in which the UK government has remained strongly committed to maintaining private finance at the heart of its infrastructure

delivery – despite multiple challenges. This is evidenced, first, in Section 2.2, through an account of the various ways through which the government initially sought to save the PFI, and, subsequently, in Section 2.3, through a critical appraisal of the main tenets of the recent proposal that have emerged in response to various government consultations on the role of private finance across infrastructure sectors.

2.1 Private infrastructure finance in the UK: An overview

The Infrastructure Finance Review (IFR) (HM Treasury/IPA 2019, p. 7) reminds its readers that:

the UK's market for private investment in infrastructure is one of the most developed in the world, and this has attracted high levels of investment. For example, in the water sector, companies have invested more than £150 billion in the last 30 years. In energy, by 2020 there will have been around £80 billion of private investment in energy networks over the same period. Last year, half of all new operational offshore wind capacity in Europe was in the UK, almost all of which was privately financed.

This is reasserted in the recently published NIS (HM Treasury 2020a, p. 67, original emphasis): “**The private sector plays a vital role in achieving the UK's infrastructure ambitions.** Much of UK's economic infrastructure is privately owned, with almost half of the UK's future infrastructure pipeline forecast to be privately financed”.

Infrastructure has certain features that affect the nature and impact of financing policies. For example, infrastructure usually is on a large scale requiring significant up front funding that generates economic and social returns that accrue over years, maybe decades. In addition, there is a strong social element to infrastructure provision as it is usually monopolistic and often provides essential services. Typically, private capital seeks profitable investor opportunities. To draw such funds into infrastructure, then, the state needs to shape policy to create a framework whereby the investor is assured of recouping investment costs and making a reasonable return.

Private infrastructure investments often serve a social as well as a commercial purpose so there is a strong state involvement in the design, governance and/or financing of investments (see O'Neill 2019). A key challenge for the state is to balance the needs of investors with those of consumers and society more generally. Hence, the models that have evolved reflect variations on the core themes of creating an attractive investment climate, with stable, predictable revenue streams that also serves the social interest. PFI, then, is one (since discredited) infrastructure financing mechanism – where the private sector provides up front finance largely for social infrastructure to be repaid over decades. Other governance models for private infrastructure finance essentially reflect variations in approaches to balancing the tensions between the needs of investors and the social interest.

An alternative private finance governance structure is “Contracts for Difference” (CFD) which has been used to attract private investment into renewable energy in the UK. Under CFD, a renewable energy producer sells power at an agreed “strike price”, the level of which is determined by auction. This is a guaranteed price to be paid to wholesale generators. Any difference between the strike price and the market-determined wholesale price is either paid to generators by the state or, if the wholesale price is above the strike price, the excess is paid by generators to the state (via the government-owned Low Carbon Contracts Company which administers the scheme). This mechanism then substitutes the potentially volatile market mechanism of the wholesale electricity price for an effectively fixed price to ensure a stable revenue stream for investors for a 15-year period. These commitments are ultimately met by consumers via payment of bills.

CFD was explicitly designed “to crowd in institutional investors (pension, wealth, insurance funds) on the basis of easily calculable cash flows” (Hall et al 2018, p.775) and this new subsidy system was developed in the UK through the Energy Market Reform and Enabling Energy Act 2013 (see Hall et al. 2018). Hall et al. (2018, p. 775) emphasise how:

this form of finance is highly intermediated which makes it very hard to connect funding to finance and therefore trace who is making decisions about investments in energy, what their aims and goals might be, and how these might affect energy system transformation or justice outcomes. It also tends to be very exclusive because of the scale of investment needed. This means that decisions about what to invest in are not transparent, and negative inter-generational equity impacts are experienced because it is impossible to benefit from direct energy investment without holding individual money capital of several hundred thousand pounds.

This draws attention to the justice implications of these kind of capital mobilisations in the energy sector. Polzin et al. (2017) denounce the “financial monoculture” that has emerged as a result of the financialisation of energy policy and how this “further exposes energy transitions to boom and bust investment cycles in the wider financialised economy” (Hall et al. 2018, p. 773).

Another alternative model for involving private finance in infrastructure is the Regulated Asset Base (RAB). RAB is designed to incentivise capital infrastructure investment. The revenue generated from the asset (typically the price charged) is negotiated between the private provider and the state and is linked to the value of the regulated asset. In this way, the investor is assured of a return on capital investment. And these returns come from end users rather than from tax payers. The state becomes a facilitator rather than a direct funder under this model of infrastructure finance. This model is currently used to finance water networks in England and Wales and gas and electricity distribution networks in Britain. The RAB model was also used for the first time for a *new* complex infrastructure asset in the Thames Tideway super sewer project (see Loftus and March 2019; Bowles et al. forthcoming), and is being considered as a model for financing new capacity in nuclear energy (BEIS 2019; BEIS 2020; see Section 2.3).

While PFI/PF2 was abandoned, formally on the grounds that it created a “fiscal illusion” and fails to provide value for money (see below), private finance flourished in other sectors, including renewable energy (see CEPA 2017). Private finance in these sectors has taken more “invisible” forms as it proceeds on the basis of governance arrangements, like the RAB and CFD, that do not depend on long-term tax-funded payments to private investors but instead rely on state facilitation of revenue capture. The way in which these alternative governance and financing arrangements offer “value for money” (VFM) are more opaque and difficult to unpack than for traditional PFI schemes.

The Treasury Green Book describes VFM as whether a project will deliver social value in terms of costs benefits and risks (HM Treasury 2020c, p. 52). Projects are required to deliver verifiable and measurable objectives. The National Audit Office (NAO)²³ uses four criteria to assess the value for money of government spending (i.e. the optimal use of resources to achieve the intended outcomes): Economy, Efficiency and Effectiveness and Equity. In contrast, for companies regulated by the RAB model, attention to VFM appears to be much weaker. Ofwat, in its regulation of private water and sewerage providers in England and Wales, conflates VFM with affordability and goes

²³ “Assessing value for money” National Audit Office, <https://www.nao.org.uk/successful-commissioning/general-principles/value-for-money/assessing-value-for-money/#>

further to interpret affordability on the basis of whether people perceive that their bills are affordable rather than through objective assessment (Ofwat 2017, p. 18):

Affordable, value for money bills, both now and in the future: To deliver this companies will need good customer engagement on overall affordability both now and in the long term, and to develop effective measures to identify and help vulnerable customers and those who struggle to pay their bills. We expect all companies to include a clear strategy for supporting customers in vulnerable circumstances as part of their plans.

And later (p.37):

Customers must feel confident they are receiving affordable, value for money services both now and in the long term. So, getting the best deal and service for customers is at the heart of what we do.

In the energy sector the regulator, Ofgem, places faith on the system of price controls to ensure value for money for consumers (Ofgem 2019, p.4). There is an assumption that setting price limits will drive efficiency and that this will result in VFM. But this approach is about perceptions and affordability rather than an objective assessment of whether the costs incurred are efficient, effective or equitable in achieving outcomes. It is unlikely that an objective assessment of the RAB model in water and energy provides VFM in the sense of the four Es specified by the NAO above.

Critics have pointed to inflated shareholder returns in privatised utilities. In the energy sector, returns made by network companies have been highlighted by the consumer watchdog Citizens Advice reporting in 2017 that the companies had been allowed to make “eye watering profits at the expense of households (Wild 2017). In the water sector, high rates of leakage and pollution sit alongside excessive executive pay and shareholder dividends (Bayliss and Hall 2017).²⁴ As discussed at length in Section 3 below, the entry of financial investors and financialised structures in the provision of infrastructure providing essential services has led to a major transformation in the way in which financial flows are managed. Since the 2000s, some investors have developed complex corporate mechanisms to boost shareholder distributions in opaque ways that are beyond the control of regulators and which are funded from end users, many of whom struggle to pay their bills. Section 3 indeed shows how one major infrastructure investor, Macquarie, has carved a niche in UK infrastructure, blazing a trail of revenue extraction from UK infrastructure in ways that are highly innovative and which have raised strong criticism, but which sit neatly within the boundaries of regulation. Before we move on to the case study, however, we demonstrate how, despite mounting evidence on the various failures of private infrastructure finance, the UK government has remained strongly committed, over the decades, to its promotion. This is evidenced, first, by drawing attention to the government’s multiple (but ultimately unsuccessful) attempts to save PFI (Section 2.2), and subsequently, in terms of how the government’s navigation of the (current) contradictions in the private finance infrastructure landscape reveals a compass strictly pointing in the direction of private finance (Section 2.3).

2.2 The slow demise of PFI/PF2

This section demonstrates that while PFI/PF2 was ultimately abandoned by the UK government for new investments in November 2018, this followed the government’s repeated attempts to keep the scheme going, despite mounting evidence of its manifold shortcomings. PFI was introduced in the UK by the Conservative government in 1992 and was significantly expanded under the Labour

²⁴ “Water regulators taken to task in damning report by MPs”, Financial Times, 10 July 2020, <https://www.ft.com/content/20683c8b-b02c-4294-a9cf-1ca5d45e01dd>

government from 1997.²⁵ It is a form of procurement in which a group of private investors manage the design, building, financing and operation of public infrastructure. The public sector does not own the asset but leases it from private investors over a period of 25 to 30 years. The initial project finance is provided by the private sector using a combination of debt and equity (Booth and Starodubsteva 2015). The NAO (2018a, p. 6) explains the difference between PFI and conventional public procurement:

The fundamental difference between conventional public procurement and PFI procurement for capital investment relates to which party raises finance for the asset's construction ... In conventional procurement the private sector is still involved (private contractors build the asset) but the public sector provides the finance. When the public sector procures an asset using PFI, a private company – a Special Purpose Vehicle (SPV) – is formed and it raises finance from debt and equity investors to pay for construction. Once the asset is constructed and available for use, the taxpayer makes 'unitary charge' payments to the SPV over the contract term, usually 25 to 30 years. This charge includes debt and interest repayments, shareholder dividends, asset maintenance, and in some cases other services like cleaning. These payments will be agreed at the start of the contract and some or all of them will be linked to inflation.

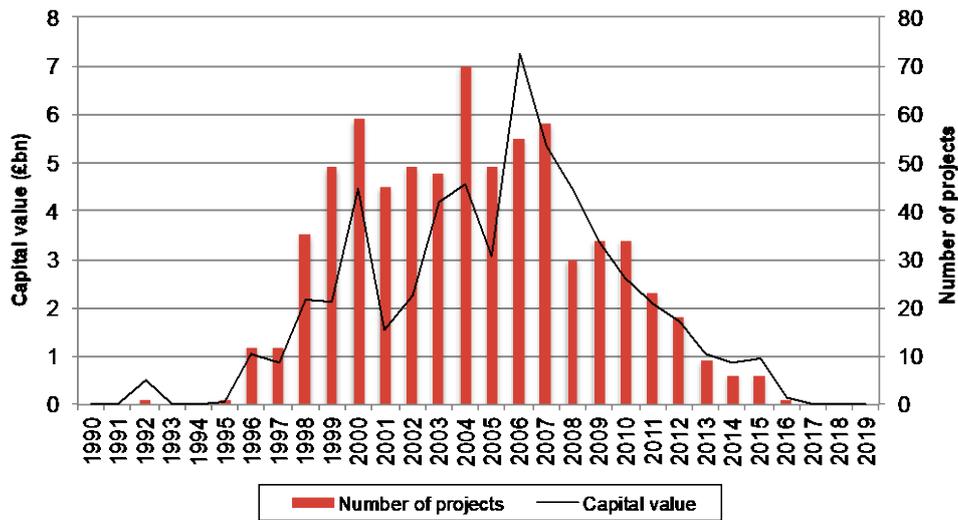
The supposed advantages of PFI include efficiency gains in the delivery of a project ("procurement of innovation – higher quality and better-maintained assets"; improved operational efficiencies); transfer of risk to the private sector ("construction risks better managed by the private sector: on-time, within budget"); and finance as PFI does not increase the debt/GDP ratio, as it is off-balance sheet for National Accounts purpose (NAO 2018a, p. 11).²⁶ The effect of PFI is to turn capital outlays that would otherwise be financed through government borrowing into "current expenditures on the books of public authorities" (Mercer and Whitfield 2018, p. 4).

As Figure 1 below documents, the UK witnessed the very fast rise of the use of PFI as a procurement mechanism between 1997 and 2007 before investments tailed off.

²⁵ More exactly, UK Treasury introduced the possibility of PFI in 1989 when removing the "Ryrie-Rules" – which had discouraged private financing of public sector projects and when it announced that additional privately financed investment would be allowed in roads. In 1992, the use of PFI "was extended to other sectors and the name 'PFI' was used for the first time" (NAO 2018, p. 8).

²⁶ Note that Gordon Brown introduced the "sustainable investment rule" in 1998 which limited public sector net debt to 40 percent of GDP (Mercer and Whitfield 2018, p. 4). Mercer and Whitfield (2018, p. 4) observe that it "is questionable whether the total impact of capital spending on PFI, had it been financed through government borrowing, would have breached this limit".

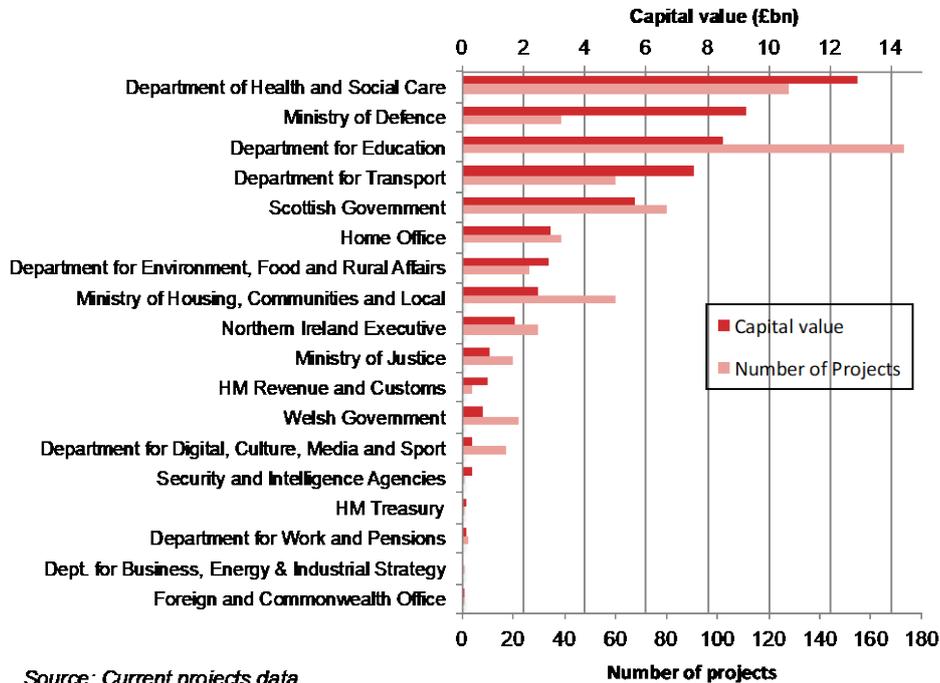
Figure 1: Portfolio of current PFI and PF2 projects – number and capital value by year of financial close



Source: HM Treasury (2019, p. 6)

Figure 2 shows that PFI has been deployed mainly across the following five sectors: Health, Defence, Education, Transport, Scottish Government. Together these account for 75 percent of total PFI capital value (see also Booth and Starodubsteva 2015, p. 5).

Figure 2: Portfolio of current PFI and PF2 projects – number and capital value by department



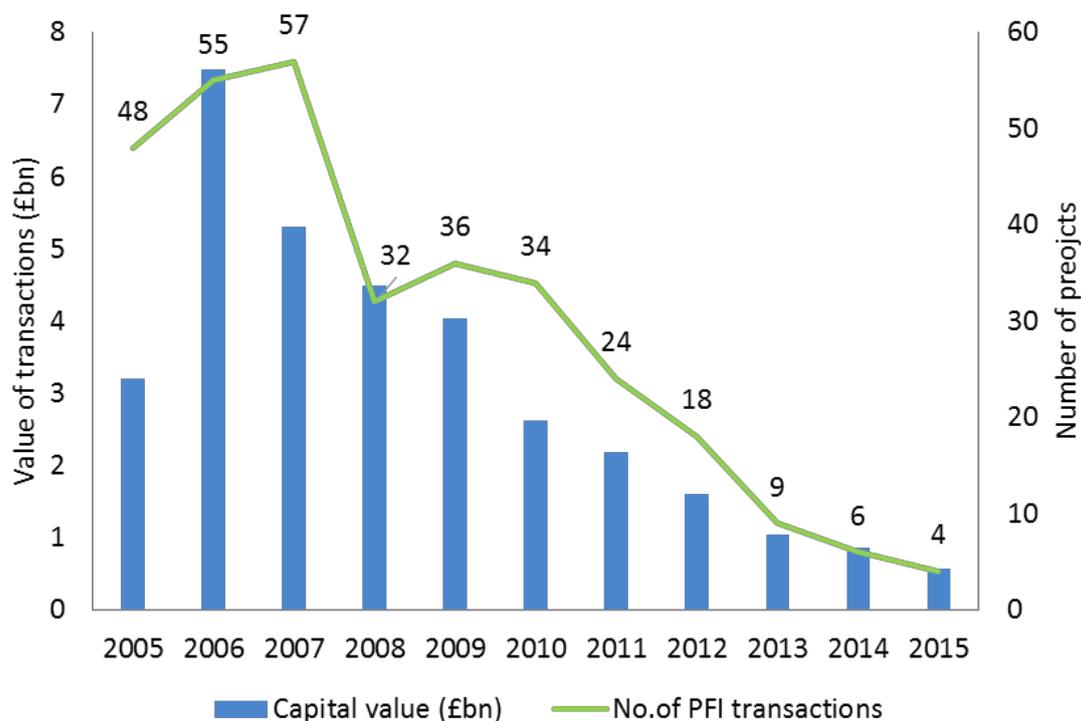
Source: Current projects data.

Source: HM Treasury (2019, p. 6)

At its highest point, PFI represented around 15 percent of gross public investment. Its use, however, considerably declined, both in terms of capital value and number of transactions, after the onset of the GFC (see Figure 3). There are various reasons for this decline (see NAO 2018a), but importantly, the financial crisis had significant negative implications for the financing costs of PFI as lending costs

for long-term debt increased in the wake of Basel III, at the same time that less finance was available (see Booth and Satrodubtseva 2015).²⁷

Figure 3: UK PFI projects to reach financial close (£bn)



Source: CEPA (2017, p. 10).

In the wake of the GFC and displaying a strong commitment to private finance, the government set up a co-lending facility, the Treasury Infrastructure Finance Unit (TIFU) within the Treasury (in 2009) “with the intention of lending to PFI projects on the same terms as commercial lenders in the event that insufficient private sector lending was available” (see Farquharson and Encinas 2010, p. 1).²⁸ The Infrastructure Finance Unit was subsequently (in 2010) merged with Partnerships UK, to form Infrastructure UK, which was formally tasked with identifying new sources of private sector infrastructure investment, including from institutional investors.²⁹ In 2012, a UK Guarantees Scheme was created to avoid further delays to investment in UK infrastructure projects that could have stalled because of adverse credit conditions. The scheme provided sovereign backed guarantees to assist projects in accessing finance,³⁰ and (further) signalled attempts by the government to attract

²⁷ See Farquharson and Encinas (2010) for an account of the changes in the market conditions for private finance for infrastructure in the UK following the GFC. See also NAO (2010).

²⁸ “This scheme provided a £120 million loan to complete a £582 million waste treatment and power generation project in Manchester but supported no other projects” (NAO 2015, p. 13 footnote 4). A few years later, in 2015, local authorities terminated this 25-year PFI agreement due to its rising costs, see “Greater Manchester councils have spent £500m buying out the failing Viridor waste and recycling contract”, Manchester Evening News, 13 June 2018, <https://www.manchestereveningnews.co.uk/news/greater-manchester-news/greater-manchester-councils-spent-500m-14774022>

²⁹ In 2015, Infrastructure UK was merged with the Major Projects Authority to form the Infrastructure and Project Authority (IPA).

³⁰ The UK Government Guarantees Scheme was created through the 2012 Infrastructure (Financial Assistance) Act. “Under the Scheme, the Treasury guarantees that lenders to infrastructure projects will be repaid in full and on time, irrespective of project performance. The Scheme transfers project risk to government and ultimately the taxpayer, in return for a fee”, see NAO (2015).

institutional investors in infrastructure financing (NAO 2015, p. 5).³¹ While the Treasury initially intended the Guarantees Scheme to be a temporary intervention (until 2014), it became institutionalised as part of the different modes of support to private investment in infrastructure.³² The scheme issued unconditional and irrevocable guarantees to the lenders to infrastructure projects guaranteeing that scheduled interest and principal payments will be paid in full irrespective of project performance (NAO 2015).³³

These attempts to offer support to private finance in infrastructure via PFI happened against the backdrop both of increased concerns regarding PFI and a renewed commitment of successive governments to upgrade the country's infrastructure. This renewed official interest in infrastructure was signalled by the publication of a series of National Infrastructure Plans starting in 2010 (see also Langley 2018), yet it coincided with deep public expenditure cuts, leading to a strong role for the private sector in projected infrastructure plans (see above). With regard to PFI, concerns included high financing costs of PFI (as compared to public procurement), questionable value for money assessment, the impact of rigid contracts, high returns for investors and financiers (including through windfall gains from refinancing or other financial engineering techniques), high unitary charges for long periods of time, the fiscal risks implied by PFI ("fiscal illusion", NAO 2018a, p. 12), etc.³⁴ The financing model was crippling for some public institutions. Estimates indicate that PFI will eventually cost the NHS £80bn for just £13bn worth of assets (Thomas 2019).

Despite growing awareness of its major shortcomings, multiple attempts to save the initiative resulted in a relaunch of PFI in December 2012, in a revised form called PF2. While the Chancellor had initially intended to end future use of PFI (see NAO 2018a, p. 35), a call for evidence regarding its reform sought to find a way forward from the continued criticism of the PFI model, such as the higher private financing costs and the uncertainty in the PFI market (NAO 2018a, p. 34).³⁵ The PFI reform was to identify a model that would be less expensive, broaden the range of financing sources to include such investors like pensions funds, to allow for greater flexibility, and provide cheaper and faster procurement and greater financial transparency (NAO 2018a, p. 36). It is important to note that "in 2012, HM Treasury considered ... the option of bringing all historic PFI debt onto the government's balance sheet and including PFI investment in departmental capital budget". The option was however rejected "in part because of the perceived risk that the UK's credit rating would be downgraded". The Treasury wanted "to ensure that PF2 continued to provide an off-balance sheet investment option".

³¹ Helm (2013, p. 298) observes how "[In] the developments of infrastructure policy in recent years there has been a focus on encouraging private finance, notably from sovereign wealth funds and pension funds. This emphasis has put the cart before the horse: the problem is not one of quantitative constraints on the flow of funding but rather the nature of the risks of infrastructure investment and the failure to close the gap between the public and private cost of capital".

³² The original extension of the scheme, in 2013 until December 2016, was deemed necessary "to accommodate renewable energy projects associated with the government's Electricity Market Reforms" (of 2013) (NAO 2015, p. 7). See Hall et al. (2018) for a critical account of the trajectory of private finance in energy in the UK.

³³ In terms of cost to the government, the NAO (2015, p. 10) noted that "Investors in government guaranteed debt usually receive a higher return than on government gilts even though the credit risk is the same (this reflects that guaranteed debt is less easily tradable than government gilts, reducing its attractiveness to some investors). The Treasury assumes guaranteed debt will typically be priced at 0.5% above gilts, although it has achieved better results when the debt has been competitively auctioned. Based on the use of the Scheme to date and the expected take up until it closes, the illustrative extra cost through using guarantees as opposed to direct lending could be between £35 million and £120 million a year, with and without Hinkley Point C".

³⁴ See Bayliss and Van Waeyenberge (2015) for a review of the various concerns with PFI.

³⁵ The coalition government had cancelled some PFI projects in the 2010 Spending Review creating some market uncertainty.

PF2 kept the core features of PFI unchanged in that: “the private sector finances, builds and maintains an asset and the public sector pays an annual fee for 25 to 30 years” (NAO 2018a, p. 36). One of the intentions for change had been to impose higher levels of equity in project finance (20 to 25 percent) and lower levels of debt in PF2 and to encourage institutional investors to invest in PFI debt (and reduce debt costs).³⁶ Neither of these intended changes materialised (NAO 2018a, p. 36). Projects under PF2 remained financed with high levels of debt (in the region of 90 percent) and “no pension funds or new investors have invested in PF2 debt”.³⁷ The main differences with PFI, in practice, included public sector equity stakes (typically 10 percent of the equity), with a seat on the board for the public sector – represented by the IPA. The government hence became both an investor and a customer. The IPA however indicated that “there is no guarantee that PF2 equity stakes would not be sold in the future”, as had been the case with previous government stakes in PFI schools (NAO 2018a, p. 39).

Through PF2 the government initially also intended to address concerns regarding the high level of equity returns on PFI contracts. Options included a cap on returns, a restriction on the amount of equity that could be sold, an equity gain-share mechanism. These options were, however, rejected as Treasury deemed these would potentially reduce investor demand (NAO 2018a, p. 40). Furthermore, NAO (2018a) documents how attempts to increase the way in which the public sector can share in PFI/PF2 equity gains were limited as the overarching aim of the Treasury remained to keep PFI recorded off the government’s balance sheet, despite Treasury’s awareness that these measures could have a negative impact on the value for money of PFI/PF2 projects.

In the end, notwithstanding the multiple attempts to save PFI and to draw in alternative types of investors (in particular institutional investors), the number and value of new PFI/PF2 projects dwindled. In October 2018, on the back of the House of Commons Public Accounts Committee’s denunciation, in July 2018, of the Treasury’s lack of data (after more than 25 years of deploying PFI) “on benefits to show whether the PFI model provides value for money” (HoC 2018, p.5),³⁸ the Chancellor finally abandoned PFI/PF2 for new projects (HM Treasury 2018a).³⁹

2.3 Private finance in infrastructure is dead. Long live private infrastructure finance!

Following the withdrawal of PFI/PF2 for new investments (and in the midst of the Brexit cacophony), the Chancellor used the 2019 Spring statement to announce the Infrastructure Finance Review (IFR) (HM Treasury/IPA 2019). This opened a consultation on how to move forward with private finance in infrastructure, or “on the future role of the government in ensuring that viable projects can raise the private investment they need” (HM Treasury/IPA 2019, p. 2). It displayed the government’s

³⁶ “PF2 will be structured in such a way that it: facilitates access to the capital markets, capitalising on the appetite of institutional investors and of other sources of long-term debt finance. Capital markets, whether public or private, have a deep pool of investors who are attracted to the relatively low risk infrastructure asset class ... Institutional investment will therefore become an important an important source of finance for PF2” (HM Treasury 2012, p. 11).

³⁷ See NAO (2018a, Figure 14) for a comparison between PFI, PF2 as originally intended, and PF2 as it panned out in practice.

³⁸ This was confirmed by the NAO (2018a, p. 18): “We have been unable to identify a robust evaluation of the actual performance of private finance at a project or programme level”.

³⁹ It should be noted however that the Infrastructure Project Authority (IPA) continues to play an important role in the promotion of PFI-like arrangements abroad. See e.g. IPA/FCO/HMT (2020) on guidance promoting the introduction of private finance in infrastructure, including transport for which “no direct evidence exists that PPP have resulted in improved VfM”, <https://www.itf-oecd.org/sites/default/files/docs/role-private-investment-transport-infrastructure.pdf>, p. 6.

commitment to private infrastructure finance (“We want to facilitate further private investment and involvement in infrastructure delivery”, p. 2), while highlighting its uncertainty regarding the specific forms this should take. Indeed, while half of the ambitious ten-year £600 billion infrastructure pipeline announced in late 2018 was to be financed and built by the private sector (IPA 2018), one of the important mechanisms through which private finance had previously been drawn upon for new investments (PFI/PF2) had now been abandoned. The government explicitly indicated that it was not looking for a “like-for-like” replacement of PFI/PF2 but sought to explore new ways of using private finance in its projects. Other modes of drawing private finance into infrastructure, like the Regulated Asset Base (RAB) model in water and energy networks, and Contracts for Difference (CfD) auctions in renewable energy were not the focus of the review, but respondents were asked whether “lessons from these existing tools could be applied to new contexts” (p. 4). The IFR was to conclude by Autumn 2019 and an expert panel was constituted to engage with the evidence that was gathered. The expert panel did not include any representation from consumer organisations, trade unions or academia and over half of its members were drawn directly from the investment community (see IJGlobal 18/7/19).

Furthermore, following multiple failures of the franchise model, a review of the railways was commissioned late 2018 by the Department for Transport (DfT 2018). Led by Keith Williams, the review would look at ways of refashioning the relationship between the public and private sectors, anticipating the formal end of the franchising system that had been in place since the mid-1990s (already enacted due to the emergency measures in response to the pandemic – see above).⁴⁰

By mid-2019, another government consultation was launched now focused specifically on whether the RAB model was to be expanded to nuclear energy. A few years earlier, the Treasury (in 2011) and the Prime Minister (Cameron) (in 2012) had considered extending the model to roads and flood defences, but the idea was dismissed on the basis of lack of clarity on what would provide the revenue stream on which the model could be based as well as affordability concerns for consumers (Helm 2013).⁴¹ Now, following the costly exposure of CfD financing for Hinkley Point C (Somerset) (NAO 2017a), the Treasury favoured the RAB model as a way to overcome the conundrum of financing new nuclear capacity, drawing heavily on the alleged success of the financing of the (greenfield) Thames Tideway Tunnel (TTT) as the first case of RAB financing for a complex single asset construction project (BEIS 2019).

The consultation would review “the viability of a RAB model as a sustainable funding model based on private finance, which could deliver the Government’s objectives in terms of value for money, fiscal responsibility and decarbonisation. Such a model should ensure taxpayers’ money could be invested in vital public services, while continuing to reduce public sector net debt” (BEIS 2019, paragraph 16).⁴² A RAB financing model of new nuclear power capacity would allow the government to access the “large volumes of private sector capital looking to invest in infrastructure projects” (paragraph 23). In particular, pension funds and insurers constitute “potentially a major source of the investment required to meet [the country’s] decarbonisation objectives” (paragraph 23). For

⁴⁰ “UK’s rail franchise system has ‘had its day’, review finds”, Financial Times, 16 July 2019, <https://www.ft.com/content/526028f2-a718-11e9-984c-fac8325aaa04>. The review has been repeatedly delayed and, at the time of writing, is running 18 months behind schedule (and has recently been renamed the Williams-Shapps Plan for Rail), “Williams rail review quietly renamed by DfT”, Railnews, 21 April 2019, <https://www.railnews.co.uk/news/2021/04/21-williams-rail-review-quietly-renamed.html>

⁴¹ For a cogent critique of these proposals in the context of roads, see Campaign for Better Transport (2012) Problems with private roads. How to get better value from public and private investment.

⁴² The consultation also indicated that the government was considering the suitability of a RAB model for other forms of “firm low carbon technologies”, such as carbon capture. “Firm” low carbon technologies refer to those that are not weather dependent.

nuclear projects to attract this finance, a “more typical infrastructure investment profile where investor exposure to risks and their returns are bounded” is necessary. A nuclear RAB model would possibly satisfy these requirements as new nuclear plants would be paid for, from the moment construction begins, through charges to customers’ energy bills – long before the new plant is up and running.

After multiple delays, late 2020 finally saw a flurry of government documents on infrastructure financing bringing some (but not all) of the above consultations to a close. The NIS was released (November 2020) and served as the government’s response to the IFR. This was accompanied, over the next few weeks, by a government response to the consultation on RAB for nuclear (BEIS 2020), the long awaited Energy White Paper (HM Government 2020) and an Interim Report by the Treasury on how to finance the transition to Net Zero (HM Treasury 2020b).

The government’s approach to private investment in infrastructure as laid out in the NIS (HM Treasury 2020a, p. 68) invokes three key principles: 1) the government commits to providing investors with long term “policy certainty” (including by co-investing alongside the private sector via the newly instituted UKIB); 2) the government pledges to maintain a “strong and enduring system of independent economic regulation” in support of investment levels that deliver “fair outcomes for consumers of today and the future”; and 3) it will continue to use “a range of policy tools and innovative funding mechanisms to embrace opportunities”. In this context, we saw the institution of the much-anticipated UK Infrastructure Bank (UKIB), which is to play a “leadership role in supporting private infrastructure projects” in the absence of the UK’s access to the European Investment Bank (HM Treasury 2020a, p. 70). More specifically: “The bank will co-invest alongside private sector investors including banks, institutional investors, sovereign wealth funds, pension funds and global infrastructure investors. It will use a range of tools to support private projects: as well as offering guarantees through the existing UK Guarantees scheme, it will be able to offer debt, equity, and hybrid products” (HM Treasury 2020a, p. 70).

However, while the NIS is big on general statements, it remains sparse on detail. Crucially, it does not signal that any new mechanism to draw in private finance in infrastructure is about to emerge, but instead we see the consolidation of a shift from state-funded to state-facilitated involvement of private finance, with regulation at the centre of this shift. Indeed, existing mechanisms that have “regulation” at their heart, like the RAB, are likely to be upscaled (including for complex new-built infrastructure assets). This chimes with the government’s response to the consultation on RAB for nuclear concluded late 2020, asserting the government’s belief that “a RAB in line with the high-level design principles set out in the consultation remains a credible basis for financing large-scale nuclear projects” (BEIS 2020, p. 20). As such, the government commits to exploring “a range of financing options with developers, including RAB”. At the same time, alongside RAB, the government “would consider the potential role of government finance during construction aligning with suggestions from some of the consultation responses, provided that there is clear value for money for consumers and taxpayers and subject to all relevant approvals” (ibid.)

The possible expansion of the use of RAB across sectors for new infrastructure projects, following the pilot of the Thames Tideway Tunnel, was much anticipated across the members of the investor community that we interviewed. One interviewee put this as follows:

“The RAB model is very attractive. What the RAB model does is basically ... it gives you as an investor the confidence that you will be able to make an investment and appreciate that investment over time and make a return on it, it’s a promise from the regulator, and it’s only as good as the regulator’s track record. Regulators have a good track record in the UK ... the RAB model, it is an attractive model for investment ... The RAB approach for Thames Tideway ... has been very successful ... So if

the government is willing to do that again on other projects, I'm sure that it will be attractive to investors, RAB is a good model" (Interview A, 6/08/2019).

Another one saw limitless possibilities:

"let's say prisons for instance. Could you have a RAB model? I don't intrinsically see why not, I don't intrinsically see why you couldn't have that with a hospital. The trouble is the revenue source is much less obvious, you know, so a reason for having a RAB model is because you've got a revenue source that is not central government" (Interview B, 15/08/2019).

When prompted to clarify that they were referring to a stable de-risked revenue source that is coming straight from consumers, the respondent continued:

"Exactly, so if you've got a RAB model where the revenue source is central government basically, you might as well say, well, why doesn't central government just pay for this? And so that's the issue with say hospitals, prisons, whatever. But ... in principle there's no particular reason why you wouldn't be able to do it with those. You could imagine a hospitals regulator or something like that, a sort of hospitals version of Ofgem set up for the hospital system".

Another respondent from the investor community emphasized that "in the current environment, I can't see any more private sector investment in taxpayer funded infrastructure ... But [there is] plenty of private finance and it has to go somewhere, hence investment into RAB and other places where the consumer pays" (Interview C, 3/06/2019).

The investors' community anticipation and enthusiasm for the migration of the RAB practice to new built assets and sectors is despite persistent criticism of the model (see Section 2.1 above), including as a funding model for new nuclear plants. Greenpeace's UK Chief Scientist, quoted in the Financial Times (22 June 2019), commented how: "The nuclear industry has gone in just 10 years from saying they need no subsidies to asking billpayers to fork out for expensive power plants that don't even exist yet, and may never".⁴³ The Infrastructure Investor, an industry magazine added (25 April 2019):⁴⁴

"Business Secretary Greg Clark promised the industry in January that the government would publish its assessment of the use of the RAB for new nuclear projects by summer at the latest. The model, which has been in utilities sector and for the greenfield TT 'super sewer' could help to attract investors that would otherwise be unlikely or unable to invest in nuclear power. Yet RAB is not the answer to every question. If anything, it's a dated answer to a dated question. Critics of the TT model, for example, would say that a structure that allows investors to gain returns via consumer bills before construction is complete illustrates the kind of risk imbalance that gives private infrastructure investment a bad name".

Furthermore, one of the great advocates (and architects) of the RAB model recently concluded that: "Looking ahead over the next 30 years, the current model is unlikely to prove fit for purpose" (Helm 2020, p. 83). For Helm (2020, p. 83), the performance of the privatised (water) sector had not been "unambiguously" better than would have been delivered publicly and a nationalised industry would at least "not have facilitated such widespread financial engineering; and the executive salary game would not have been permitted". Our next section takes these issues forward in great detail by looking more closely at the difficulties that regulation in the public interest against the backdrop of

⁴³ "New UK nuclear plants could be paid for upfront through energy bills", Financial Times, 22 July 2019, <https://www.ft.com/content/e2cf07ae-acaa-11e9-8030-530adfa879c2>.

⁴⁴ See also "How can we pay for new nuclear power stations", Financial Times, 9 September 2019, <https://www.ft.com/content/4b81682e-cf19-11e9-99a4-b5ded7a7fe3f>.

late-stage financialised capitalism. This is despite the government's repeated emphasis on "affordability" and "fairness" as important principles to govern decisions around financing and funding of infrastructure (including the transition to net zero) (see HM Treasury 2020b). This raises a whole set of issues – in particular around the purpose of regulation and the distribution of its benefits, which are explored in detail in Section 4 below, but first in Section 3 we consider the role of the private sector in infrastructure finance.

3 Macquarie: Charting the path of an innovative financial infrastructure investor

The model of private finance and its regulation in Britain's infrastructure is based on certain understandings of the behaviour of firms and of consumers and their interaction. The investor is seen as a benign force which provides long-term capital investment on which it earns a reasonable (but not excessive) return. The regulatory framework for networked utilities (water and gas and electricity transmission and distribution networks) is based on a system of price controls (RPI-X) which was originally designed for privatised telecoms in the UK in the 1980s (Beesley and Littlechild 1989). The regulator sets prices for a fixed number of years in advance (five years in the case of water) based on negotiations with firms regarding investment needs and performance against targets (i.e. the value of "X"). At the time of privatisation in the 1980s and 90s, this system was considered to be superior to that used widely in the USA, rate of return regulation where the state specifies the amount that shareholders can earn on investment. The UK approach, in contrast, was devised to encourage greater productivity and innovation. Firms would have an incentive to improve productivity as they were able to retain profits generated in the specific price control review period but these improvements would be revealed to the regulator and incorporated in subsequent price reviews and so eventually the benefits would reach the consumer in the form of lower prices.

However, policy makers in the late 80s and 90s, when companies were privatised by listing on the London Stock Exchange, had not bargained on the entry of aggressive and predatory financial investors in the 2000s who would work around the regulatory framework, creating innovative financial structures for value extraction, for which consumers will continue to pay for decades. Moreover, the narrow focus of regulation on the specifics of the prices of a single utility, means that the bigger picture of global infrastructure finance and the operations of transnational portfolios cannot be accommodated, as the case of Macquarie demonstrates.

3.1 Macquarie: the "millionaire's factory"

Macquarie is an Australian bank. The company operates an extensive range of investor funds. These vary across a number of dimensions: the fund may be closed or open ended (i.e. it has a fixed timeframe or continues rolling indefinitely), stakes in the fund are listed publicly (where shares in it are traded) or held privately; the fund may invest in listed securities or take equity stakes in assets or invest in debt (through Macquarie Infrastructure Debt Investment Solutions (MIDIS)); and funds may focus on specific sectors (such as infrastructure) and / or regions (such as the Macquarie European Infrastructure (MEIF) series of funds).

However, the essence of the investment relationship is that Macquarie holds funds for other investors that may be pension funds or wealthy individuals or smaller investment funds. These are packaged and engage in infrastructure financing via these different institutional forms. Such investment funds provide mechanisms for smaller institutional investors to access large infrastructure investments. But financial flows are difficult to trace, through complex corporate structures (for example with umbrella funds and subfunds). Finances are often channelled through operations located in offshore jurisdictions, routed through tax havens including Luxembourg,

Bermuda and Jersey (see for example Luxembourg-registered Macquarie Fund Solutions,⁴⁵ or Bermuda-registered Macquarie Atlas Roads International Ltd (MARIL)).⁴⁶

Macquarie operates in infrastructure across the globe. The company has a history of buying infrastructure that is under-leveraged. They then generate an early return on investments via debt refinancing, a technique applied in airports in Sydney and Rome. The company paid a high premium for a majority stake in Brussels airport. Following refinancing they paid out special distributions to shareholders, described as “returning equity to investors” while also paying fees to other Macquarie companies. Macquarie Airports promised investors a return of 13.9 percent (Deruytter and Derudder 2019).

Macquarie earns revenue from fees charged to investors and has a reputation for generating substantial returns. The company was described as the “millionaire’s factory” on account of the levels of executive pay and shareholder returns.⁴⁷ The company’s initial expansion into infrastructure investment in Australia in the 1990s led to it being dubbed “the bank that ate Sydney” in the Australian Press (Jefferis and Stilwell 2006).⁴⁸ The company share price has climbed steadily over the past five years, until the crisis at the start of 2020. In October 2019, shareholders in Macquarie were celebrating the fact that the value of shares increased by 126 percent over five years. The company managed to increase its earnings per share by 18 percent a year.⁴⁹

Macquarie has received high praise. In 2019 the company was awarded the “coveted” IJ Global award for Sponsor of the Year for the second year running due to “an impressive flow of transactions across the full 2019 calendar year, closing deals in all corners of the world” in part due to being “genuinely innovative and ground-breaking”.⁵⁰ But while the company has generated substantial profits, the methods by which these are generated have raised concerns. The company operates in the provision of essential services. Thus, to some degree these high returns and value increases are ultimately funded by taxpayers and households meeting basic needs. Such allocations raise fundamental questions of accountability and equity. Macquarie exemplifies the complex contestation that lies at the heart of private infrastructure financing. On the one hand, high returns, particularly to pension funds are desirable but, on the other, these are funded by households, many of whom struggle to pay their bills.

3.2 Macquarie in the UK

The Macquarie name is not well known in the UK, yet the company operates across numerous sectors, often providing essential services to millions of households. The company has had

⁴⁵ “Macquarie Fund Solutions” Financial Times Markets Data, <https://markets.ft.com/data/funds/tearsheet/summary?s=lu1274825196:eur>

⁴⁶ “Macquarie Atlas Roads International Annual Report 2016, p.16, https://www.atlasarteria.com/stores/_sharedfiles/Investor_Resources/Annual_Reports/mqa-annual-report-2016.pdf

⁴⁷ “Macquarie boosts executive pay despite warning on 2020 profits”, Financial Times, 3 May 2019, <https://www.ft.com/content/63608bb8-6d40-11e9-80c7-60ee53e6681d>

⁴⁸ See also: “MacBank launches \$300m bid for speed cameras through buying Redflex” The Daily Telegraph, 21 February 2011, <https://www.dailytelegraph.com.au/macbank-buys-up-speed-cameras-at-300m-through-buying-redflex/news-story/c38ad28f0ebb474c53c8d96573bf90d9>; and see also “Mac Bank buying up water”, The Daily Telegraph, 25 February 2007, <https://www.dailytelegraph.com.au/news/nsw/mac-bank-buying-up-water/news-story/dd0f1f444880c294bbe6b23a31768414>

⁴⁹ “Shareholders Are Thrilled That The Macquarie Group (ASX:MQG) Share Price Increased 126%”, Simply Wall St, October 7, 2019, <https://simplywall.st/stocks/au/diversified-financials/asx-mgg/macquarie-group-shares/news/shareholders-are-thrilled-that-the-macquarie-group-asxm-gg-share-price-increased-126/>

⁵⁰ Melville, A. (2020) IJGlobal Awards Winner – Global Sponsor Category IJ Global 17 July 2020

investments in rail, in roads, in airports, in social housing, in property as well as water and gas networks.

3.2.1 Macquarie in water

Macquarie's first move into Britain's water was when Macquarie European Infrastructure Fund LP bought South East Water for £386m in 2003. It was sold three years later to Westpac for £665.4 million in 2006. The utility's borrowing doubled between 2004 and 2006 as debt finance was raised through a Cayman Islands subsidiary (South East Water Ltd Annual Report and Accounts 2005).

Macquarie sold its stake in South East Water to be part of a consortium that bought Thames Water in 2007. Floated on the stock exchange in 1989 Thames was acquired by German utility RWE in 2001 and was then sold to a consortium of investors, Kemble Water, in December 2006. The consortium paid £5.1 billion for Thames, of which £2.8 billion came from Macquarie⁵¹ which had a 47.65 percent stake in Kemble Water. The Macquarie stake was held via six separate funds, some located offshore in Bermuda and Jersey. A public consultation before the takeover of Thames raised concerns regarding Macquarie's previous "asset stripping" of the UK's M6 Tollroad and South East Water but the position taken by the regulator was that capital structures and dividend payouts were market outcomes and any "tax efficiencies" would be passed through to customers in subsequent regulatory price reviews (Ofwat 2007).

Some ten years later when, Macquarie sold its final stake in Thames, numerous media investigations were critical of the company's activities. "This is Money" reported the sale of Thames with the headline "Vultures who left Thames Water with £10 billion of debt: Controversial Aussie bank Macquarie sells stake in UK giant".⁵² The Financial Times ran a lengthy article titled "Thames Water: the murky structure of a utility company"⁵³ and the BBC broadcast a radio programme titled "Macquarie: The tale of the riverbank"⁵⁴ in September 2017. Academics Allen and Pryke (2013, p. 424) highlight the "byzantine corporate structure where the significance of the revenues contributed and what happens to them are far from transparent" devised to turn Thames Water's households into revenue streams for investors. Macquarie's ownership of Thames is described as an "iconic example of a financialised water services provider" (Loftus and March 2019, p. 2288) introducing fundamental and long-lasting changes into the company's business model (Bayliss 2014; Loftus and March 2019; Allen and Pryke, 2013).

Under the ownership of the Macquarie-led consortium, the financing of Thames was revolutionised. The investor's practice of refinancing under-leveraged infrastructure pushed Thames to become highly geared. Company refinancing soon after takeover meant that part of the debt borrowed by investors to buy the investment (acquisition debt) was allocated to the regulated utility. The investor consortium, Kemble, had borrowed more than £2.8 billion to finance the £5.1 billion purchase of the water company in 2006. But with refinancing, via loans raised through a Cayman

⁵¹ "How Macquarie bank left Thames Water with extra £2bn debt" BBC News, 5 September 2017, <https://www.bbc.co.uk/news/business-41152516>

⁵² "Vultures who left Thames Water with £10bn of debt: Controversial Aussie bank Macquarie sells stake in UK giant". This is Money, 14 March 2017, <https://www.thisismoney.co.uk/money/markets/article-4313638/Vultures-left-Thames-Water-10bn-debt.html>

⁵³ "Thames Water: the murky structure of a utility company", Financial Times, 4 May 2017, <https://www.ft.com/content/5413ebf8-24f1-11e7-8691-d5f7e0cd0a16>

⁵⁴ "Macquarie: The Tale of the River Bank" BBC Radio 4, 5 September 2017, <https://www.bbc.co.uk/programmes/b0931hl5>

Islands subsidiary, £2 billion of the debt was repaid.⁵⁵ In the 2007 accounts, the company paid dividends of £535 million despite profits of only £190.5 million. In the same year there was a capital reduction of £310 million (around 20 percent) leading to an increase in leverage from 57 to 72 percent (Blaiklock 2008).

During the years that Macquarie controlled Thames Water, debts increased from about £3.6 billion in 2007 to £10.2 billion by March 2016,⁵⁶ and included loans from shareholders. Water bills were securitised with a bond profile stretching out to 2062 (Allen and Pryke 2013). Thus, future revenue streams were brought forward and paid to shareholders. In the decade between 2007 and 2017 Thames Water paid out dividends of more than £2.5 billion (Bayliss and Hall 2017). The company reportedly paid no UK corporation tax and Macquarie received returns of between 15.5 percent and 19 percent annually - although Macquarie considers the internal rate of return on its MEIF fund to be nearer 12.3 percent.⁵⁷ The level of net debt, at over nine times EBITDA (earnings before interest tax depreciation and amortisation), was such that “Thames Water would make private equity blush” according to the Financial Times.⁵⁸

At the same time that debts and dividends were increasing, Thames Water was also pouring raw sewage into the river. In 2013-14 the company admitted dumping 1.4 billion litres of raw sewage into the river Thames at six sites in Oxfordshire and Buckinghamshire.⁵⁹ The Financial Times reported that at one site, up to 32 million litres of waste flowed into the Thames each day, causing illness in people and animals and killing thousands of fish. In 2017 the company was fined a record £20.3 million which was ten times larger than the previous record of £2 million.⁶⁰

Also, under the ownership of Macquarie, the Thames Water pension deficit increased substantially. Pension liabilities swung from £26.1 million surplus in 2008 to deficits of £65 million in 2009 and £260 million in 2016, creating potential risks for employees in the event of a crisis.⁶¹ In the year-ending 2017, the Thames Water pension deficit went up from £260 million to £379 million. While Thames contributed around £60 million to its two pension funds in 2017 the company paid shareholders a dividend of £157 million (Blaiklock 2018).

The controversial Thames Tideway RAB-financed project referenced above, which began construction in 2016, will ultimately be funded by the bill payments of Thames Water customers. In part the rationale for the provisioning of the sewer via an independent investment structure was due to the high debts and fragile financial structure of Thames Water, following the financing structure established under Macquarie ownership. This is spelled out in a newspaper article titled

⁵⁵ “Macquarie ‘transferred £2bn of debt’ on to Thames Water’s books”, Financial Times, 5 September 2017, <https://www.ft.com/content/61bd8f0a-9181-11e7-bdfa-eda243196c2c>; “How Macquarie bank left Thames Water with extra £2bn debt” BBC News, 5 September 2017, <https://www.bbc.co.uk/news/business-41152516>

⁵⁶ “Thames Water: the murky structure of a utility company”, Financial Times, 4 May 2017, <https://www.ft.com/content/5413ebf8-24f1-11e7-8691-d5f7e0cd0a16>

⁵⁷ “Macquarie ‘transferred £2bn of debt’ on to Thames Water’s books”, Financial Times, 5 September 2017, <https://www.ft.com/content/61bd8f0a-9181-11e7-bdfa-eda243196c2c>

⁵⁸ “Thames Water: fluid financing”, Financial Times, 14 June 2017, <https://www.ft.com/content/9e0b5c26-5112-11e7-bfb8-997009366969>

⁵⁹ “Macquarie ‘transferred £2bn of debt’ on to Thames Water’s books”, Financial Times, 5 September 2017, <https://www.ft.com/content/61bd8f0a-9181-11e7-bdfa-eda243196c2c>

⁶⁰ “Thames Water fined record £20m for sewage dump”, Financial Times, 22 March 2017, <https://www.ft.com/content/b121a9e6-0a68-11e7-97d1-5e720a26771b>

⁶¹ “Thames Water: the murky structure of a utility company”, Financial Times, 4 May 2017, <https://www.ft.com/content/5413ebf8-24f1-11e7-8691-d5f7e0cd0a16>

“Thames Water – a private equity plaything that takes us for fools”⁶² which cites calculations to demonstrate that the amount paid in dividends since the Macquarie takeover of Thames Water would have accumulated sufficient funds to finance the sewer with no extra borrowing. Macquarie left the company with high debts and interest charges and sold its final stake in March 2017, just days before the Environment Agency imposed its record £20 million fine for pollution. Yet, despite such censure of Macquarie’s ownership of Thames Water, in 2017, the company moved apparently seamlessly to take an ownership stake in the UK’s largest gas distribution network.

3.2.2 Macquarie in gas

Gas in Britain is transported through a national transmission system and then through eight regional gas distribution networks (GDNs). Until June 2005, all of the GDNs were owned by National Grid Gas Plc, a listed company that also owned the gas and electricity transmission network. In 2005, National Grid sold four of these. The Macquarie European Infrastructure Fund (MEIF), which also includes Macquarie Global Infrastructure Fund II (GIFII), led the company’s first foray into Britain’s gas distribution networks at this time, with a 17 percent stake in a consortium that took over the Wales and West Gas Distribution Network from National Grid plc.⁶³ This stake was sold in 2012 Cheung Kong Infrastructure (CKI), a company controlled by Hong Kong billionaire, Li Ka-shing. CKI already owned another gas distribution network as well as Northumbrian Water.⁶⁴

Five years later, Macquarie took a stake in a consortium, Cadent, that bought all four of National Grid’s remaining gas distribution networks, providing gas to 11 million customers. The sale attracted extensive interest from global capital, with the deal described in the press as “a rare opportunity” for the big asset managers and sovereign wealth funds. The winning consortium bid a 50 percent premium to the regulated asset value.⁶⁵ The high premium paid suggests that investors are expecting to generate returns from means unrelated to standard production (see also Ashton et al. 2012). The regulator, Ofgem, warned that investors would not be able to recoup the inflated sale price from consumers.⁶⁶

The Macquarie investment is held by the Macquarie Supercore Infrastructure Fund (MSCIF). The equity stakeholders are shown in Table 1.

Table 1: Equity investors in Cadent plc⁶⁷:

	£m	% share
Macquarie Super Core Infrastructure Fund	855.72	23.77
China Investment Corporation	619.67	17.21
Allianz Capital Partners	601.96	16.72

⁶² “Thames Water – a private equity plaything that takes us for fools”, The Guardian, 11 November 2012, <https://www.theguardian.com/commentisfree/2012/nov/11/will-hutton-thames-water-private-equity-plaything>

⁶³ “Macquarie Bank part of a consortium to purchase the Wales & the West Gas Distribution Network in the UK for £1.2 billion” Macquarie Press Release, 31 August 2004.

⁶⁴ “Li Ka-shing to buy UK gas group”, Financial Times, 25 July 2012, <https://www.ft.com/content/80bc6a26-d60f-11e1-a5f3-00144feabdc0>

⁶⁵ Dockreay, A. (2017) “Acquisition of 61% of National Grid Gas Distribution, UK”, IJGlobal 18 June 2017

⁶⁶ “National Grid to sell 61% of gas business to Sino-Australian group”, Financial Times, 8 December 2016, <https://www.ft.com/content/6f421412-bd00-11e6-8b45-b8b81dd5d080>

⁶⁷ IJ Global ‘Acquisition of 61% in National Grid’s UK gas distribution assets’ Transaction data

Hermes Investment Management	501.67	13.94
Qatar Investment Authority	501.67	13.94
International Public Partnerships	259.69	7.21
Dalmore Capital Fund 3	259.69	7.21
	3600.07	100

In addition, debt finance was provided by 13 banks that contributed £138.46 million each.⁶⁸ A further £502 million was raised in debt via MIDIS. The total funds raised for the purchase came to £5,902 million. This was for a 61 percent stake in Cadent in 2017. In 2019 the remaining 39 percent of Cadent was sold by National Grid to the consortium.

On becoming owners, the investors set up a parent company Quadgas Holdings TopCo Ltd, in the offshore jurisdiction of Jersey, owned by the equity investors above. A series of holding companies are between the consortium and Cadent Gas Ltd which is the regulated utility. The Board of Directors is heavily dominated by representation from finance.

Net debt was zero at the start of the company's operations on 23 March 2016. Since inception, the company has issued a number of substantial debt instruments. Debt is typically issued by the financing subsidiary, Cadent Finance Plc. Table 2 shows extracts from the consolidated⁶⁹ accounts of Cadent Gas Ltd.

Table 2: Cadent Gas Ltd consolidated⁷⁰ accounts (£m)

	2017	2018	2019	2020
Profit for period	238	465	542	482
Dividends	95	418	423	275
Net debt	5,992	6,199	6,428	6,734
RAV (£bn)	9.0	9.4	9.7	10.0
Gearing (%)	62	62	62	64

As part of its debt portfolio, Cadent Finance plc has a £6 billion Euro Medium Term Note Programme (unconditionally and irrevocably guaranteed by Cadent Gas Ltd). The majority of the company's fixed rate bonds were issued under this EMTN programme. A provision of this is that borrowing is restricted. A breach of the Net Debt to RAV ratio of 70 percent could be considered a default and trigger a repayment of some of the debt (Cadent 2019, p. 71).

⁶⁸ The banks were: Bank of China, BNP Paribas, Credit Agricole Group, ING Group, JP Morgan, Mitsubishi UFJ Financial Group, Santander, Skandinaviska Enskilda Banken, Sumitomo Mitsui Banking Corporation, Societe Generale, Royal Bank of Canada, Royal Bank of Scotland and China Construction Bank

⁶⁹ i.e. including its subsidiaries.

⁷⁰ The accounts are consolidated for the group of companies which includes Cadent Gas Ltd and its subsidiaries.

Hence, Cadent is prevented, by its financing covenants from engaging in the highly geared structures of Thames Water on account of the terms of the EMTN programme. However, debt appears to be accruing higher up the corporate chain. Net debt at Cadent was £6.4 billion in 2019 (Cadent Annual Report and Accounts 2018/19) but gearing and debts are considerably higher at the holding company level, at £9.2 billion for Quadgas Midco Ltd (Quadgas MidCo Ltd Annual Report and Financial Statements 2018/19).

In May 2017, credit ratings agency, Moody's, reported that it would downgrade the ratings of Cadent Gas Ltd from A3 to Baa1 due to significant gearing at Cadent's immediate parent company, Quadgas MidCo Ltd.⁷¹ In March 2020, Moody's indicated that Cadent's rating was constrained by the debt held by Quadgas MidCo Ltd which has a consolidated net debt/RAV around 86 percent. While the utility itself is subject to licence provisions which require it to maintain an investment grade rating and the covenants of the EMTN constrain gearing to below 70 percent, "these protections are not, of themselves, sufficient to fully insulate Cadent from the weaker credit quality of its parent" (Moody's 2020).

These are early days for the new ownership structure of Cadent but already international capital is doing well from the deal. The sale was lucrative for National Grid. Shareholders gained around £4 billion from the sale, comprising £3.2 billion special dividends and £839 million share buy backs (National Grid Annual Report and Accounts 2017/18, p. 103). In four years, new shareholders have received dividends of over £1.2 billion on their equity investment. Gas distribution is an incredibly secure investment and made even more so by not having a customer-facing position in the supply chain. Cadent does not own or sell gas. This is provided to end users by gas supplier companies. Cadent also does not deal with household bill collection as the customers are the energy retail supply companies who pay Cadent for the service of transporting gas to end users. The price paid is set in negotiation with the regulator, Ofgem. The price is passed on to end users who pay for it in their gas bills. Moody's gearing downgrade was mitigated by the "very low business risk of gas distribution networks in GB which operate under a well-established and transparent regulatory framework" that offers highly predictable cashflows (Moody's 2020).

3.3 Issues arising in financialised infrastructure

Macquarie is one of a growing number of financial investors in UK infrastructure and the company has been a shining example for financial investors in regulated utilities (see above). Macquarie's strategy of operating on a smaller scale before scaling up infrastructure investments has led to the company being involved in the supply of essential services to millions in Britain. The example of Macquarie highlights the contestations and contradictions with private finance in infrastructure. On the one hand, investors are queueing up to provide private finance for investment via funds with profitable track records. But on the other, the profits generated are from the taxpayers and users of essential infrastructure who have no choice but to pay bills to finance the extractive practices of global investors. This is problematic for a number of reasons.

First, while these sectors have attracted high amounts of private sector finance, this has not necessarily been from the investors' own equity but raised by borrowing in the form of commercial debt. While swapping equity finance for debt does not immediately affect prices, overall there is pressure on costs. The privatised water utilities have built up debts of £51 billion since they were transferred to the private sector, debt-free, in 1989. Thames Water has debts of over £10 billion with bond tenors stretching for decades into the future and interest charges have escalated. There is

⁷¹ "Moody's downgrades Cadent Gas Limited to Baa1, concluding review" 10 May 2017, https://www.moody.com/research/Moodys-downgrades-Cadent-Gas-Limited-to-Baa1-concluding-review--PR_365561

evidence that England's largest water companies could have funded all of their capital expenditure since privatisation without debt if surplus funds had been reinvested (Yearwood, 2018).⁷² High debts create financial risks for the utility provider such as if they need to raise funds for investment. Over the decade to 2016, the nine largest water companies paid nearly £1.5 billion a year in finance costs (mainly debt interest) at the same time companies also paid an average of £1.8 billion a year to shareholders in dividends (Bayliss and Hall 2017). Some water company directors have remuneration packages in excess of £2 million (Bayliss et al 2020). These costs are paid from customer bills. It is far from clear that these well-established financing models represent value for money for customers.

Second, accountability and transparency in the provision of essential services is compromised by complex corporate structures via offshore ownerships. Dense corporate structures mean that it is unclear what funds flow where and for what purpose. With parent companies located offshore, it is not clear who are the beneficiaries of private financing.

While owners of water companies have recently made a point of taking measures to close their subsidiary companies in the Cayman Islands,⁷³ there has been less discussion about offshore ownership of parent companies. Like Cadent, three water companies are owned by special purpose vehicles (SPVs) established in Jersey. The rationale for this, according to Southern Water is that "Jersey law allows greater choice than the UK as to the way distributions can be made to shareholders" (Southern Water Annual Report and Accounts 2018-19, p. 98). But it is unclear how such a corporate structure benefits consumers. The identity of the ultimate shareholders is not even clear in some cases. The 2018 Southern Water accounts, for example, state that the largest shareholder in their (Jersey-registered) parent was an "institutional investment company advised by JP Morgan Asset Management owning 31.24%" (Southern Water Annual Report and Accounts 2018-19, p. 213).

Accountability is also undermined by the way that investors are able to transfer ownerships, buying and selling ownership stakes according to commercial imperatives. The regulator has introduced new measures to tighten shareholder returns from financial engineering (such as highly geared corporate structures). But these penalties do not affect those responsible where they are no longer the owners. Closed end funds have a short-term perspective. By the time the regulator was catching up with the pollution caused by Thames Water, Macquarie had sold their stake. When there was political pressure to address the high dividends paid by water companies, Macquarie had moved on. The regulatory ideal, where a company will profit initially from innovations but benefits are subsequently shared with consumers, seems naïve in the context of global finance.

Finally, these corporate structures are inequitable. Returns to the "millionaire's factory" are coming from households meeting their basic needs. Substituting equity finance for debt means that firms can "outperform" their regulatory settings and boost profits. Debt financing costs (interest payments) are tax deductible (unlike dividends) so firms have incentives to skew financing towards high levels of gearing. But these corporate structures have benefitted shareholders at the expense of consumers and taxpayers. Many struggle to pay their water and energy bills. Provision for disadvantaged customers is inadequate and the effects of low affordability translates into major hardship for the poorest households. Meanwhile some investors in these utilities are among the world's most wealthy. Private finance then risks creating structures whereby funds trickle up to the world's richest from households meeting their basic needs (Bayliss et al 2020). Furthermore, drawing down payments on future bills to pay current dividends is a form of intergenerational transfer and

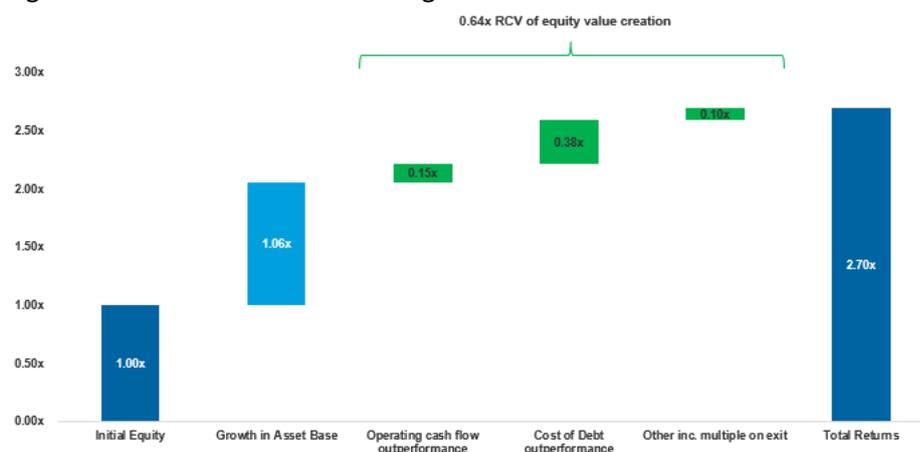
⁷² "Investors benefit from water groups' borrowing at expense of customers", Financial Times 12 October 2018, <https://www.ft.com/content/b60e062e-9712-11e8-b67b-b8205561c3fe>; see also Yearwood (2018).

⁷³ "Thames Water to shut Cayman Island subsidiaries under new chairman", The Guardian, 23 November 2017, <https://www.theguardian.com/business/2017/nov/23/thames-water-cayman-island-subsidiaries-chairman>

alongside other privatisations constitutes “a decisive break in the intergenerational contract” (Helm 2020, p. 80).

Macquarie is highly attractive for institutions looking to invest. For example, Macquarie launched its Macquarie Supercore Infrastructure Fund (MSCIF) in May 2017 with a minimum target of raising 1.5 billion Euro. It closed in July 2018 having greatly exceeded the fundraising target, with 2.5 billion Euro of investor commitments.⁷⁴ The target internal rate of return (IRR) was understood to be in the “high single-digit ballpark”.⁷⁵ Investors include public and private pension plans, insurance companies, corporates and sovereign wealth funds.⁷⁶ Stakes in the fund were highly sought after on account of the returns generated by previous Macquarie funds. For example, US pension fund, the South Carolina Retirement System Investment Commission (RSIC) committed 125 million Euro to the MSCIF. In a presentation to the commissioners, the investment officer recommended the investment in MSCIF in part on account of the performance of previous Macquarie funds, including MEIF 2 which had a stake in Thames Water. The presentation shows a “value bridge” which by the end value of the investment in Thames was 2.7 times the initial equity investment (Figure 4) when the company sold its final stake in the company in 2017.

Figure 4: Thames Water Value Bridge



Source: Presentation to South Carolina Retirement System Investment Commission (RSIC 2018)

Thus, while it is not possible for an outsider to know the full extent of the returns to shareholders from Macquarie’s investments which are routed through complex corporate structures, including offshore ownerships, and values of disposals are undisclosed, some information can be gleaned from the investors in Macquarie funds.

Macquarie has been a major infrastructure investor in the UK, with Thames the country’s largest water company and Cadent operating half of Britain’s gas distribution networks. Macquarie’s approach to achieving shareholder returns is not an isolated case. Rather it is increasingly the norm for infrastructure finance. Looking at the operations of some of the other investors in Cadent (Table 1), the portfolio private financing model outlined above permeates infrastructure across the country and beyond. For example, Dalmore Capital which has a stake in Cadent via its Dalmore Capital Fund 3 LP also has a stake in Anglian Water. Through another fund (Dalmore Infrastructure Investments LP), Dalmore also has an equity stake in Thames Tideway.⁷⁷ Another investor in Cadent, Hermes

⁷⁴ “Macquarie Super Core Infrastructure Fund Series 1 closes with E2.5 billion of investor commitments” Macquarie Press Release 9 July 2018.

⁷⁵ Caon, V. (2018) “First close imminent on Macquarie supercore strategy”, IJGlobal 6/3/2018

⁷⁶ Whiteaker, J. (2018) “MIRA exceeds target with Super Core fund close”, IJGlobal 6.7.2018

⁷⁷ See <https://www.dalmorecapital.com/dalmore/funds/>

Infrastructure Fund 1 LP has a portfolio including Associated British Ports, Eurostar and Southern Water, and attracts pension fund investors such as Dorset County Council (as the Pension Fund Committee minutes from 2018 demonstrate).⁷⁸ International Public Partnerships is registered in Guernsey and also has a stake in Thames Tideway and other infrastructures including rail networks in Belgium.⁷⁹ More research is needed to unpack the operations of these infrastructure investment funds. However, analysis of the water sector indicates that practices of securitisation and hiking up gearing levels was replicated by financial investors in other privatised water companies (notably, Yorkshire Water, Southern Water and Anglian Water, Bayliss et al 2020; Bayliss 2014).

Macquarie (and other financial investors) has created extraction methods that work around the regulatory parameters. The ethos and the approach of the company, operating through globalised infrastructure funds is far removed from the type of private owner that was envisaged when the regulatory architecture was established. The regulatory role has evolved to try to keep up with financialised extraction methods but, as the next section demonstrates, the tensions and contestations are increasingly coming to light.

4 Regulation to the rescue?

The regulatory landscape is incredibly complicated with dedicated specialist journals (such as the Journal of Regulatory Governance). The 2019 price review for water involved the drafting of hundreds of reports, some running into hundreds of pages, with both the regulator and water companies employing the services of specialist legal and financial consultants.

In theory, regulation is intended both to protect the interests of consumers and allow investors to earn a reasonable return. But, as shown above, predatory investors have manipulated the framework to extract high profits. It is tempting to believe that more interventions can plug regulatory gaps. But this inevitably requires ever greater state intervention such that the rationale for private provisioning is undermined. The regulators in water and energy are independent of government, accountable to Parliament. Ofwat is described as "the independent economic regulator for the water and sewerage sector" (Ofwat 2020, p.2). But the notion of an independent technical rule setter does not accurately capture the messy complexity and tensions of regulation in practice.

Regulation is clearly contested and the interests of investors and consumers are not necessarily compatible, even if they are depicted as such by the industries. Certainly, water and energy consumers have an interest in companies remaining solvent but beyond that, interests may diverge across many areas such as price, investment or asset maintenance. Even within the regulatory structure, there are different regulatory agencies including in water for example, environmental standards and drinking water quality alongside the economic regulator, Ofwat. Negotiations between Ofwat and water companies over the prices they can charge are oriented around the quality of the business plan submitted by the company. State institutions such as the Environment Agency and the National Infrastructure Commission call for increased investment in water.⁸⁰ Yet, for Ofwat weak business plans cannot be approved.

For some time, the regulatory process has benefitted investors. The Chief Executive of the regulator Ofwat stated in 2017 that while price setting inevitably involves estimation, "over the past twenty

⁷⁸ "Agenda" Pension Fund Committee Meeting, Dorset County Council, 28 February 2018, <http://modern.gov.dorsetcouncil.gov.uk/Data/271/201802281000/Agenda/Agenda%20reports%20pack.pdf>

⁷⁹ International Public Partnerships Annual Report and Financial Statements 2020

⁸⁰ See, for example, the National Infrastructure Commission's report "Preparing for a drier future England's water infrastructure needs" <https://www.nic.org.uk/wp-content/uploads/NIC-Preparing-for-a-Drier-Future-26-April-2018.pdf>

years, the direction of error has been consistently in favour of companies rather than customers”.⁸¹ Furthermore, the regulator’s consistent over-estimation of the financing and taxation costs led to windfall gains for water companies of at least £1.2 billion between 2010 and 2015.⁸² Similarly, energy companies have made billions in excess profits because of biases in assumptions in the regulatory structure (Wild 2017). The six companies that operate Britain’s regional electricity distribution networks made profits averaging 32 percent of revenue over the period 2010-2015 (ECIU 2018). There is now evidence that the regulator has consistently over-estimated the level of risk that investors face, resulting in higher bills for customers (Wild 2018). Even The National Infrastructure Commission acknowledges a regulatory bias towards investors (NIC 2019).

For many years the extraction by financial investors was ignored. Allen and Pryke (2013) suggest that the absence of political intervention in financialised extraction in water placed the financial arrangements within a kind of political ring fence “where the regulatory body brokers agreement with investors over domestic water prices, service quality, water efficiency and the like, yet leave untouched the politics of packaging and selling households as a captive revenue stream” (p. 420). But failure to intervene in securitisation practices tacitly supports high shareholder returns and, in itself, is a political position.

More recently, the issues of value extraction reached the media, and political pressure for intervention began to emerge.⁸³ In the 2019 price review (PR19, some three decades after privatisation), the regulator recognised that high gearing levels are not “appropriately aligned to the interests of customers” (Ofwat 2018, p. 8). Ofwat introduced new measures to discourage high gearing, requiring firms to share the benefits of high gearing with customers and insisting that firms justify dividend payouts and executive pay to customers (Ofwat 2018). This was a way to circumnavigate direct intervention in capital structures. PR19, which set prices from 2020 to 2025, has been stricter on the returns that companies can make from the sector. A sharp reduction in the allowed cost of capital, according to Ofwat: “would reduce bills by an average of £50 per household, or 12 per cent, over the next five years ... The regulator is also demanding that the 10 large regional water and sewage companies and seven smaller water suppliers lower debt levels. ... The settlement for the next five-year period is the toughest yet by the water regulator as it seeks to curtail the excesses of the sector”.⁸⁴ These measures to redress the balance towards the consumer resulted in a downgrading of the credit ratings of water companies on account of what Moody’s considers to be “political interference” in that these measures are “departures from long-standing regulatory practice” (Moody’s 2018a and b).

As part of the regulatory contract, firms are required to maintain a credit rating that is “investment grade”, while Ofwat has a responsibility to ensure that firms are able to raise capital to finance investment. But these functions are not unrelated. This intervention by Ofwat to tip the balance towards consumers after decades of support for investors inevitably creates an additional stress on corporate finances which then weakens the financial structure of water companies. Clearly, then regulation is not independent. In the RPI-X price-setting process, there is no objectively knowable value for “X” but rather it is subject to interpretation, bargaining positions and political pressure.

⁸¹ “The Future of Utilities” November 2017 <https://www.ofwat.gov.uk/wp-content/uploads/2017/11/Cathryn-Ross-speaking-notes-Future-of-Utilities-Water-2017-21-November-2017-FINAL.pdf>

⁸² House of Commons Public Accounts Committee <https://publications.parliament.uk/pa/cm201516/cmselect/cmpubacc/505/50505.htm>

⁸³ See speech by then Environment Secretary, Michael Gove, at Water UK City Conference “A water industry that works for everyone” 1 March 2018, <https://www.gov.uk/government/speeches/a-water-industry-that-works-for-everyone>

⁸⁴ “Water rates set to fall after regulatory shake up”, Financial Times, 16 December 2019, <https://www.ft.com/content/4f94ad22-1ffa-11ea-b8a1-584213ee7b2b>

While the notion of an independent rule-setting body is the holy grail of regulation, this can never be achieved in practice.

Regulation is a moving target with regulators having to adjust their financial assumptions to meet the new debt-laden global circumstances while maintaining a monitoring and control function at seemingly ever greater levels of detail and refinement (Allen and Pryke 2013, p. 426). Yet, despite the greater complexity, the extensive expertise and the pages of reports, there is nothing to prevent Macquarie, the widely criticised architect of the financialisation of Thames Water (Allen and Pryke 2013; Loftus and March 2019) and other infrastructure assets, from taking over half of Britain's gas distribution networks to begin pursuing the same financial engineering practices. The regulator, attending to the narrow matters of price formation has no capacity to intervene ex ante on account of the track record of investors. The financial engineering that depleted the balance sheet of Thames Water is set to be repeated this time in gas distribution.

Tensions are rising in infrastructure in the UK. The contestations between agents is becoming increasingly prominent. Following PR19, four companies appealed against the latest Price Review to the Competition and Markets Authority (CMA) on the grounds that the tighter rules would prevent them from carrying out adequate investment.⁸⁵ The CMA has supported their appeal and in their 800-page report proposes lighter controls (CMA 2020). In their response to the CMA, Ofwat point (implicitly) to the extractive practices of financialised infrastructure (Ofwat 2020, p. 3):

There is nothing in the CMA's proposals that would prevent investors simply extracting their newly increased returns in the form of higher dividends or through asset premia or transactions. The history of the water sector, as recently as a decade ago, demonstrates that we can have no confidence that these higher returns will translate into investment services for the benefit of consumers and the environment.

Ofwat highlight the contestation that surrounds regulation, indicating that an increase in allowable returns "increases the value of water companies and is good for investors. But we have seen no evidence over the thirty years since privatisation that this kind of gain directly increases the level of investment. It clearly comes at an extra cost to customers through increased bills" (Ofwat 2020, p. 4). They consider that the measures proposed by the CMA could "impact the effectiveness of utility regulation more generally" (Ofwat 2020, p. 6).

Similarly, in the energy sector, the next set of price controls, RIIO-2 is due to take effect from April 2021. By the end of Summer 2020, it seemed that Ofgem was set to halve the returns that energy network companies could make on their investments. As in water, firms are protesting against Ofgem's proposals to lower the returns from 7-8 percent in under the current price control regime (RIIO-1, running since April 2013) to 3.95 percent.⁸⁶ The regulatory regime remains in a bind, mandated to meet the potentially conflicting needs of both investors and end users, while powerful investors seek to resist small regulatory attempts to protect consumer interests.

⁸⁵ "Regulator backs UK water companies over price cuts rebellion", Financial Times, 29 September 2020, <https://www.ft.com/content/995bfd41-e721-4a57-8e5b-e54f1ef091ae>

⁸⁶ "Ofgem faces pricing rebellion from energy network suppliers", The Guardian, 31 August 2020, <https://www.theguardian.com/business/2020/aug/31/ofgem-faces-pricing-rebellion-from-energy-network-suppliers-national-grid> and "Ofgem proposes cutting energy companies' returns by half" Financial Times 9 July 2020, <https://www.ft.com/content/3cbc0618-e4af-4a07-b2ca-a0ff65fc7cdc>

Thus the conflicting interests of the different regulatory agencies, as well as the agents involved in provisioning, and consumers themselves are adding more layers to the regulatory process, in ways that are on one level highlighting the contestation in regulation. But at the same time they are increasing the complexity, the time and the costs of regulation, which ultimately falls on households, and risks undermining the whole regulatory process. Littlechild (2020, p. 7), the original architect of the RPI-X regulatory structure, in a letter to the CMA in May 2020 was harshly critical of the time and resources involved in the price control process saying: “[t]here should be more to life than arguing about price controls”.

The RPI-X framework has evolved into an impossibly complex process as it engages with financialised structures and processes. For Littlechild (2020, p. 4): “we have to accept that what the price control process has gradually evolved into looks more like regulatory failure than regulatory success”. Helm (2018) says that the RPI-X regulation model is “now a fragment of what it was”. Later, Helm (2020, p. 83) takes the view that “it might not matter very much who owns the water companies, and renationalisation might not make much difference”, indicating that, on one level, this is due to regulation: “the regulators could have been smarter”.

The regulatory framework for these privatised monopolistic utilities was designed for an entirely different kind of investor from the predatory global capital that is buying up infrastructure assets today. Investors are paying a premium for companies where they can extract revenue by manipulating capital and financial structures in ways that the current regulatory framework is unable to prevent. It is difficult to envisage a means by which Macquarie could be prevented from pursuing the extractive practices outlined above without a scale of state intervention that undermines the rationale for the private finance model.

5 Conclusion

There is obviously a clear need for large-scale investment to address the multiple challenges that face the UK, including the urgent decarbonisation of the economy and persistently low productivity. This is widely recognised. Our inductive and qualitative political economy analysis, however, draws attention to the implications of the heavy reliance on private finance in attending to these major infrastructure challenges. We have sought to demonstrate how the logic of state intervention (here in the context of infrastructure finance) in late-stage financialised capitalism fails to impose limits on the way in which the public good can be protected from excessive rent extraction.

In sum, despite its many challenges, the UK government remains thoroughly committed to private financial involvement in infrastructure, in particular through governance forms like the RAB, which move away from direct fiscal liabilities for the state. Core players have strengthened their position in the UK’s private infrastructure landscape, as they seamlessly shift their involvement from one sector to another despite a poor track record in the sectors from which they migrate. This has been facilitated by bespoke institutional arrangements crafted by policymakers strongly committed to maintaining private finance at the heart of the UK’s infrastructure financing landscape, as was the case for the creation of a new (“greenfield”) complex infrastructure asset like the Thames Tideway Tunnel (see Loftus and March 2019; Bowles et al. forthcoming). These arrangements tend to put regulation at the heart of the way in which private finance is drawn into infrastructure.

When the contested relations that underpin private infrastructure finance are unpacked, the impossible tensions of the state regulator, required both to ensure that investments generate returns and to protect the public interest are revealed. Investors’ interests have consistently been prioritised and recent attempts to redress the balance have resulted in clashes between state agencies. Furthermore, there are a set of fundamental inadequacies in the regulatory framework

within which financialised infrastructure takes shape, as this remains focused on a narrow set of sectoral performance indicators. Regulatory interventions fail to limit rent capture by private finance as it roams the terrain of essential service provision. These regulatory inadequacies tie back to some of the fundamental tendencies of financialised capitalism in terms of the continuous search for opportunities of value capture through financial means (to the detriment of investment in productive activity) and further consolidate the conditions that underpin poor UK economic performance (including worsening inequalities and failures to invest in productive upgrading). In the end, with infrastructure in the UK as a nexus of conflicting interests, the question of where is the public interest remains open and infrastructure financing remains an imbroglio of unsolved oversight problems.

References

- Aalbers, M. (2016) *The Financialization of Housing. A political economy approach* New York: Routledge
- Allen, J. and Pryke, M. (2013) "Financialising household water: Thames water, MEIF, and 'ring-fenced' politics" *Cambridge Journal of Regions, Economy and Society* 6(3): 419-439.
- Appel, H., N. Anand and A. Gupta (2018) "Introduction: Temporality, Politics and the Promise of Infrastructure", in N. Anand, A. Gupta, H. Appel, *The Promise of Infrastructure*, Duke University Press: Durham and London.
- Ashton, P., M. Doussard & R. Weber (2012) "The Financial Engineering of Infrastructure Privatization", *Journal of the American Planning Association*, 78(3): 300-312, DOI: 10.1080/01944363.2012.715540
- Ashton P, Doussard M and Weber R (2016) "Reconstituting the state: City powers and exposures in Chicago's infrastructure leases" *Urban Studies* 53(7): 1384–1400.
- Bailey, A. (2020) "Uncorrected oral evidence: Annual evidence session with the Governor of the Bank of England", House of Lords Select Committee on Economic Affairs, 13 October 2020.
- Bayliss, K. (2014) "The Financialisation of Water in England and Wales", *FESSUD Working Paper Series*, No. 52.
- Bayliss, K., B. Bowles and E. Van Waeyenberge (2019) Response to the Infrastructure Finance Review Consultation (mimeo).
- Bayliss, K. and D. Hall (2017) "Bringing water into public ownership: costs and benefits" PSIRU Working Paper, [https://gala.gre.ac.uk/id/eprint/17277/10/17277%20HALL_Bringing_Water_into_Public_Ownership_\(Rev'd\)_2017.pdf](https://gala.gre.ac.uk/id/eprint/17277/10/17277%20HALL_Bringing_Water_into_Public_Ownership_(Rev'd)_2017.pdf)
- Bayliss, K, G. Mattioli and J. Steinberger (2020) "Inequality, poverty and the privatization of essential services: A 'systems of provision' study of water, energy and local buses in the UK" *Competition and Change*, 0(0):1-27, DOI: 10.1177/1024529420964933
- Bayliss, K. and B. Fine (2020) *A Guide to the Systems of Provision Approach: Who Gets What, How and Why*, Basingstoke: Palgrave.
- Bayliss, K. and J. Gideon (2020) "The privatisation and financialisation of social care in the UK" SOAS Working Paper Series No. 238, <https://www.soas.ac.uk/economics/research/workingpapers/file150390.pdf>, (accessed 1 November 2020)

Bayliss, K. and E. Van Waeyenberge (2015) *Funding Infrastructure: Critical Observations and Lessons for Cuba* (unpublished), <https://eprints.soas.ac.uk/19759/>

Bayliss, K. and E. Van Waeyenberge (2018) “Unpacking the Public Private Partnerships Revival”, *Journal of Development Studies* 54(4): 577-593, DOI: 10.1080/00220388.2017.1303671

Bear, L. (2020) “Speculations on infrastructure: from colonial public works to a post-colonial global asset class on the Indian railways 1840–2017”, *Economy and Society*, 49(1): 45-70, DOI: 10.1080/03085147.2020.1702416

Beesley, M. and S. Littlechild (1989) “The Regulation of Privatized Monopolies in the United Kingdom” *The RAND Journal of Economics* 20(3): 454-472.

BEIS (2019) “RAB model for nuclear”. Consultation on a RAB model for new nuclear projects. July 2019.

Blaiklock, M (2008) “Evidence to Treasury Committee”, <https://publications.parliament.uk/pa/cm200708/cmselect/cmtreasy/166/166we03.htm>

BEIS (2020) “RAB Model for Nuclear”, Department for Business, Energy & Industrial Strategy, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943762/Nuclear_RAB_Consultation_Government_Response-.pdf

Blaiklock, M. (2018) “OFWAT Consultation: ‘Change of Control – General Policy and its Application to Thames Water’” Consultation Response, 8 June

Blanchard, O. (2019) “Public debt and low interest rates”, *American Economic Review* 109(4): 1197-1229.

Blanchard, O. and D. Leigh (2013) “Growth forecast errors and fiscal multipliers”, IMF Working Paper/13/1

Booth, L. and V. Sarodubsteva (2015) “PFI: Costs and benefits”, House of Commons Library Briefing Paper 6007, May 2015.

Bowles, B., K. Bayliss and E. Van Waeyenberge (forthcoming) “London’s ‘Super Sewer’: A case study for the interdisciplinary possibilities of anthropologists and economists investigating infrastructure together”, *Research in Economic Anthropology*.

Cadent (2019) Prospectus for £6,000,000,000 Euro Medium Term Note Programme, issued by Cadent Gas Finance Plc, 16 December 2019.

CEPA (2017) “Background Evidence: Review Of The UK Infrastructure Financing Market Final Report” Report for National Infrastructure Commission by Cambridge Economic Policy Associates

Christiano, L. Eichenbaum, M. and Rebelo, S. (2011), “When is the government spending multiplier large?”, *Journal of Political Economy*, 119(1): 78-121

CMA (2020) Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations Provisional findings, https://assets.publishing.service.gov.uk/media/5f7c467ee90e070dde709cee/Water_provisional_determinations_report_all_-_September_2020_---_web_-online-2.pdf

Coenen, G. et al. (2010), “Effects of fiscal stimulus in structural models”, IMF Working Papers, Vol. 10/73.

Confederation for British Industry (2020) “Investing in Infrastructure. Sourcing the finance to build back better”, September 2020.

DeLong, J. and Summers, L.H. (2012), “Fiscal policy in a depressed economy”, *Brookings Papers on Economic Activity*, 43(1): 233-297.

- Deruytter, L. and B. Derudder (2019) "Keeping financialisation under the radar: Brussels Airport, Macquarie Bank and the Belgian politics of privatised infrastructure" *Urban Studies* 56(7): 1347-1367.
- Desai, V. and A. Loftus (2012) "Speculating on Slums: Infrastructural Fixes in Informal Housing in the Global South", *Antipode* 45(4).
- DfT (2018) "Rail Review", see <https://www.gov.uk/government/groups/rail-review>
- Dymski, G. (2020) "The UK productivity paradox and the governance of UK science and technology policy: lessons from California?", in McCann and Vorley (eds) *Productivity Perspectives*, Edward Elgar.
- ECIU (2018) "RIIO Carnival: How new Ofgem regulations are failing to hit high network company profits" Report by Energy and Climate Intelligence Unit.
- Farquharson, E. and J. Encinas (2010) The U.K. Treasury Infrastructure Finance Unit, World Bank Other Operational Studies 23035, The World Bank.
- Fine, B. and E. Leopold (1993) *The World of Consumption*, Routledge: London
- G20/OECD (2020) "Report on the collaboration with institutional investors and asset managers on infrastructure: investor proposals and the way forward".
- Gabor, D. (2021a) "The Wall Street Consensus", *Development and Change*, <https://doi.org/10.1111/dech.12645>
- Gabor (2021b) "Revolution without revolutionaries: interrogating the return of monetary financing", *Transformative Responses to the Crisis*, https://transformative-responses.org/wp-content/uploads/2021/01/TR_Report_Gabor_FINAL.pdf
- Grice, J. (2016) "National accounting for infrastructure", *Oxford Review of Economic Policy*, Volume 32(3): 431–445, <https://doi.org/10.1093/oxrep/grw018>
- Hall, S., K. Roelich, M. Davis and L. Holstenkamp (2018) "Finance and justice in low-carbon energy transitions", *Applied Energy* 222: 772–780.
- Hebb, T. and R. Sharma (2014) "New finance for America's Cities", *Regional Studies*, 48(3) <https://doi.org/10.1080/00343404.2013.843163>
- Helm, D. (2013) "British infrastructure policy and the gradual return of the state", *Oxford Review of Economic Policy*, 29(2): 287–306.
- Helm, D. (2018) "RIP RPI-X Regulation - OFWAT and OFGEM nail down the coffin" Cross Regulation Network Paper 10, <http://www.dieterhelm.co.uk/regulation/regulation/rip-rpi-x-regulation-ofwat-and-ofgem-nail-down-the-coffin/>
- Helm, D. (2020) "Thirty years after water privatization—is the English model the envy of the world?" *Oxford Review of Economic Policy*, 36(1): 69–85.
- Helm, D. and T. Tindall (2009) "The evolution of infrastructure and utility ownership and its implications", *Oxford Review of Economic Policy*, 25(3): 411–434.
- HM Government (2020) The Energy White Paper. Powering our Net Zero Future. December 2020
- HM Treasury (2012) "A new approach to public private partnerships", https://www.minfin.bg/upload/11842/infrastructure_new_approach_to_public_private_partnerships_05.pdf
- HM Treasury (2018a) Budget 2018. Private Finance Initiative (PFI) and Private Finance Initiative (PF2), published 29 October, <https://www.gov.uk/government/publications/private-finance-initiative-pfi-and-private-finance-2-pf2-budget-2018-brief>

HM Treasury (2019) “PFI and PF2 projects”,
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/805117/PFI and PF2 FINAL PDF1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/805117/PFI_and_PF2_FINAL_PDF1.pdf)

HM Treasury (2020a) “National Infrastructure Strategy. Fairer, faster, greener”,
<https://www.gov.uk/government/publications/national-infrastructure-strategy>

HM Treasury (2020b) Net Zero Review: Interim Report.

HM Treasury (2020c) “The Green Book: Central Government Guidance on Appraisal and Evaluation”,
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The Green Book 2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The_Green_Book_2020.pdf)

HM Treasury (2021) “Build Back Better, our plan for growth”,
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/969275/PfG_Final_print_Plan_for_Growth_Print.pdf

HM Treasury/IPA (2019) “Infrastructure Finance Review: Consultation”,
<https://www.gov.uk/government/consultations/infrastructure-finance-review>

HoC (2018) “Private Finance Initiatives” House of Commons Committee of Public Accounts, Forty-Sixth Report of Session 2017-19, HC894,
<https://publications.parliament.uk/pa/cm201719/cmselect/cmpublicacc/894/894.pdf>

IPA (2018) “National infrastructure and construction pipeline”,
<https://www.gov.uk/government/publications/national-infrastructure-and-construction-pipeline-2018>

Jefferis C and F Stilwell (2006) “Private finance for public infrastructure: The case of Macquarie Bank” *Journal of Australian Political Economy* 58: 44–61.

Langley, P. (2018) “Frontier financialization: Urban infrastructure in the United Kingdom” *Economic Anthropology*, 5: 172–184 DOI:10.1002/sea2.12115

Lazard (2020) “Government debt in rough waters. A navigation guide”. September, available at:
<https://www.lazard.com/media/451399/20200929-whitepaper-en-final.pdf>

Littlechild, S. (2020) Letter to Competition and Markets Authority in response to appeals of four water companies against Ofwat’s price determinations, 24 May 2020,
https://assets.publishing.service.gov.uk/media/5eda3e6ce90e071b7bd7a2ed/Stephen_Littlechild_submission.pdf

Loftus, A. and H. March (2019) “Integrating what and for whom? Financialisation and the Thames Tideway Tunnel” *Urban Studies* 56(1): 2280-2296.

Mazzucato, M. and G Semieniuk (2018) “Financing renewable energy: Who is financing what and why it matters” *Technological Forecasting and Social Change*, 127: 8-22

McManus, P. and G. Haughton (2020) “Fighting to undo a deal: Identifying and resisting the financialization of the WestConnex motorway, Sydney, Australia” *A Economy and Space* DOI: 10.1177/0308518X20933279

Mercer, H. and D. Whitfield (2018) “Nationalising special purpose vehicles to end PFI: A discussion of costs and benefits”, <https://gala.gre.ac.uk/id/eprint/20016/>

MFS (2020) Macquarie Fund Solutions Audited Annual Report, 31 March 2020,
<https://mim.fgsfulfillment.com/download.aspx?sku=MFS-AR-EN>

Moody’s (2018a) “Moody’s: UK water utilities outlook is negative as regulatory, political and public pressure mounts” Moody’s Investors Services.

Moody's (2018b) "Moody's changes outlook to negative on ratings of 4 UK water groups", Moody's Announcement 22 May 2018.

Moody's (2019) "Moody's affirms Southern Water's Class A debt at Baa1, negative outlook" Moody's Investors Service.

Moody's (2020) "Announcement of Periodic Review: Moody's announces completion of a periodic review of ratings of Cadent Gas Limited", Moody's Investors Service, Press Release 5 March 2020.

NAO (2015) "UK guarantees scheme for infrastructure", <https://www.nao.org.uk/wp-content/uploads/2015/01/UK-Guarantees-scheme-for-infrastructure.pdf>

NAO (2016) "Controlling the consumer-funded costs of energy policies: The Levy Control Framework" National Audit Office Report HC 725

NAO (2017a) "Hinkley Point C", <https://www.nao.org.uk/wp-content/uploads/2017/06/Hinkley-Point-C.pdf>

NAO (2017b) "The Green Investment Bank" Report by National Audit Office HC619 <https://www.nao.org.uk/wp-content/uploads/2017/12/The-Green-Investment-Bank.pdf>

NAO (2018a) "PFI and PF2", <https://www.nao.org.uk/report/pfi-and-pf2/>

NAO (2018b) "Investigation into the 2017 auction for low-carbon electricity generation contracts" National Audit Office HC949.

NAO (2020) "Investigation into the rescue of Carillion's PFI hospital contracts", <https://www.nao.org.uk/report/investigation-into-the-rescue-of-carillions-pfi-hospital-contracts/>

NIC (2019) "Strategic Investment and Public Confidence" Report by the National Infrastructure Commission, <https://nic.org.uk/app/uploads/NIC-Strategic-Investment-Public-Confidence-October-2019.pdf>,

O'Neill, P. (2015) "Infrastructure's Stubborn Spatiality and its Maturing Financialisation" (April 16, 2015), SSRN: <https://ssrn.com/abstract=2595157> or <http://dx.doi.org/10.2139/ssrn.2595157>

O'Brien, P., P. O'Neill and A. Pike (2019) "Funding, financing and governing urban infrastructure", *Urban Studies* 56(7), <https://doi.org/10.1177/0042098018824014>

O'Brien, P. and A. Pike (2017) "The financialisation and governance of infrastructure" in R. Martin and J. Pollard (Eds.) *Handbook of the Geographies of Money and Finance* (Elgar: Aldershot).

O'Neill, P. (2013) "The financialisation of infrastructure: The role of categorisation and property relations", *Cambridge Journal of Regions, Economy and Society* 6: 441-454.

O'Neill, P. (2019) "The financialisation of urban infrastructure: A framework of analysis", *Urban Studies*, 56(7): 1304–1325.

OBR (2020) "Fiscal sustainability Report", July 2020, <https://obr.uk/fsr/fiscal-sustainability-report-july-2020/>

Ofgem (2016) "National Grid's sale of Gas Distribution Network business – decision on regulatory aspects and the transfer of assets", https://www.ofgem.gov.uk/system/files/docs/2016/07/ng_sale_decision_on_regulatory_aspects_and_the_transfer_of_assets_0.pdf

Ofgem (2019) "RIIO-GD1 Annual Report 20187-2018", Ofgem Report, https://www.ofgem.gov.uk/system/files/docs/2019/03/riio-gd1_annual_report_2017-18_0.pdf

Ofwat (2007) "The completed acquisition of Thames Water Holdings Plc by Kemble Water Limited" A position paper by Ofwat, https://www.ofwat.gov.uk/wp-content/uploads/2015/11/pap_pos_tms_acqtmkemble.pdf

Ofwat (2017) “Delivering Water 2020: Consulting on our methodology for the 2019 price review” <https://www.ofwat.gov.uk/wp-content/uploads/2017/07/Delivering-Water-2020-Consulting-on-our-PR19-draft-methodology-2.pdf>

Ofwat (2018) “Putting the sector in balance: position statement on PR19 business plans”, Ofwat report <https://www.ofwat.gov.uk/wp-content/uploads/2018/04/Putting-the-sector-in-balance-position-statement-on-PR19-business-plans-FINAL2.pdf>

Ofwat (2020) “Reference of the PR19 final determinations: Overview - response to CMA provisional findings” available from https://assets.publishing.service.gov.uk/media/5f97f5bee90e077aff632953/Overview_-_response_to_CMA_provisional_findings.pdf (accessed 31 October 2020)

ONS (2017) “Developing new measures of infrastructure investment”, July 2017, : <https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/developingnewmeasuresofinfrastructureinvestment/july2017>

Perraton J. (2018) “Secular Stagnation: The New Normal for the UK?”. In: Hay C., Hunt T. (eds) *The Coming Crisis. Building a Sustainable Political Economy: SPERI Research & Policy*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-63814-0_12

Pike, A., P. O’Brien, T. Strickland and G. Thrower (2019) *Financialising City Statecraft and Infrastructure*, Edward Elgar: Cheltenham UK/Northampton MA, USA.

Polzin, F., M. Sanders, F. Taube (2017) “A diverse and resilient financial systems for investments in the energy transition”, U.S.E Discussion Paper Series nr. 17-03.

Pryke, M and J. Allen (2019) “Financialising urban water infrastructure: Extracting local value, distributing value globally” *Urban Studies*, 56(7): 1326–1346.

RSIC (2018) Commission Meeting Agenda, Retirement System Investment Commission, South Carolina, 14-15 June 2018. <https://www.rsic.sc.gov/documents/2018.06.14%20Combined%20Meeting%20Materials%20Day%20One.pdf>

Summers, L. (2013) “Policy responses to crises”, Speech at the IMF Economic Forum, 8 November 2013.

Thomas, C. (2019) “The ‘Make do and Mend’ Health Service” Report for Institute for Public Policy Research, https://www.ippr.org/files/2019-09/1568215451_the-make-do-and-mend-health-service-sep19.pdf

Torrance, M. (2008) “Forging Glocal Governance? Urban Infrastructures as Networked Financial Products” *International Journal of Urban and Regional Research* 32(1): 1–21, DOI:10.1111/j.1468-2427.2007.00756.x

Torrance, M. (2009) “Reconceptualizing urban governance through a new paradigm for urban infrastructure networks”, *Journal of Economic Geography* 9:805–822, DOI:10.1093/jeg/lbn048

Waddams Price, C. (2018) “Back to the Future? Regulating Residential Energy Markets”, *International Journal of the Economics of Business*, 25(1): 147-155, DOI: 10.1080/13571516.2017.1402469

Webb, J. (2019) “New lamps for old: financialised governance of cities and clean energy”, *Journal of Cultural Economy*, 12(4): 286-298, DOI: 10.1080/17530350.2019.1613253

Whiteside, H. (2019) “Advanced perspectives on financialised urban infrastructures”, *Urban Studies* 56(7): 1477–1484.

Wild, M. (2017) “Energy Consumers’ Missing Billions The profits gifted to energy networks” Report for Citizen’s Advice Bureau,

<https://www.citizensadvice.org.uk/Global/CitizensAdvice/Energy/EnergyConsumersMissingBillions.pdf>

World Bank (2020) "Saving Lives, Scaling-up Impact and Getting Back on Track", World Bank Group Covid-19 Crisis Response Approach Paper. World Bank Group, <http://documents1.worldbank.org/curated/en/136631594937150795/pdf/World-Bank-Group-COVID-19-Crisis-Response-Approach-Paper-Saving-Lives-Scaling-up-Impact-and-Getting-Back-on-Track.pdf>

Wren Lewis (2016) "Ricardian equivalence, benchmark models and academics response to the financial crisis", <https://economistsview.typepad.com/economistsview/2016/10/ricardian-equivalence-benchmark-models-and-academics-response-to-the-financial-crisis.html>

Yearwood, K. (2018) "The Privatised Water Industry in the UK: An ATM for investors", Report for PSIRU, [https://gala.gre.ac.uk/id/eprint/21097/20/21097%20YEARWOOD The Privatised Water Industry in the UK 2018.pdf](https://gala.gre.ac.uk/id/eprint/21097/20/21097%20YEARWOOD%20The%20Privatised%20Water%20Industry%20in%20the%20UK%202018.pdf)