1 EXECUTIVE SUMMARY

1.1 BACKGROUND

(1) Northumbrian Water Limited (NWL) submitted comments on the NATS (En-route Limited) (NATS) CMA process as part of a joint submission with Anglian Water and Wessex Water.[1] Since then we have rejected our PR19 regulatory settlement and had it referred to the CMA for redetermination. We submitted our Statement of Case (SoC) in our redetermination on the 2nd of April 2020. As part of our SoC, we have procured an independent, expert assessment on WACC from KPMG and Professor Alan Gregory, a Director in AGRF Limited[2] (KPMG/AGRF) (see attached). Our response to the NATS preliminary findings is focused on areas where this expert report has taken a different approach to certain key parameters of WACC, which may also be relevant to the NATS case.

(2) This note sets out NWL's response to the CMA's provisional findings in the NATS (En Route) Plc / CAA Regulatory Appeal, hereafter the 'NATS PFs'. While many of the arguments presented in this note are consistent with those in the KPMG/AGRF response to the NATS PFs for Anglian Water ("A reply to the CMA's approach to the cost of equity in the NATS Provisional Findings"), the note also reflects additional points for the CMA's consideration. It represents NWL's own views and has not been written in conjunction with any other party.

(3) As a general point, we note that the CMA sought specific comments on how it should take account of the impact of Covid-19 in its final determination for NATS. Given the significant impact of Covid-19 on the air travel sector, and the focus of our submission on certain elements of WACC, we have not sought to express a view on the specific way this should be addressed for NATS. We do, however, reiterate our understanding, as expressed in our SoC and acknowledged in the PFs, that the CMA should reach its determinations based on the best information available to it at the time of that decision, making use of the regulatory mechanisms as appropriate to take account of any ongoing uncertainties.

1.2 OUR VIEWS ON THE NATS PROVISIONAL FINDINGS

1.2.1 Risk free rate (RFR)

(4) The CMA's estimate for the RFR is based solely on a current and short-term trailing averages of yields on ILGs with maturities of between 10 and 20 years uplifted for market expectations for increases in interest rates during the charge control. Based on findings in the KPMG/AGRF Report, we believe the CMA's approach in determining the RFR could be further improved. Key issues we highlight for consideration are as follows:

- the yields on assets with negligible risk in the UK are volatile, which significantly increases the risk that the outturn RFR will deviate substantially from its estimate on any particular day;
- the CC/CMA has historically set the RFR above the prevailing ILG yields due to distortions in the market for ILGs the NATS approach takes not account of these distortions;
- disregarding or not considering other UK assets with negligible risk besides ILGs introduces market- or ILG-specific distortions into estimates of the RFR;
- disregarding equilibrium or international evidence provided by US Treasury Inflation-Protected Securities (US TIPS) ignores the fact that the distribution for the outturn RFR is likely to be skewed towards higher values; and

[1] *"Setting the Cost of Equity in UK Price Controls". Professor Alan Gregory – a joint submission on behalf of Anglian Water, Northumbrian Water and Wessex Water, 2 January 2020.*

[2] *Professor Gregory is a Professor Emeritus in Corporate Finance at the University of Exeter and a director of AGRF Ltd. His research interests are in the general area of market-based empirical research, including the empirical estimation of cost of capital. From September 2001 to September 2009 he was a Reporting Panel Member of the UK Competition Commission (CC) where he was involved in a number of inquiries, including the merger investigation of two potential European takeover bids for the London Stock Exchange, and the groceries or "supermarkets" market investigation. Professor Gregory was a member of the CC's cost of capital panel from 2009 to 2017 and continues to provide advice to the Competition and Markets Authority (CMA). In addition to more than thirty papers in peer-reviewed academic journals, he has contributed to an OECD Roundtable publication on Excessive Prices and is the author of the Financial Times book 'Strategic Valuation of Companies'.*

— taking the mid-point of an appropriate range for estimate of the RFR would ignore asymmetric considerations, such as the risk on either side of the trade-off between incentivising investment versus keeping bills low, and the one-sided financeability duty[3].

1.2.2 Total Market Return (TMR)

(5) Both the CMA and KPMG/AGRF estimate TMR based on historical returns data, being averages of actual achieved returns from 1900 to 2018 (historical ex post approach) and expected returns over the same period (historical ex ante approach). The CMA provisionally derives a range of 5.0% to 6.0%, real RPI and an overall WACC from the mid-point of its range, therefore implicitly adopting a mid-point TMR of 5.5%, real RPI. The KPMG/AGRF Report derives a point estimate of 6.25%, real RPI.

(6) Based on findings in the KPMG/AGRF Report, we believe the CMA's approach in determining the TMR could be further improved. Key issues we highlight for consideration are as follows:

— the CMA's range on TMR is markedly lower than estimates used in previous inquires. The CMA should put more weight on the adjusted RPI series, and at a minimum should point to estimate for the TMR that sits at the top end of its range. Placing 100% weight on the consumption expenditure deflator (CED)/ consumer price index (CPI) is i) inconsistent with ONS advice that the CPI back-cast is 'not intended for official purposes' and ii) inconsistent with its own position in the text that all historical inflation series have issues and that CED/RPI is useful as a cross check. If 50:50 weight is placed on CED/RPI and CED/CPI, the CMA's own results support a TMR estimate of 5.9%, real RPI. The KPMG/AGRF Report concluded that most weight should be given to the CED/RPI, which supports a TMR estimate of 6.25%, real RPI.

— the CMA incorrectly excludes non-overlapping returns and does not apply sufficient uplift for the Bias Adjustment in the ex ante estimates. Correcting for these two errors but using the CMA's own results, supports a point estimate for TMR at the top of the CMA's own range.

— the CMA should place greater weight on regulatory consistency. It should explicitly consider the cost-benefit analysis of making a material reduction in TMR, on the basis of inherently imprecise evidence.

1.2.3 Beta

(7) Whilst the beta estimate is sector specific, based on findings in the KPMG/AGRF Report, we believe the CMA's approach in estimating beta could be further improved. Key issues we highlight for consideration are as follows:

— first, the CMA has not estimated monthly betas but instead relies on daily and weekly estimates. However, there is robust empirical evidence that higher frequency betas, such as the daily estimates, are downward biased and monthly estimates may therefore provide more robust beta estimates;

— second, the CMA places too much weight on 2-year daily betas, which are not the best predictor of betas over long-run forward looking horizons. Instead, the longest run of data since the last structural break should be used; and

— third, the CMA's estimation procedure is not clear. The CMA only presents its beta estimates as asset betas. Asset betas cannot be estimated directly, only equity betas can be observed. We assume the CMA calculated equity betas from the raw returns data and then estimated the gearing and debt beta of the comparators to derive the asset betas which are presented. However, the underlying gearing and debt beta assumptions are not presented, so we cannot comment on the approach used to derive the asset betas.

[3] *In the case of the NATS PFs the relevant duty applies under the TA 2000 (To secure that NERL will not find it unduly difficult to finance activities authorised by our Licence). This is naturally different to the version that applies to Ofwat under the WIA 91 (secure that companies holding appointments under Chapter 1 of Part 2 of this Act as relevant undertakers are able (in particular, by securing reasonable returns on their capital) to finance the proper carrying out of those functions). The latter is potentially an even more binding constraint reflecting the asset intensive nature of the sector.*

2 BACKGROUND AND PURPOSE

2.1 BACKGROUND AND PURPOSE

(8) This note provides input into the provisional findings in the NATS (En Route) Plc / CAA Regulatory Appeal, hereafter the 'NATS PFs'.

(9) Northumbrian has appealed its regulatory settlement and submitted its SoC on the 2nd of April 2020. As part of our SoC, we have procured an independent, expert assessment on WACC from KPMG and Professor Alan Gregory (the "Expert report on the allowed return" or "WACC expert report" or "KPMG/AGRF"). Professor Gregory is a Professor Emeritus in Corporate Finance at the University of Exeter and a director of AGRF Ltd. His research interests are in the general area of market-based empirical research, including the empirical estimation of cost of capital. From September 2001 to September 2009 he was a Reporting Panel Member of the UK Competition Commission (CC) where he was involved in a number of inquiries, including the merger investigation of two potential European takeover bids for the London Stock Exchange, and the groceries or "supermarkets" market investigation.

(10) Professor Gregory was a member of the CC's cost of capital panel from 2009 to 2017 and continues to provide advice to the Competition and Markets Authority (CMA). In addition to more than thirty papers in peer-reviewed academic journals, he has contributed to an OECD Roundtable publication on Excessive Prices and is the author of the Financial Times book 'Strategic Valuation of Companies'.

(11) Throughout this note we provide a comparison with that expert report and the views of KPMG and Professor Alan Gregory as well as highlighting other areas the CMA may wish to consider in relation to the PFs for NATS.

(12) The following parameters have read across and are therefore addressed in this report:

- Risk free rate (RFR);
- Total market return (TMR); and
- Beta.

(13) For each parameter we summarise the CMA's approach in the NATS PFs and then set out our key concerns with the approach taken. These concerns also draw out inconsistencies with the KPMG/AGRF expert report.

3 RISK FREE RATE

3.1 SUMMARY OF THE CMA'S APPROACH IN NATS PFS

(14) In the NATS PF's, the CMA uses yields on index-linked gilts (ILGs) to obtain the most appropriate basis for the measurement of a notional investor's achievable risk-free returns.[4]

(15) Nominal gilts evidence is not given much weight and the CMA appears to take the view that nominal yields include an inflation risk premium and therefore that the use of unadjusted deflated nominal yields would be inappropriate when inflation risk is largely passed on to NATS' customers. It finds that, given the level of uncertainty in the inflation risk premium, appropriately adjusted nominal gilt yields are not materially different from estimates provided by ILGs, with ILG-based estimates having the advantage of being directly observable.[5]

(16) The CMA disregards evidence of long-run interest rate expectations that is provided by data from two sources:

- the market for US Treasury Inflation-Protected Securities (US TIPS); and,
- the BoE's estimate of the long-run 'trend' component of the equilibrium real interest rate, R*.

(17) Both of these sources are referenced in the KPMG/AGRF WACC report. Evidence provided by US TIPS is disregarded by the CMA as a result of its view that international RFR data is not appropriate for a notional investor buying equity in a regulated UK asset that has pound sterling-denominated assets and cashflows.[6]

(18) The CMA dismisses evidence provided by the BoE's R* estimate because it does not consider there is any evidence to suggest that risk free investment returns will reach or trend towards this figure within the period in question.[7]

(19) The CMA's estimate for the RFR is based on spot yields on ILGs with a 10-year maturity. Spot and three- and six-month trailing averages for yields at 10, 15 and 20-year maturities are qualitatively described as a cross check. However, in fact they drive a significant portion of the CMA's estimated range of -2.60% to -2.20%. The midpoint of this range, -2.40%, is used by the CMA as a basis for its RFR assumptions.[8]

(20) The figure of -2.40% is subsequently adjusted upwards to account for anticipated increases in yields between now and the middle of RP3. The CMA's approach uses implied forward gilt yields at different maturities for the period covering RP3 and estimates the adjustment to be 0.15%, based on an average of six months of end-of-month yields. This therefore results in a real RFR in RPI terms of -2.25%.[9]

(21) The CMA does not consider any further adjustment to current market expectations, or the introduction of an indexation mechanism, to account for the possibility that current market rates are in disequilibrium and/or that current yields are subject to significant volatility.

3.2 NWL RECOMMENDATION ON HOW THE CMA'S APPROACH COULD BE FURTHER IMPROVED

(22) The KPMG/AGRF Report concludes that the for the purposes of setting a fixed allowed return for the RFR, a glide path from estimates using current yields on UK assets with negligible risk to equilibrium rates should be adopted.[10] The effect of this approach is to place weight on both equilibrium and current market estimates, with most weight placed on the former. Disregarding the current distortions in UK yields and the volatility of the series, runs the real risk that the allowed RFR differs to the outturn rate.

---

[4] *CMA (2020), "NATS (En Route) Plc / CAA Regulatory Appeal: Provisional Findings",(referred to as 'CMA (2020), NATS PFs' in future references), paragraph 12.251*
[5] *CMA (2020), NATS PFs, paragraph 12.252*
[6] *CMA (2020), NATS PFs, paragraph 12.255*
[7] *ibid.*
[8] *CMA (2020), NATS PFs, paragraphs 12.258 and 12.259 and Table 12-15*
[9] *CMA (2020), NATS PFs, paragraphs 12.260 and 12.261*
[10] *KPMG/AGRF WACC Report, paragraph 4.5.21*

- the KPMG/AGRF report proposes that an appropriate approach to setting a fixed RFR for regulatory charge control purposes, is to place weight on estimates of the RFR that are expected to prevail over the long run. Under this approach, whilst outturn values of the RFR over the charge control may deviate from the estimate, the long-run equilibrium estimate will broadly reflect the outturn RFR on average.

- in contrast to the CMA, KPMG/AGRF stresses the importance of not basing the estimation of the RFR solely on current market ILG yields. It is broadly accepted that current yields on UK market instruments with negligible risk provide an appropriate basis on which to derive an estimate for the current instantaneous WACC. However, it will not, in general, be the case that an estimate based on current yields will remain appropriate for an estimate of the WACC over the regulatory horizon. This is because current yields provide estimates of the RFR that are dependent on current available information, so are therefore likely to experience considerable volatility and may be distorted by current market conditions. It is likely that these short-term estimates will vary significantly over short periods, and there is no reason to expect that current yields will reflect the outturn RFR on average.

(23) The KPMG/AGRF report considers at least three reasons why regulators cannot be confident that current ILG yields will persist:

- the 'International Fisher Effect' posits that in open economies, real interest rates across countries should be equal. This is because if risk free assets are readily transportable and instantly transferrable then the prices of these assets should be identical in a manner akin to the theory of Purchasing Power Parity (PPP). Therefore, it suggests that long-run expectations for real interest rates in the UK will be influenced by those of other countries.[11] Data from yields on US TIPS illustrates that rates on UK riskless assets are significantly beneath those of the US and therefore that they may be expected to rise over the long term.

- current market yields on UK assets with negligible risk are substantially negative and inconsistent with equilibrium evidence from the BoE, which is positive in real CPI terms. Notwithstanding the arguments in Wright et al (2018)[12], it has hitherto been unusual to find any arguments to support the rationalisation of a negative RFR. The normal assumption is that time preference for consumption now rather than consumption in the future would ensure a positive real interest rate. The "neo-classical" assumption is that this rate would be close to the long run steady-state GDP growth rate (e.g. Taylor (1993))[13].

- yields on ILG are volatile. This volatility is heightened at present due to Brexit and Covid-19 related issues. Therefore, it is likely that estimates based solely on current market yields will deviate materially from outturn RFR values.[14]

(24) Setting aside the position in the KPMG/AGRF Report that weight should be given to the equilibrium evidence. The CMA's approach in determining the RFR is not suitable for a number of reasons, including:

- the yields on assets with negligible risk in the UK are volatile, which significantly increases the risk that the outturn RFR will deviate substantially from its estimate on any particular day;

- the CC/CMA has historically set the RFR above the prevailing ILG yields due to distortions in the market for ILGs;

- disregarding or not considering other UK assets with negligible risk besides ILGs introduces market- or ILG-specific distortions into estimates of the RFR;

- disregarding equilibrium evidence from the BoE and international evidence provided by US TIPS ignores the fact that the distribution for the outturn RFR is likely to be skewed towards higher values; and

- taking the mid-point of an appropriate range for estimate of the RFR would ignore asymmetric considerations, such as the risk on either side of the trade-off between incentivising investment versus keeping bills low, and the one-sided Financeability duty.

(25) These issues are discussed in further detail below.

---

[11] *KPMG/AGRF WACC Report, paragraph 4.5.17*

[12] *Wright et al (2018), 'Estimating the cost of capital for implementation of price controls by UK Regulators', (referred to as Wright et al (2018) in future references)*

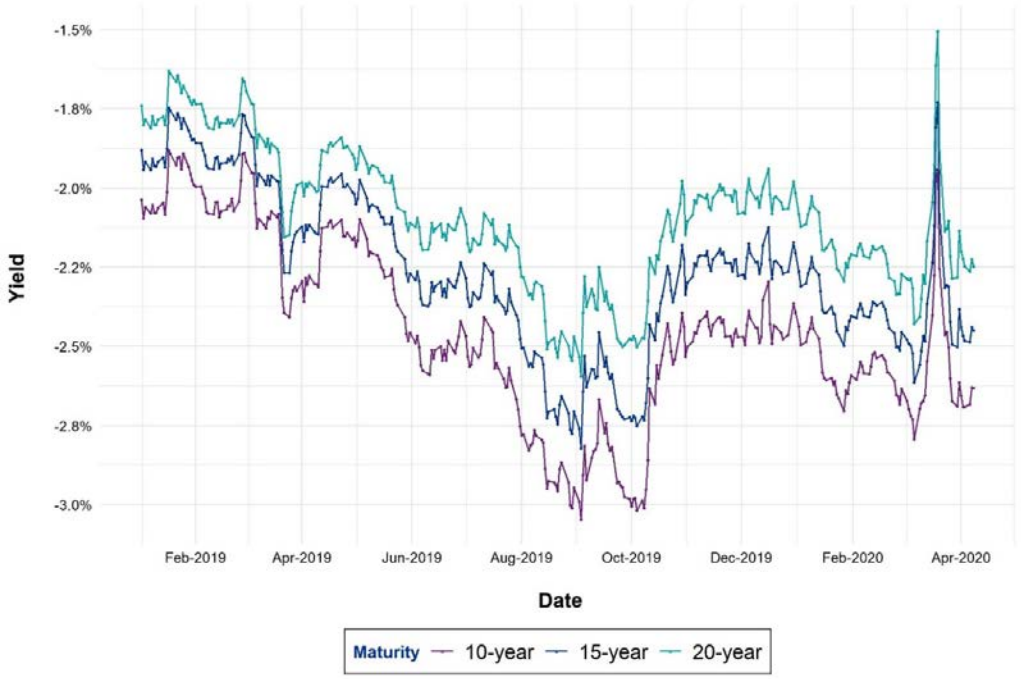
[13] *Taylor, J (1993): 'Discretion versus policy rules in practice', Carnegie-Rochester Conference Series on Public Policy, no 39, pp.195–214*

[14] *KPMG/AGRF WACC Report, paragraph 4.5.18*

3.2.1 Yields on ILGs are volatile

(26) The yields on long-term ILGs have been volatile in the past, and continue to be volatile. The figure below illustrates the 10, 15 and 20-year ILG spot yields over the period January 2019 and March 2020. It shows that the pre-adjusted RFR estimate (i.e. pre-adjusted for the likely increase in yields) in the CMA's Provisional Findings on NATS of – 2.40% is already outdated, with 15-year spot rates varying between – 1.73% and -2.61% in March 2020. This suggests that under the CMA's approach, the ILG spot estimate could have changed by -21bps to +67bps in March (compared to its -2.40%) simply by virtue of the date on which the CMA conducted its analysis.

Figure 1: 10. 15 and 20-year yields on ILGs from January 2019 to March 2020

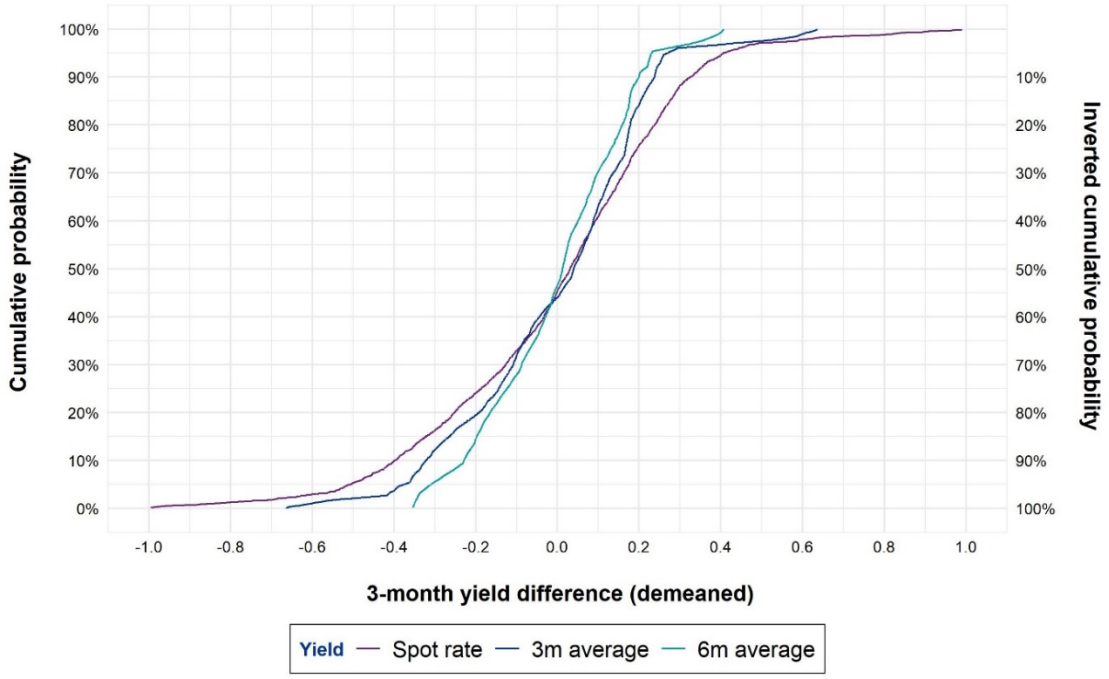


Source: Bank of England, Yield curves data.

(27) Setting a fixed assumption for the RFR over the charge control period using the current volatile data, such as on ILG yields, would increase the risk that the outturn RFR will deviate significantly from the regulator's fixed assumption. This is supported by the evidence in the figure below, which illustrates that between January 2010 and April 2020, the resulting RFR three months after any particular estimation date would have deviated from the initial estimate by more than 25bps on ~ 40% of occasions, and by more than 50bps on~ 10% of occasions.[15]

[15] *Whilst it could be the case that the resulting RFR may deviate from estimates based on equilibrium and international data by a similar amount, equilibrium estimates are designed to reflect the resulting long term RFR on average, so over time the deviations should cancel out. This is not the case with estimates based solely on current yields.*

Figure 2: Cumulative distribution of the deviation between yields and their 3-month lag from January 2010 to April 2020

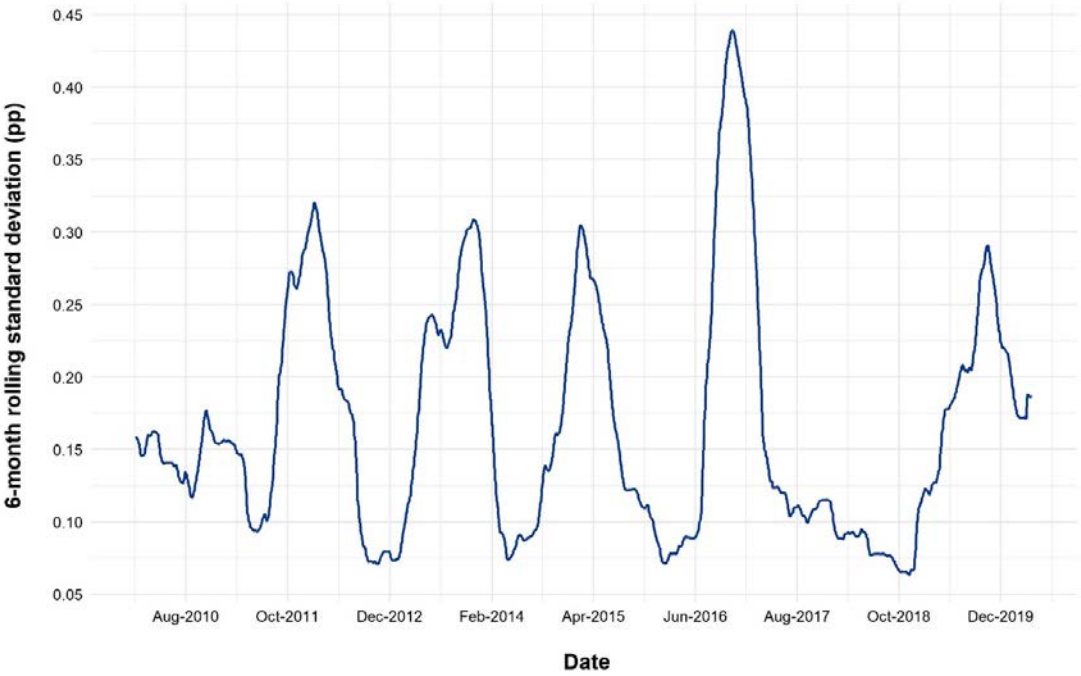


Notes: 3-month difference defined as difference between yield and its 90 working day lag. Mean yield difference of relevant PR period substracted from differences. 3m (6m) yield average defined as 90- (180-) working day historical yield average. All yields refer to 15-year ILGs.

Source: Analysis of Bank of England Yield Curves data.

(28) Spikes in volatility are not uncommon as illustrated in the figure below, which shows that the 6-month trailing standard deviation of 15-year ILG yields has oscillated fairly periodically between approximately 5bps and more than 30bps, during the period from January 2010 to April 2020. This demonstrates that no potential lull in volatility can be expected last for a significant period of time.

Figure 3: Six-month trailing standard deviation of 15-year ILG yields



Notes: 6-month rolling standard deviation defined as standard deviation of yields in previous 180 business days.

Source: Analysis of Bank of England data

(29) It should be noted that the introduction of a trailing average does serve to lower the volatility of the RFR estimate driven by current ILG yields. However, it is no more likely to reflect the outturn RFR over the charge control. This is because it does not capture any more information on forward-looking considerations, than the spot yield on a given day.

(30) Current UK macroeconomic issues that revolve around Brexit and the Covid-19 crisis have resulted in ILG yields that are particularly volatile by historical standards. This exacerbates the issues concerning volatility in the ILG yields that are discussed above.

(31) Locking in a fixed allowance based on yields on a volatile series runs the risk that the RFR allowance differs from outturn values, in either direction. This is illustrated by the CMA's own estimate for the RFR, which is 55 bps beneath the CAA's Final Decision for RP3[16], with the change being driven primarily by an update in yield data.

(32) Absent an indexation or reconciliation mechanism, the allowed cost of equity is therefore likely to differ to the market cost of equity over the relevant time horizon. Whilst this difference in outturn values may be in either direction, 1) the equilibrium evidence suggests that the likely distribution is skewed to the upside and 2) there are asymmetric considerations with regards to over/under estimating the WACC, which are discussed below.

3.2.2 The CC/CMA has historically set the RFR above the prevailing ILG yields due to distortions in the market for ILGs

(33) A negative RFR over an extended period is difficult to explain in economic terms. It implies that investors are investing in order to be able to consume less in the future than they can consume now. This is counter-intuitive and suggests that the CMA should take another, deeper look at the estimate of the RFR proposed in the NATS PFs before making its final decision.

(34) The CMA historically set the RFR above the prevailing ILG yields as illustrated in the table below. The basis for this is that there were distortions in the market for ILGs, which suggests that ILGs were not a reliable indicator of the CAPM risk-free rate of return. However, the CMA has not followed a consistent approach in setting the RFR under the NATS PF by setting a RFR that is in the range implied by the market evidence on ILGs.

Table 1: CC / CMA precedent on RFR and supporting evidence

Averaging method	RFR implied by ILGs	CC / CMA estimate of RFR, real (RPI)	CC / CMA comment
CC (2010), Bristol Water	1%	1 – 2%	For maturities of 15 years and more, the current IL yield curve is roughly flat at 1%.[1]
CC (2014), NIE	0%	1 – 1.5%	For maturities of 15 years and more, the current IL yield curve is roughly flat at 0%.[2]
CMA (2015), Bristol Water	0%	1.25%	The evidence indicates that gilt yields remained low, often around 0%.[3]
CMA (2020), NATS PF	-2.6 to -2.2%	- 2.4%	We estimate a suitable RFR would be in the range of -2.60% to -2.20% and use -2.40% as an appropriate basis of our RFR assumptions.[4] Note, this does not include the adjustment for the anticipated increase in yields.

Source: [1] CC (2010), Bristol Water plc price determination' Final Determination, Annex N, para. 65 and 73. [2] CMA (2014), 'Northern Ireland Electricity Limited price determination' Final Determination, para. 13.120, 13.129; [3] CMA (2015), 'Bristol Water plc' Final Determination, para. 10.171 10.173; 4 CMA (2020), NATS PFs, para. 12.259

(35) The CMA acknowledges in the NATS PFs that "*there is a spectrum of views as to whether current market-based risk-free rates are distorted in absolute terms*".[17] However, the CMA does not explore what these alleged distortions are. Rather it takes an extreme position by reading directly across from current ILG yields without making any adjustments, as discussed and illustrated in the table above.

(36) Overall, when setting the RFR, the CMA should consider that ILG yields could be distorted and why it should not only rely on evidence on ILG yields. These include:

[16] *CMA (2020), NATS PFs, para. 12.238 and 12.261*
[17] *CMA (2020), NATS PFs, para. 12.253*

- pension funds are the main purchasers of ILGs[18]. These funds have a relatively inelastic demand for gilts because pension funds typically target long-term stable inflation linked cash flows. This implies that pension funds are not as sensitive to the price of ILGs, which has resulted in yields falling below fundamentals;

- in the NIE Final Determination (NIE FD), the CC has stated that it *"considered that long-dated index-linked gilt yields have been affected by distortions (associated, for example, with pension fund dynamics) and that these need to corrected in estimating the RFR applicable to the cost of equity"* [19]; and

- the marginal equity investor in a regulated company is not likely to be a significant purchaser of UK ILGs. The return that the marginal equity investor expects from a riskless asset is therefore likely more in line with the return on the global risk-free rate assets as discussed in the KPMG/AGRF report.

3.2.3 The sole use of ILGs introduces asset-specific distortions into estimates of the RFR

(37) The CMA relies solely on evidence provided by longer-term ILG yields and does not consider alternative UK assets with negligible risk. Evidence from yields on nominal gilts is disregarded on the basis that nominal yields include an inflation risk premium, and therefore that the use of unadjusted deflated nominal yields would be inappropriate when inflation risk is largely passed on to their customers.

(38) KPMG/AGRF consider that relying solely on yields on longer-term ILGs is not appropriate for the following reasons:

- in the presence of inflation swap markets, it is unlikely that an inflation premium will render (appropriately deflated) nominal gilts yields higher than ILG yields. This is because the cashflows on both nominal and ILGs can be constructed so that they are equivalent: 1) a nominal Gilt plus an inflation swap would lead to nominal cashflows, linked to the outturn rate of inflation; and 2) an ILG pays nominal cashflows, which are linked to the outturn rate of UK inflation. As both cashflows are equivalent, a material wedge between ILG and nominal yields due to inflation premia is not expected. . An analogous argument to the CMA in this regard would be to suggest that a US investor choosing to invest in UK gilts would demand a higher risk premium than a UK investor on the basis that he must be rewarded for exchange rate risk. However, they both clearly agree on the price at which a UK gilt should be purchased as large notional amounts of UK gilts are bought by international investors on a daily basis. Therefore, an approach to relying on appropriately deflated nominal gilts is as robust as one relying on ILGs;

- the demand for ILGs may be distorted by market-specific factors when compared to alternative UK assets with negligible risk for the following reasons: 1) the eligibility of ILGs for use as collateral in secured lending transactions by wholesale market participants may attract a convenience adjustment which would depress yields downwards; 2) regulatory constraints may result in different investor bases preferring to hold ILGs over alternative near risk-free assets such as nominal gilts; and 3) the outstanding notional value of nominal gilts is significantly larger than that of index-linked gilts. Therefore, any embedded compensation for liquidity risk is likely to be larger for index-linked than for nominal gilts, which may distort observed yields. This has been observed by Ofwat, and estimated to be 8 basis points as of February 2019[20]; and

- the BoE's Working Group on Sterling Risk-Free Reference Rates' endorses the use of the interbank benchmark SONIA[21] (and related OIS swaps) as its preferred near risk-free interest rate benchmark[22].

(39) KPMG/AGRF consider a prudent approach to estimating the RFR directly from current market data would be to place weight on all alternative UK assets, which have negligible risk. Placing weight on other UK instruments serves to increase the estimated RFR by an order of approximately 30 to 50 basis points, depending on the instrument and time period chosen.[23]

3.2.4 Disregarding equilibrium evidence from the BoE and international evidence provided by US TIPS ignores that the distribution for the outturn RFR is likely to be skewed towards higher values

(40) As outlined in KPMG/AGRF Report, it is important to consider the evidence provided by US TIPS. This is because the 'International Fisher Effect' suggests that long-run expectations for real interest rates in the UK will be influenced by those

---

[18] *See for example: Schroders (2016), 'Pension funds and index-linked gilts', June. Available: https://www.schroders.com/en/sysglobalassets/schroders/sites/ukpensions/pdfs/2016-06-pension-schemes-and-index-linked-gilts.pdf*

[19] *CMA (2014), 'Northern Ireland Electricity Limited price determination' Final Determination, para. 13.117*

[20] *Ofwat, PR19 Draft Determinations: Cost of capital technical appendix, p.23*

[21] *SONIA (Sterling Overnight Index Average) is an interest rate benchmark that reflects the average of the interest rates that banks pay to borrow sterling overnight from other financial institutions*

[22] *The Working Group on Sterling Risk-Free Reference Rates, 'SONIA as the RFR and approaches to adoption', June 2017, p.1*

[23] *See for example Table 4 of Setting the Cost of Equity in UK Price Controls, by Professor Alan Gregory.*

of other countries. Data from yields on US TIPS illustrates that rates on UK riskless assets (after adjusting for the different methods of indexation) are significantly beneath those of the US and therefore that they may be expected to rise over the long term.

(41) The CMA disregards evidence provided by US TIPS on the basis that: 1) International RFR data is not appropriate for a notional investor buying equity in a regulated UK asset that has pound sterling-denominated assets and cashflows, and 2) there is no evidence of convergence between US TIPS and UK ILGs.

(42) The CMA notes that '*US TIPS yields have remained above UK ILG yields (normalised for their different inflation adjustment methods) for a number of years, with no evidence of convergence between them*'[24].However, the CMA provides little discussion of its approach to assessing the convergence of the two series.

(43) In assessing whether yields on US TIPS and UK ILGs are likely to converge in the long term, it is necessary to consider the drivers of observed differences between yields of equal maturities, and the likelihood that these differences will persist. KPMG/AGRF accepts that the differences in inflation indexation adjustment methods between US TIPS and UK ILGs will mean that, in general, a non-zero difference in yields is to be expected over the long term. However, it is not the absolute level of this long term difference that is important, but rather whether the recent deviations away from this long term difference may be expected to persist.

(44) The figure below illustrates the observed yields on UK ILGs and US TIPS with a 10-year maturity between 2005 and 2020. It can be observed that the difference between the series was broadly constant until the start of 2013, which can be expected as a result of the International Fisher Effect. Since then, however, two events can be identified at which time the difference between UK and US inflation-linked yields deviated considerably from its long term average. These events are set out below.

- in the period between policy meetings of the US Federal Reserve in April and June 2013, US policymakers revealed their intention to reduce the magnitude of their Quantitative Easing programme. Yields on 10-year US TIPS rose by approximately 50 bps more than equivalent UK yields during this period[25]; and
- the UK held its 'Brexit' referendum on its membership of the European Union in June 2016..Following the result, yields on UK ILGs fell by approximately 1 percentage point.[26]

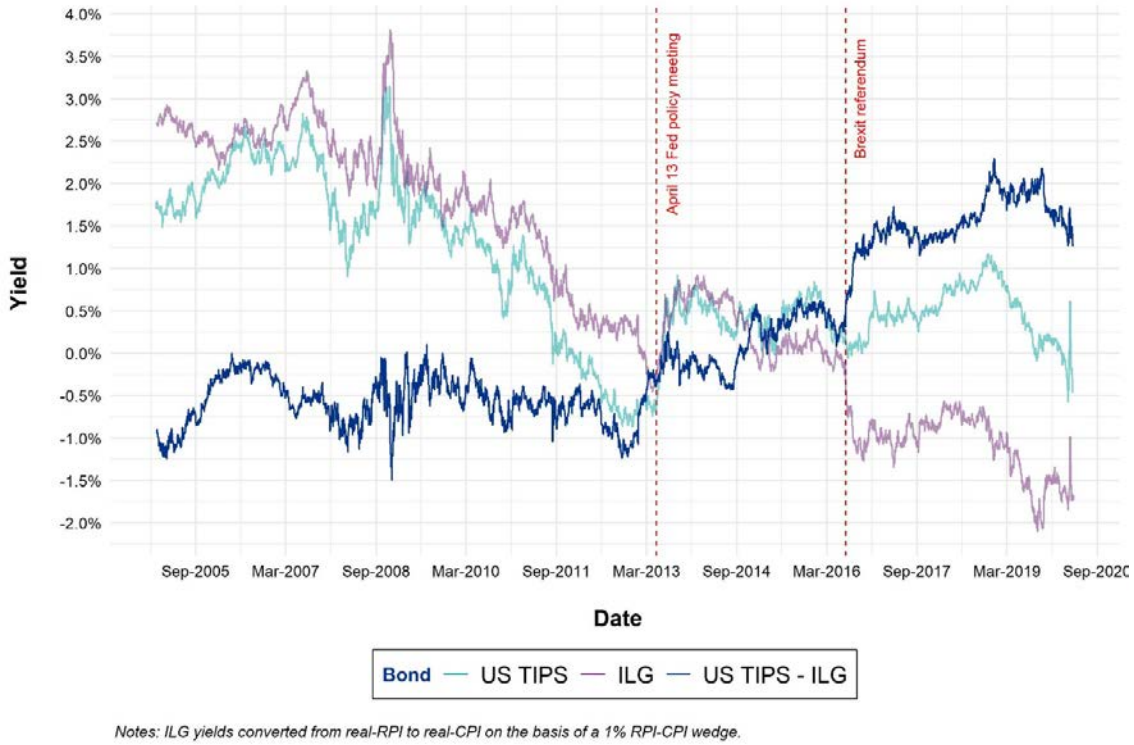
(45) Changes to exceptional US monetary policy and the negotiation of the UK's ongoing arrangement with the European Union are likely to be temporary in nature. Therefore, in light of: 1) the international investor base of utilities, and 2) the drivers of the current deviation in US and UK bond yields being exceptional events, the yields on US TIPS remain relevant for determining whether the distribution for the outturn RFR is likely to be skewed towards higher values.

[24] *CMA (2020), NATS PFs, para. 12.251*

[25] *Between the day before 30 April/1 May 2013 policy meeting and the day after the 18/19 June 2013 policy meeting, ILG yields (US TIPS yields) increased from approximately -0.29% (-0.67%) real CPI, to +0.34% (+0.46%) real CPI.*

[26] *10-year ILG yields dropped from -0.08% on 23 June 2016 to -1.05% on 10 August 2016, in real CPI terms. The BoE introduced a number of measures to mitigate the potential impact of the referendum result, such as a reduction in the official Bank Rate and an extension of its Quantitative easing programme*

Figure 4: Yields on UK ILGs and US TIPS with a 10-year maturity from 2005 to 2020



Notes: ILG yields converted from real-RPI to real-CPI on the basis of a 1% RPI-CPI wedge.

Source: Federal Reserve Economics Department, Federal Reserve Bank of St. Louis

(46) The CMA also dismisses evidence provided by the BoE's R* estimate on the basis that it does not consider there is any evidence to suggest that risk free investment returns will reach or trend towards this figure within the period in question.

(47) The BoE states that when estimating R*: '*one approach is to use market-based measures implied by long-term government bond yields*. As explained in the May 2017 Report[27], 'term structure' models can be used to decompose these yields into expected future short-term interest rates and term premia, which are the additional compensation that investors require for holding longer-maturity assets.[28] It is therefore the case that estimates of R* computed by the BoE are based on the same underlying principle and evidence base as that of the CMA in estimating the RFR; i.e. yields on long-term UK government bonds provide an estimate of expected risk-free rates in the future.

(48) Overall, this supports that more weight should be placed on evidence provided by the BoE's estimate for R*. This equilibrium evidence is important and it again, in conjunction with the data provided by US TIPS, suggests that the distribution for the outturn RFR is likely to be skewed towards higher values.

3.2.5 Taking a midpoint estimate for the RFR ignores asymmetric considerations

(49) The CMA takes the midpoint of its estimated range from ILG yields of -2.25%, and uses this as both the lower and upper bound for its WACC range.[29] This overlooks::

- the inherent uncertainty in estimating the RFR over the regulatory horizon, in light of the distorted and volatile UK yields, as explained in paragraphs (26) to (32) and (37) to (39) above; and
- the asymmetric considerations with regards to the allowed RFR being above or below the outturn RFR.

[27] *Bank of England (2017), 'Inflation Report', May, p.6-7 https://www.bankofengland.co.uk/-/media/boe/files/inflation-report/2017/may-2017.pdf?la=en&hash=92BA13788FBF71CBC9D800DDCD0EA3D217008867*

[28] *Bank of England (2018), 'Prospects for inflation. Section 5 of the Inflation Report', August. https://www.bankofengland.co.uk/inflation-report/2018/august-2018/prospects-for-inflation*

[29] *CMA (2020), NATS PFs, Table 12-17*

(50) The asymmetric considerations, with respect to setting the overall WACC too high versus too low are discussed in detail in 'Setting the Cost of Equity in UK Price Controls, by Professor Alan Gregory'.[30] However, the following two concerns are particularly pertinent to the risks arising from locking in a spot RFR from a volatile series.

— first, the Financeability duty is asymmetric, in so far as the duty to ensure that an efficient company can finance its functions is only called in to question when the fixed allowance, which is dependent on the RFR, is beneath the actual WACC. Therefore if the outturn RFR is higher than the CMA's fixed allowance and the CMA has calibrated all other parameters in the WACC in line with market evidence, the Financaebility duty will be breached.

second, whilst there is debate as to whether the allowed WACC should be above the mid-point, it should not be controversial that an allowed WACC that is below market rates, will lead to reduced investment. If the outturn RFR is higher than the CMA's fixed allowance and the CMA has calibrated all other parameters in the WACC in line with market evidence, then incentives to invest will be dampened.

3.2.6 Summary

(51) In summary:

— the CMA's approach, of locking in rates based on current yields on ILGs, risks the allowed RFR differing to the outturn RFR, as a result of the volatility in the series.

— the CC/CMA has historically set the RFR above the prevailing ILG yields due to distortions in the market for ILGs.

— the CMA's sole use of ILG's overlooks asset specific distortions in ILGs. A wider range of instruments should then be used in order to estimate current yields on risk-free assets.

— the CMA's disregard of US TIPS and BoE equilibrium evidence is inconsistent with the evidence and serves to overlook evidence that the distribution for the outturn RFR is likely to be skewed towards higher values.

— the CMA's approach overlooks the asymmetric consequences of the outturn RFR being higher/lower than the fixed allowance.

(52) A more appropriate approach for a fixed allowance in a regulatory charge control, is to adopt a glide path from current yields to a forward looking equilibrium RFR. This approach recognises the volatility and distortions in current ILG yields as well as the asymmetric consequences of setting the WACC too low versus too high.

[30] *Setting the Cost of Equity in UK Price Controls, by Professor Alan Gregory, 2 January 2020, Section 11.*

4 TOTAL MARKET RETURN

4.1 SUMMARY OF THE CMA'S APPROACH IN NATS PFS

(53) In deriving the Total Market Return (TMR), the CMA considers both historical ex post and historical ex ante evidence. It does not place any weight on forward-looking approaches, noting that they are *"…largely assumption-driven, with little evidence to support the use of one set of assumptions over others, and they produce a wide range of estimates."*[31]

(54) In order to estimate historical equity returns, a historic time series of nominal returns needs to be deflated by a measure of inflation to estimate real equity returns. The CMA undertakes analysis using both 'CED/CPI' and 'CED/RPI'. In both cases the consumption expenditure deflator (CED) is used from 1900 to 1947 since neither RPI nor CPI existed and because the Office for National Statistics (ONS) prefers CED to the cost of living index (COLI).[32] Subsequent to 1947, RPI and CPI (actual plus 'backcast') are used, with greater weight placed on CPI because:

- RPI is a less robust measure of inflation than CPI due to its use of the Carli formula which can cause an upward bias; and
- RPI is an inconsistent measure of inflation due to changes in the underlying methodology to calculate it. The clearest example of this was a significant increase in the formula effect in 2010 as a result of a change to the way clothing prices were collected.[33]

(55) The CMA, however, also observes that the CPI data series has some issues in terms of its coverage of goods and services and as a result believe it is appropriate to consider the TMR estimates using RPI data as a cross-check on the CPI results.[34]

(56) The CMA uses the CED/RPI as cross-check only and considers that CED/RPI is overstated by 30 – 40 bps, due to the change in RPI formulation in 2010.[35]

(57) The table below illustrates the approaches taken by the CMA on averaging, and the results of its analysis.

Table 2: CMA's estimates of TMR on ex post data, 1900 to 2019

Averaging method	Holding period (years)	CED/CPI (real CPI)	CED/RPI (real RPI)	CED/CPI (real RPI)
Arithmetic mean	1	7.0%	6.7%	5.9%
Geometric mean	120	5.2%	5.0%	4.2%
Blume (1974)	10	6.8%	6.6%	5.7%
	20	6.4%	6.5%	5.3%
JKM (2005) unbiased	10	6.9%	6.6%	5.8%
	20	6.7%	6.5%	5.6%
JKM (MSE)	10	6.6%	6.3%	5.5%
	20	6.1%	5.9%	5.0%
Overlapping	10	6.6%	6.4%	5.5%
	20	6.7%	6.4%	5.6%
Non-overlapping	10	6.8%	6.5%	5.7%
	20	7.2%	6.8%	6.1%

Source: CMA (2020), NATS PFs, Table 12-14. The column, CED / CPI (real RPI) has been added to for comparability purposes. It is derived by adjusting the CMA's CED / CPI series by 100bps using the Fisher equation.

(58) Based on the historical ex post data, the CMA derives a range of 6.1% - 6.9% for CED/CPI. After adjusting for the RPI/CPI wedge of approximately 100bps this gives a RPI real range of 5.1% - 5.9%. The estimates if the RPI real TMR using the

[31] *CMA (2020), NATS PFs paragraph 12.166*
[32] *CMA (2020), NATS PFs, para. 12.190*
[33] *CMA (2020), NATS PFs, para. 12.192*
[34] *CMA (2020), NATS PFs, para. 12.194 - 12.195*
[35] *See paragraph (55). This 30-40 bps deduction is based on the fact that the formula effect increased from 0.5% to 0.8-0.9% due to the 2010 change in the way clothing and footwear prices were calculated for RPI. However, there are two versions of the formula effect, coded DRA9 and CRFU. The former is a reconciliation between RPI and CPI that takes RPI as its base. It then takes the coverage differences between CPI and RPI and then calculates the effect of the CPI formula on the CPI. This is the version of the formula effect used by the CMA. However, the other formula effect, CRFU, identifies the effect of the RPI formula on RPI figures. In this way it is independent of CPI and is therefore the correct measure to use when looking at how the 2010 changes affect RPI. If CRFU figures are used rather than RPI, the formula effect increase from 2010 is from 0.35-0.4% to 0.65%, equating to 25-30 bps, rather than 30-40 bps.*

CED/RPI data is a range of 5.9 – 6.6%, however, the CMA makes the following adjustments which result in a range of 5.6 – 6.2%. The CMA:

- excludes the arithmetic and geometric averages and the non-overlapping estimates on the basis that they are based on small sizes;[36] and
- deducts 30 – 40bps from the CED/RPI range of 5.9 – 6.2% due to the change in the formula effect from 2010, which results in a range of 5.6 – 6.2%.[37]

(59) For the historical ex ante evidence, the CMA uses the Fama and French approach[38] and data from the 2018 Barclays Equity Gilt Study[39], which suggests a TMR of around 5.7% (noting that this figure has been deflated by RPI inflation).[40] The CMA also uses the decomposition approach in the Dimson, Marsh and Staunton (DMS) dataset[41], with both the CED/CPI and CED/RPI inflation series. DMS uplift the geometric mean returns by 150bps in order to derive the arithmetic mean.[42]

(60) The CMA finds that, on an ex ante basis, the evidence suggests a range of between 4.1% and 6.5% depending on whether CPI or RPI is used, and whether geometric or arithmetic means are considered.[43]

(61) Overall, based on the estimates produced under the historic ex post and historic ex ante approaches, the CMA considers the TMR (on a real RPI basis) to be in the range 5.0 – 6.0%.[44] The CMA notes that the discrepancy between this and the 5.0 – 6.5% range calculated for the NIE FD[45] is due to:

- the use of CED rather than COLI, as the measure of pre-1947 inflation; and
- the downward adjustment of 30 – 40 bps to the RPI deflated returns as a result of the formula effect of 2010.

(62) The CMA presents a range for the TMR, but does not come to a view on a point estimate.[46] However, it selects the mid-point of the WACC range, which implies that it has implicitly adopted a TMR of 5.5%, real RPI (the mid-point of the 5.0 – 6.0% TMR range). This is lower than the 6.5% point estimate in the NIE (2014) FD, where the CMA selected the upper end of the TMR range.[47]

4.2 NWL RECOMMENDATION ON HOW THE CMA'S APPROACH COULD BE FURTHER IMPROVED

(63) The following factors are considered:

- the CMA's range on TMR is markedly lower than estimates used in previous inquires, the CMA should put more weight on the adjusted RPI series, and at a minimum should point to an estimate for the TMR that sits at the top end of its range;
- the range and mid-point do not reflect the CMA's own results;
- there is no discussion of regulatory consistency; and
- an update should be made for DMS 2019 data.

[36] *CMA (2020), NATS PFs, para. 12.201 and 12.202*
[37] *CMA (2020), NATS PFs, para. 12.201 and 12.208*
[38] *Fama and French (2002), 'The Equity Premium', Journal of Finance Vol 57, No.2*
[39] *Barclays Equity Gilt Study 2018, Figure 7, p. 107 – 109*
[40] *CMA (2020), NATS PFs, para. 12.212*
[41] *Credit Suisse Global Investment Yearbook 2019, p.34, Table*
[42] *CMA (2020), NATS PFs, para. 12.216, 12.220 and 12.221*
[43] *CMA (2020), NATS PFs, para. 12.233*
[44] *CMA (2020), NATS PFs, para. 12.234*
[45] *CMA (2014), 'Northern Ireland Electricity Limited price determination' Final Determination, para. 13.117, paragraph 13.141*
[46] *CMA (2020), NATS PFs, para. 12.280*
[47] *CMA (2014), 'Northern Ireland Electricity Limited price determination' Final Determination, para. 13.189*

4.2.1 The CMA's range on TMR is markedly lower than estimates used in previous inquires. It should put more weight on the adjusted RPI series, and at a minimum should point to an estimate for the TMR that sits at the top end of its range

(64) The CMA's range on TMR of 5 – 6% in the NATS PFs is lower than the 6.5% point estimate in the NIE (2014) FD, where the CMA selected the upper end of the TMR range.

(65) The lower TMR is not driven by new market evidence, but rather is a consequence of the CMA revising its previous research. Specifically, the CMA has created a new CED/CPI returns series (as discussed in section 4.1 above), which has resulted in a different benchmark compared to its previous benchmarks.

(66) The CMA has effectively switched from analysing the TMR in RPI terms to CPI terms. However, in order for this to reflect an accurate estimate of the TMR, the CMA needs to ensure that it is confident in its approach. NWL does not consider that the CED/CPI series is strong enough to bear the weight that the CMA is expecting it to carry for the following reasons:

- the KPMG/AGRF report placed 100% weight on RPI for the period 1947 to 2018, the rationale for which was set out in paragraphs 4.2.18 to 4.2.20 of the KPMG/AGRF Report.
- the ONS itself has stated that the calculation of CPI inflation data between 1948 and 1988 contains errors and will be replaced with new data by the end of the year.[48] Prior to 1988, backcast estimates have to be relied upon, which the ONS themselves caution against using, noting:

  "…the results of the estimation procedure are analysed in order to make a broad assessment of whether or not the estimates appear reasonable. It is difficult to assess the accuracy of the series, as the true CPI can never be known. For that reason it is also worth emphasising that these modelled estimates can only be considered as broad indications of the level of the CPI series at best and caution should be exercised when using these series. For the same reason, these estimates are not National Statistics." [49]
- the KPMG/AGRF WACC report recognises that there are changes in the RPI formula over time as consumer behaviour changes and new modelling techniques became available. However, consistent with Wright and Smothers (2014) we consider that adjusting the RPI based TMR downwards for a particular event over a 120 year series overlooks the inherent uncertainty in the inflation data. As stated by Wright and Smithers (2014).

  "We therefore simply do not know whether, for example, this new source of bias [referring to the 2010 change in RPI] may simply offset the impact of other biases in earlier data." [50]
- consistent with O'Donoghue (authors of the CED paper) RPI was the UK's preferred measure of inflation over the relevant period, and can therefore be considered the most relevant inflation to index to consider for the relevant historical period;

  "The decision is clear-cut. The retail prices index (RPI) is the preferred index over this period. It is of the correct index form; it is available monthly back to June 1947; and it is the most familiar measure of inflation in the UK." [51]
- RPI is available for the longest part of the period, in the form of reported, actual data, it does not have to be estimated using data and assumptions made today. The RPI series is therefore not as heavily influenced by practitioner assumptions, present-day data inadequacies and possible hindsight bias in interpretation.

(67) This suggests that, given the poor quality of the CED/CPI data, the CMA should place less weight on the CED/CPI stripped returns series.

(68) Overall, we consider that given the lack of confidence in the CED/CPI series, the CMA should put more weight on the adjusted RPI series, and at a minimum should point to estimate for the TMR that sits at the top end of its range.

---

[48] *ONS (2019), 'Developing CPIH and CPI historical estimates between 1947 and 1987', October. https://www.ons.gov.uk/news/statementsandletters/developingcpihandcpihistoricalestimatesbetween1947and1987*

49 O'Neill and Ralph (2013), 'Modelling a Back Series for the Consumer Price Index', p.7

50 Wright and Smithers (2014), 'The cost of equity capital for regulated companies', p.10

51 O'Donoghue et al (2004), p.39

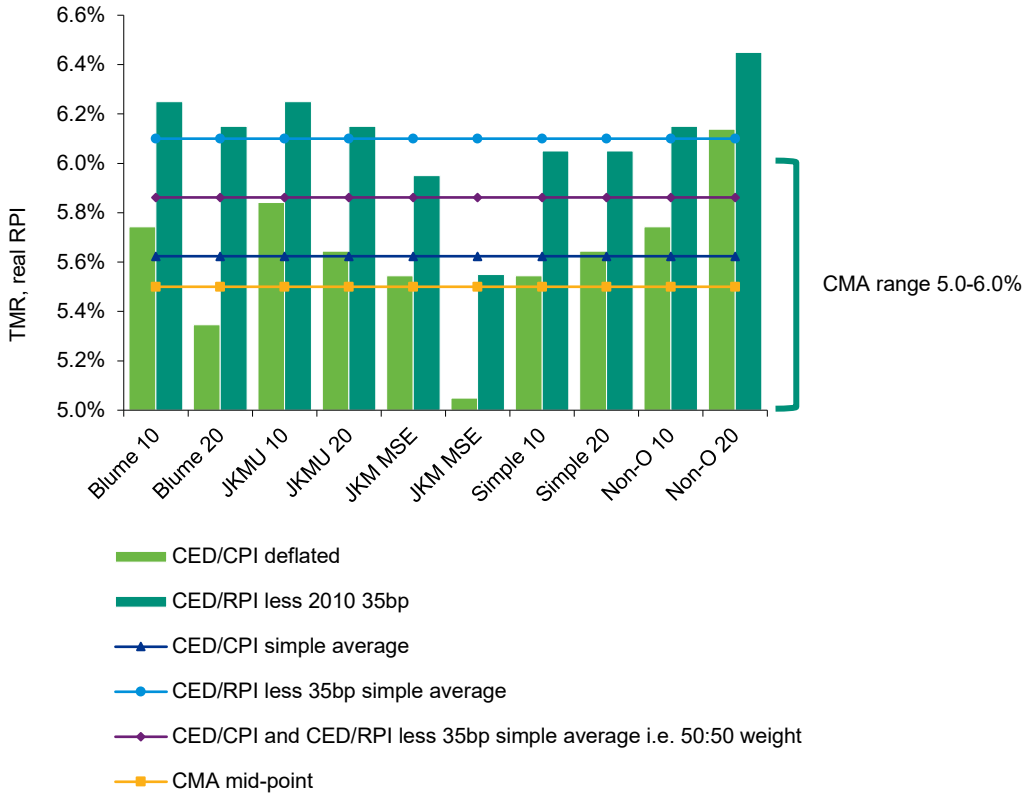
4.2.2 The range and mid-point do not reflect the CMA's own results

(69) Setting aside the differences in position on the weight that should be placed on CED/RPI versus CED/CPI, the CMA's range does not appear to be representative of its view in the text of the PFs or its own empirical findings for the following reasons:

- the upper end of the CMA's range of 5.0-6.0% is lower than the upper end of the range from the CMA's preferred series being the CED/CPI, which is 6.2%. This is because the CMA has excluded non-overlapping returns[52]., despite calculating these are part of its analysis. While these have a small sample size, they are still important because the data points are independent observations and are therefore assumption free in terms of the distribution of returns and serial correlation[53]. Further, it is inconsistent to exclude non-overlapping returns on the grounds of sample size, whilst also including overlapping returns. This is because the annual data points used in the overlapping returns are not independent data points. With the addition of the 2019 data from the recently published 2020 Yearbook, the sample sizes for the non-overlapping returns approach increase to 12 and 6 for the 10 year and 20 year holding periods respectively (see section 4.2.4 below);

- the CMA's range and implicit point estimate effectively place zero weight on the CED/RPI and 100% weight on CED/CPI, despite the CMA saying that "*all the available inflation series have issues*"[54] and that CED/RPI is useful as a cross-check.[55] Including the CED/RPI (adjusted downwards for the 2010 change) would lead to a range of 5.0-6.8% (if non-overlapping returns are included) and 5.0-6.6% if non-overlapping returns are not included. The simple average of the results where equal weight is placed on the CMA's CED/RPI (adjusted downwards for the 2010 RPI change) and CED/CPI results is 5.9%. The figure below illustrates these points graphically, using the CMA's own data from its ex post results.

Figure 5: Analysis of CMA's ex post data on TMR



Note: The CMA's CED/RPI results are adjusted downwards by 35 basis points, to reflect the CMA' s conclusion that the CED/RPI results are overstated by 30-40 basis points. The chart also includes the CMA's CED/CPI results deflated by 1% using the Fisher equation rather than the flat 1% reduction applied by the CMA.

[52] *CMA (2020), NATS PFs, para. 12.201 and 12.202*
[53] *See Technical Appendix 1 of Setting the Cost of Equity in UK Price Controls, by Professor Alan Gregory, 2 January 2020.*
[54] *CMA (2020), NATS PFs, para. 12.188*
[55] *CMA (2020), NATS PFs, para. 12.191*

- when deriving estimates from the ex ante data, the CMA acknowledges that a Bias Adjustment is necessary. However, it presents a range of 4.1-6.5%, where the lower end is not uplifted for the Bias Adjustment and therefore represents a geometric average.[56] The CMA then concludes that "*the reasonable range of TMR is likely to be above the bottom end of this range and below the top end"*[57]. However, as acknowledged by the CMA,[58] the average for a 10/20 year holding period will be closer to the arithmetic average than the geometric average. This is clear from the ex post return results in Table 21, where the averages over 10/20 years (using Blume, JKM etc.) are closer to the arithmetic than the geometric average, which makes sense as 10/20 years is closer to 1 year than to 120 years. The CMA's conclusion with regards to the ex ante range above, is therefore inconsistent with empirical evidence. A conclusion that is consistent with the empirical evidence would have instead been "*the reasonable range of TMR is likely to be towards the upper end of the range".* To illustrate this poin*t,* if an uplift is applied from the lower end of the CMA's range that is broadly in line with the uplift implied from the ex post returns data, then the lower end of the range would, instead be 5.9%, with the upper end of 6.5% reflecting an arithmetic average.[59]

(70) If geometric averages are excluded from the CMA's analysis and non-overlapping returns are included, the ranges are:

- ex post CED/CPI: 5.0 to 6.2%, with a mid-point of 5.6%, real RPI;
- ex post CED/RPI: 5.9% to 6.5%, with a mid-point of 6.2%, real RPI; and
- ex ante returns: either the range of 4.1% to 6.5% should be adjusted to exclude the geometric averages, which would lead to a range of approximately 6.1-6.5% (as discussed above). Alternatively, the CMA's qualitative conclusions with regards to the ex ante evidence and its point estimate for TMR should reflect the evidence that the reasonable TMR will be towards the upper end of the ex ante range.

(71) The ex post ranges presented in the paragraph above and Figure 5 are prudent in so far as they exclude arithmetic averages (CED/CPI: 5.9%, real RPI and CED/RPI 6.7%, real RPI). Cooper (1996) notes that an appropriate discount rate will lie above the arithmetic average, not below it, suggesting that the arithmetic average itself should be considered as informing the range.

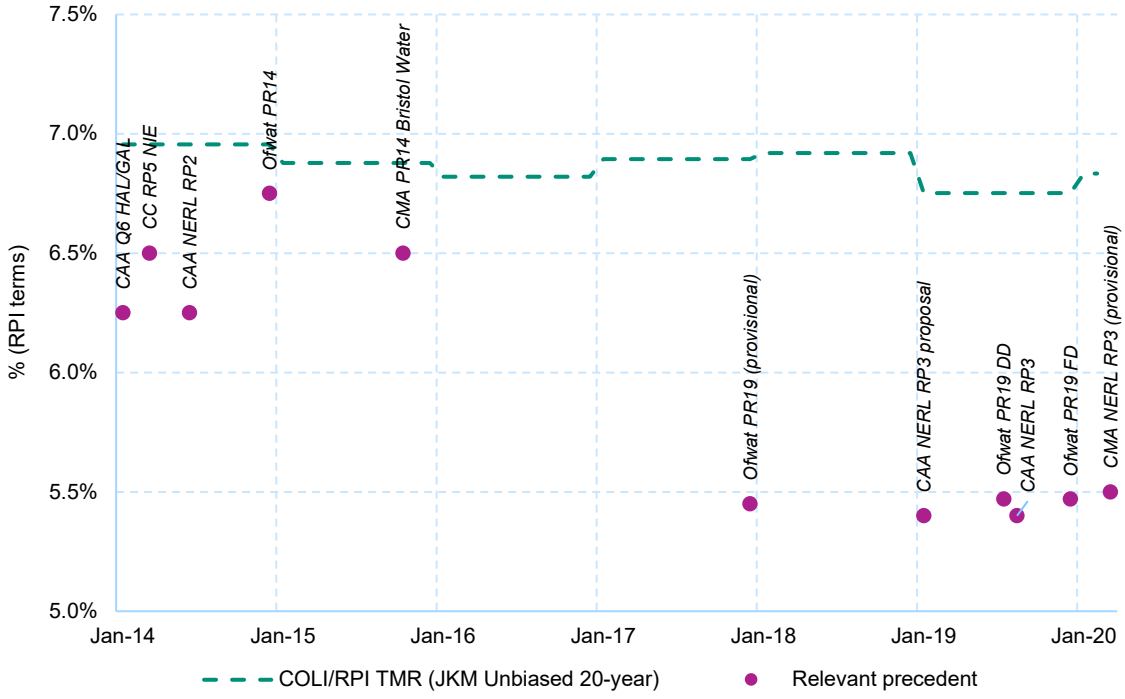
(72) Overall, the robustness of the evidence forming the range should inform where in the range the point estimate should be selected. This is acknowledged by the CMA.[60] When non-overlapping returns are included and zero weight is placed on geometric returns, the CMA's evidence would support a point estimate at the top end of its range. Further, despite the CMA stating that "*all the available inflation series have issues*" and that the CED/RPI is useful as a cross check, it has placed zero weight on the CED/RPI results and 100% weight on the CED/CPI series. The CMA's range and consequently its point estimate should reflect the robustness of the evidence it used in developing the TMR range, its qualitative conclusions in the text and the robustness of the evidence in forming its range. .

4.2.3 No discussion of regulatory consistency

(73) As illustrated in the figure below, consistently deflated returns haven't changed since the CMA (or CC) last determined the TMR for NIE in 2014.

[56] *See for example, CMA (2020), NATS PFs, para. 12.213, 12.216 and 12.233*
[57] *CMA (2020), NATS PFs, para. 12.233*
[58] *CMA (2020), NATS PFs, para. 12.222*
[59] *This figure is the average uplift of 84% from all the CED/CPI and CED/RPI ex post estimates between the geometric and arithmetic means applied to the CMA's ex ante range of 4.1% to 6.5%.*
[60] *CMA (2020), NATS PFs, para. 12.283*

Figure 6: Consistently deflated TMR data and key regulatory decisions by the CAA and CMA



Source: Analysis of DMS returns and CAA/CMA decisions

(74) The following adjustments by the CMA in the NATS PFs have, however, reduced the TMR by 100 bps since the NIE FD. The reduction has largely been on the basis of placing a 100% weight on a different historical inflation series.

- the RPI inflation series uses CED pre-1947, whereas in the NIE FD the COLI was used;
- a reduction of 30-40bp is made for the change in RPI inflation in 2010. No adjustment was made in the NIE FD; and
- the mid-point from the CMA's range is selected, whereas in the NIE FD the upper end of the TMR range was used.

(75) It may be appropriate to adjust parameters such as TMR if new information comes to light which demonstrates that past decisions were based on erroneous data. However, the historical inflation data going back to 1900, is inherently imprecise as recognised by the CMA.[61] To adopt a different position on how much weight to place on different inflation series is therefore a different judgement, rather than a correction of errors in the CC's data/analysis in 2014.

(76) If the evidence upon which the new judgment made is weak, it is necessary to explicitly consider whether the resulting material reductions in TMR and therefore WACC are appropriate in light of:

- the impact of a significant reduction in returns on the basis of differing judgment has on the investors' perception of regulatory risk and the overall financing environment in which regulated utilities operate. A stable and consistent approach has traditionally been adopted, which has benefits in terms of investor confidence and incentives to invest. This was recognised by the CMA in its redetermination of Bristol Water'S PR14 settlement:

  "An important part of the analysis [of the WACC] is the application of a consistent approach to setting the assumptions which form the basis of the calculation of the cost of capital. Both debt and equity investors make long-term financing decisions, including debt financing of up to 30 years' maturity. This reflects investors' expectations not just in respect of the immediate regulatory period, but of a consistent approach over the longer term…the financing environment is influenced by the stable approach to the estimation of the cost of capital, applied by both sector regulators and also in previous CC/CMA decisions"[62]

  To adopt an inconsistent approach on the basis of different judgments compared to a previous CC panel, without strong evidence and reasoning as to why the judgement has changed, would be to dismiss the benefits that a consistent approach over time has on the sector's ability to attract finance.

[61] *CMA (2020), NATS PFs, para. 12.188*
[62] *CMA (2015), 'Bristol Water plc, A reference under section 12(3)(a) of the Water Industry Act 1991' paras 10.6 to 10.7*

- the impact that the reduced stability in the regime will have on long-run financing costs. The CMA has in effect provisionally endorsed the reduction in cost of equity allowances, by regulators, through the reduction in the TMR. The reduction in cost of equity allowances had triggered credit rating downgrades across the sector, which have a direct and tangible impact on the cost of debt. This would, all else equal, raise the cost of finance in the long-run. Further, the step change in the TMR adopted by sector regulators, and provisionally endorsed by the CMA may heighten the perception of regulatory risk and consequently the long run cost of equity.

- The information with regards to the assessment of historical inflation being, in principle, available to the CC at the time of the NIE decision. The new information, which has been produced since, are the further announcements from the ONS that the back-cast estimates need to be revised.

(77) However, the CMA has not explicitly addressed whether it is comfortable with making such a material reduction in returns, on the basis of a judgment call with regards to historical inflation. The issue of regulatory consistency should be explicitly considered by the CMA and rationale as to why the benefits of the reduction outweigh the costs should be consulted upon.

4.2.4 Update for DMS 2019 data

(78) The 2020 DMS Yearbook was published during February 2020. It shows that the annual return in RPI terms between 2018 and 2019 was 16.3%. Given that significant weight is placed on the DMS returns data, in deriving the TMR range by both CMA and KPMG/AGRF, the ex post estimates should be updated.

(79) KPMG/AGRF find that the average impact on the ex post results from the inclusion of the latest returns data is between 6 and 9 bps, depending on the weight placed on the various averaging approaches.

(80) As the data of annual returns between 1899 and 2018 does not divide into 10 and 20-year periods without a remainder, there is a choice as to which year is taken as the point of reference. Therefore, there may be a degree of difference between estimates using non-overlapping returns as calculated by the CMA and KPMG/AGRF, i.e. changes in estimates based on non-overlapping returns may depend on the reference year from which subsequent 10 and 20-year returns are calculated. However, as annual returns using the updated data from 1899 to 2019 can be divided in to 10 and 20-year periods without remainder, this ambiguity ceases to be an issue. The estimates using non-overlapping returns increase by 6-13 bps from the CMA's equivalent figures, depending on whether a 10 or 20 year holding period is assumed.

(81) Overall, the CMA should update its results and outturn TMR range for the 2019 returns included in the 2020 Yearbook.

4.2.5 Summary

(82) In summary:

- the CMA's range on TMR is markedly lower than estimates used in previous inquires;

- the CMA's approach of (in effect) placing 100% weight on the CED/CPI: 1) disregards ONS advice that the CPI back-cast is 'not intended for official purposes' and 2) is inconsistent with its own position in the text that all historical inflation series have issues and that CED/RPI is useful as a cross check. If a 50:50 weight is placed on CED/RPI and CED/CPI, the CMA's own results would support a TMR estimate of 5.9%, real RPI. The KPMG/AGRF Report concluded that most weight should be given to the CED/RPI, which supports a TMR estimate of 6.25%, real RPI;

- the CMA incorrectly excludes non-overlapping returns and does not apply a sufficient uplift for the Bias Adjustment in the ex ante estimates. Correcting for these two errors but using the CMA's own results, supports a point estimate for TMR at the top of the CMA's own range;

- the CMA should update the ex post returns for the 2019 data, given that the 2020 DMS Yearbook has now been published; and

- the CMA should explicitly consider the cost-benefit analysis of making a material reduction in TMR, on the basis of inherently imprecise inflation evidence.

5 BETA

5.1 SUMMARY OF THE CMA'S APPROACH IN NATS PFS

(83) The CMA has calculated betas based on 2 and 5 year time horizons, which is consistent with the approach taken by NATS and the CAA and "consistent with normal practice"[63], and only considers daily and weekly frequencies.[64]

(84) The CMA recognise that while daily data is often used, there is a body of evidence which suggests that daily data may understate betas.[65] While the CMA considers that there is no evidence to suggest that daily data is likely to be inaccurate due to the presence of autocorrelation or a lack of liquidity,[66] the CMA found that in some cases daily data produced significantly lower beta estimates. Therefore, 2-yer and 5-year weekly data was also used, with more weight placed on 5-year weekly betas as the standard error around 2-year weekly betas is high.[67]

(85) Beta estimates are only presented as asset betas.[68] The CMA, however, has raised concerns with using the Modigliani Miller (MM) approach to re-lever betas to the 60% gearing figure used by both the CAA and NERL because this approach would result in the WACC increasing with gearing.[69] The CMA addresses this issue in the NATS case by adopting a notional gearing of 30%, which is broadly consistent with the gearing of the comparators.[70]

(86) The CMA's approach has a number of significant differences with the approach adopted in the KPMG/AGRF expert report attached to our SoC:

- the KPMG/AGRF Report estimates raw equity betas at daily and monthly frequencies, with most weight placed on monthly frequencies. However, the CMA presents betas calculated from daily and weekly data, with greater emphasis on daily data and no consideration of monthly data;
- KPMG/AGRF consider that a 5-year time horizon is most appropriate, whereas the CMA uses beta estimates over a combination of both 2-year and 5-year time horizons;
- KPMG/AGRF outline how the equity betas are derived from the raw data and the gearing (and debt beta) assumption(s) used to subsequently calculate the asset beta. The CMA simply presents asset betas with little discussion as to how they were derived;
- KPMG/AGRF consider that analysis of the variance of the beta results should be undertaken and that the Vasicek adjustment should be applied in cases where the variance is high. The CMA does not consider any such adjustment; and
- KPMG/AGRF use the MM approach to both de-lever and re-lever betas. It is unclear what approach the CMA uses to de-lever raw equity betas but it has concerns with application of the MM approach to re-lever betas.

5.2 NWL RECOMMENDATION ON HOW THE CMA'S APPROACH COULD BE FURTHER IMPROVED

(87) KPMG/AGRF recognises that a greater number of observations may result in an estimate with a smaller level of uncertainty. Despite this, KPMG/AGRF considers that most weight should be placed on betas observed at monthly frequencies because of the downward bias that is associated with higher frequency observations, which encompass both weekly and daily observations. In other words, a less accurate unbiased estimate should be preferred to a more accurate biased estimate, as it is unclear to what extent biased estimates should drive final allowances.[71] It is also the method used by CMA in the Energy Market Investigation and suggested by Wright et al (2018).[72]

[63] *CMA (2020), NATS PFs, para. 12.78*
[64] *CMA (2020), NATS PFs, para. 12.80*
[65] *CMA (2020), NATS PFs, para. 12.80*
[66] *CMA (2020), NATS PFs, para. 12.81*
[67] *CMA (2020), NATS PFs, para. 12.82*
[68] *CMA (2020), NATS PFs, para. 12.94 and 12.122*
[69] *CMA (2020), NATS PFs, para. 12.94 and 12.120*
[70] *CMA (2020), NATS PFs, para. 12.94 and 12.120*
[71] *KPMG/AGRF WACC Report, paragraph 4.6.15*
[72] *CMA (2016), 'Appendix 9.12: Cost of capital' to the CMA's energy market inquiry, paragraph 48*

(88) KPMG/AGRF use unconditional betas which are not unduly affected by recent market volatility in order to estimate beta over a long-term forward-looking time horizon. Short-run conditional betas are likely be volatile and there is no guarantee that short-run conditional betas will reflect outturn values over the long run.[73] This is consistent with the CC's view in the NIE FD that long run data is most appropriate when estimating betas[74].

(89) Setting aside the differences in approach with respect to how much weight should be placed on monthly betas and the appropriate time window for estimating betas for regulatory charge controls, the CMA's own approach also suffers from the following short-comings and considerations:

- the estimation approach is unclear;
- monthly betas have not been calculated;
- the CMA has not fully considered the appropriate time horizon; and
- the CMA's approach to gearing is NATS specific.

(90) These are discussed in detail below.

5.2.1 The estimation approach is unclear

(91) The CMA only presents its beta estimates as asset betas. Asset betas cannot be estimated directly, only equity betas can be observed. We assume the CMA calculated equity betas from the raw returns data[75] and then estimated the gearing and debt beta of the comparators to derive the asset betas which are presented. However, the underlying gearing and debt beta assumptions are not presented, so we cannot comment on the approach used to derive the asset betas.

5.2.2 Monthly betas have not been calculated

(92) As explained above, there is evidence that daily betas are downward biased and monthly estimates provide more robust beta estimates. The CMA has noted that daily data may understate beta, but has merely provided weekly estimates to account for this and has not estimated monthly betas for comparison or acknowledged the downward bias in the final figures. The downward bias becomes apparent when the calculations are undertaken. It is unclear how the CMA is able to comprehensively dismiss the presumption that betas using daily frequencies are distorted downwards if monthly estimates have not been calculated.

(93) Furthermore, the CMA's dismissal of the evidence that daily is downwardly biased is incomplete. It reviewed the daily data for evidence of autocorrelation and lack of liquidity,[76] but these are only two of the reasons behind the downward bias in daily data. Further, the evidence in the Donald Robertson paper appears to have been given substantial weight but there is little/no assessment of its contents. In fact when considered in detail the evidence on the issue of sampling frequency in the paper is not robust.

5.2.3 The CMA has not fully considered the appropriate time horizon

(94) As set out above, the forward looking time horizon is key. However, the CMA has not considered the need for the time horizon over which betas should be estimated to reflect the regulatory horizon. The only justifications for the use of a 2-year time horizon were that both the CAA and NERL used that time period and that it is consistent with normal practice.[77]

[73] *Wright et al (2018), p.7*
[74] *NIE FD, paragraph 13.183*
[75] *Although it is not clear, another reading of the Figures is that the CMA simply took equity betas from Bloomberg.*
[76] *NATS PFs, paragraph 12.81*
[77] *KPMG/AGRF WACC Report, paragraph 3.5.2*

5.2.4 The CMA's approach to gearing is NATS specific

(95) A number of the statements in the CMA's Appendix D are inconsistent with finance theory and are based on an incomplete assessment of the impact of changes in gearing on WACC. The primary example of this is the CMA's conclusion that because the A-WACC increases with gearing, it follows that asset beta must reduce with gearing.[78]

(96) There are a number of reasons why the way in which the CMA/CAA estimate the parameters in the A-WACC, leads to the perverse effect of the A-WACC increasing with gearing, which do not involve dismissing well-established theory. These are explained below. When the parameters in the A-WACC are properly calibrated the vanilla WACC should not increase materially with gearing:

- the substantially negative RFR used by the CMA/CAA is distorting the relationships between gearing and the cost of equity. We note that adopting a RFR of around -1%, real RPI results in an A-WACC that does not increase with gearing.[79] If a more appropriate approach to RFR is adopted, then the issue of WACC increasing with gearing falls away. In essence, the problem is that the assumed debt beta is regarded as "implausible" by the CMA. But this result only comes about because the combination of the assumed RFR and TMR generate a high risk premium which in turn appears incompatible with the observed debt cost. The CMA's extreme view of the real RFR automatically implies a negative real return on a zero beta asset. But this is simply another way of saying that the current returns on ILGs are not an appropriate measure of the "true" RFR. If the CMA instead adopts the position that a long run equilibrium RFR is a better proxy for the expected return on a zero beta asset, the so-called "implausible debt beta" problem falls away.

- the CMA models the impact of changes in gearing on equity beta but fails to model the impact of changes in gearing on the debt beta. The CMA's analysis of how gearing impacts the WACC is therefore incomplete. As gearing increases, the systematic risk migrates from equity to debt holders. The result is an increase in debt beta as gearing increases, which has not been factored into the CMA's assessment. A Black-Scholes option pricing approach can be used to model the relationship between equity beta, debt beta and asset beta as gearing changes.

[78] *The CMA does not disclose what de-gearing assumptions it used to derive the asset beta, but we assume that it used the MM de-gearing formula for that purpose.*

[79] *Flexing the RFR assumption in the CMA's Figure D-1 will illustrate this point.*

NORTHUMBRIAN WATER living water

ESSEX&SUFFOLK WATER living water