Europe Economics

Comments on BT's response to the BCMR consultation in relation to WACC market parameters

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1 Introduction

This paper sets out Europe Economics' views on certain aspects of BT's response to Ofcom's BCMR consultation, as requested by Ofcom. Specifically, it responds to:

- BT's views on the dividend growth model (DGM) approach, and associated assumptions, used by Europe Economics in estimating the total market return (TMR) (paragraphs 2.23 to 2.35 of BT's submission).[1]
- BT's views on the correlation analysis between the risk-free rate and TMR undertaken by Europe Economics (paragraphs 2.36 to 2.40 of BT's submission).

In responding to each of these points, we:

- Rehearse the approach taken by Europe Economics' in its report to Ofcom.[2]
- Describe the approach used by Ofcom in its BCMR consultation.[3]
- Summarise BT's response to the Ofcom BCMR consultation (and Europe Economics' report).
- Set out Europe Economics' response to BT's view.

[1] BT (2019), "Response to Ofcom's consultations on the Physical Infrastructure and the Business Connectivity Markets". Annex 2.
[2] Europe Economics (2018), "Cost of Capital: Total Market Return".
[3] Ofcom (2018), "Business Connectivity Market Review", Annex 21.

2 DGM Approach to Estimation of the TMR

2.1 What approach did Europe Economics' take?

In our report to Ofcom on the TMR in October 2018,[4] we adopted a multi-stranded approach to estimating the TMR, using both a historical ex-post approach (average historical returns) and a forward-looking approach (a market-wide DGM).

We used three different DGM model variants:

1. A multi-stage DGM model based on GDP growth.
2. A variant of the multi-stage DGM model based on GDP growth with expected rather than actual inflation.
3. A multi-stage DGM model based on dividend growth.

The first model is based on the assumption that expected dividend growth is in line with historic GDP and IMF forecasts of future UK GDP growth. The second model is a slight variation on this, and uses real GDP growth rates translated into nominal terms using CPI and then deflated back to real terms using expected (not actual) inflation (using HM Treasury UK economy forecast reports). The third model uses actual annual growth in dividends and buybacks.

Depending on which approach is used to measure expected dividend growth, our DGM modelling implies real returns of 6.4 to 6.7 per cent. We considered this evidence alongside evidence from the historical ex-post approach (average historical returns) and regulatory precedent, and recommended a real TMR range of 6.25 to 7 per cent, equivalent to 8.4 to 9.1 per cent in nominal terms.

2.2 What was recommended by Ofcom in its BCMR consultation?

Ofcom draws on a range of evidence in reaching its recommendation for the TMR:

- historical ex post approaches which suggest a real TMR of around 6% to a little over 7%;
- historical ex ante approaches which typically suggest lower figures, potentially below 6%;
- forward-looking evidence (based on Europe Economics' DGM) which implies a range of 6.4-6.7%; and
- empirical evidence (albeit mixed) of a positive relationship between the RFR and the TMR.

In considering all this evidence in the round, Ofcom reaches the conclusion that Europe Economics' proposed range of 6.25 to 7.0 per cent for the real TMR is reasonable. Within this range, Ofcom selected a point figure for the real TMR of 6.7%, "as this seems most compatible with the various methodologies considered in this consultation and sits close to the middle of the range recommended in the Europe Economics report".[5]

[4] Europe Economics (2018), "Cost of Capital: Total Market Return".
[5] Ofcom (2018), "Business Connectivity Market Review", Annex 21, page 216.

2.3 What did BT say in response to Ofcom's BCMR consultation?

In Annex 2 of BT's response to the BCMR consultation, BT sets out its views on the forward-looking evidence on the TMR, including the approach taken by Europe Economics.[6]

BT do not support the use of DGM in estimating the TMR. This is on the basis that "different assumptions about long-run dividend growth can result in a significant difference in the TMR estimate, and there is no objective method for determining the most appropriate assumptions". Instead, BT is of the view that long-run historical data offers an objective method as it is based on realised returns and therefore not reliant on assumptions. It is also concerned by the volatility of DGM estimates over time, which serves to create additional regulatory risk for investors, a problem it believes to be particularly acute in the telecoms market where investments are made over a long time horizon.

BT compares the nominal TMR estimated using Europe Economics' model to those figures estimated by the Bank of England and Bloomberg (see table below). It believes this comparison demonstrates the subjectivity of the DGM approach, and its sensitivity to different assumptions around the expected rate of dividend growth.

Table 2.1: Comparison of TMR estimates using DGM analysis

Source	TMR estimate (nominal)
Europe Economics for Ofcom	8.4 – 8.7% (as reported by BT)
Bank of England	c. 10.4%
Bloomberg	c. 13%

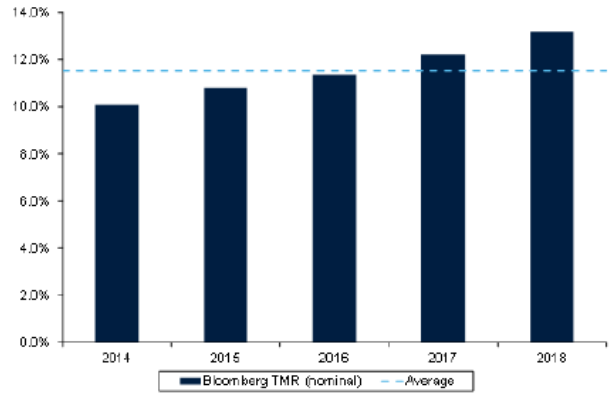
Source: BT response to Ofcom BCMR consultation paper.

It notes that a key difference between the Europe Economics and Bank of England approach is the assumption around long-run dividend growth. Specifically, while the Bank of England uses weighted average international GDP growth forecasts (with weights reflective of the share of revenues generated by FTSE All-Share companies in different regions), the Europe Economics' report uses projections of UK GDP growth. BT asserts that "since the companies that make up the FTSE All Share Index earn revenues internationally, and not just in the UK, the expected market return of the index should reflect international growth prospects rather than solely UK domestic growth". It notes that IMF forecasts have, over the last five years, consistently placed international long-run GDP growth above that for the UK. BT says that the implication is that Europe Economics' approach would underestimate the actual TMR, as FTSE All-Share companies are forecast to grow faster in the long-run than implied by UK GDP growth forecasts alone.

BT also compares Europe Economics' DGM estimates to those of Bloomberg which are more than 4 percentage points higher than the top end of the Europe Economics' range. The Bloomberg model is a proprietary three-stage DGM model, but no further details are available as to how its TMR figures using DGM analysis have been estimated. The Bloomberg DGM estimates show a consistently rising TMR over the past five years, as reproduced in Figure 2.1.

[6] BT (2019), "Response to Ofcom's consultations on the Physical Infrastructure and the Business Connectivity Markets". Annex 2.

Figure 2.1: Bloomberg DGM TMR estimates



Source: Oxera analysis based on data from Bloomberg, as reproduced in BT response to Ofcom BCMR consultation paper.

2.4 Europe Economics' response to BT

We respond to BT's views in four areas:

- Conversion from real to nominal TMR figures.
- Comparison with Bank of England DGM figures.
- Comparison with Bloomberg DGM figures.
- Other comments on BT's response.

Conversion from real to nominal TMR figures

While this is only a minor point, BT misrepresents our range for the nominal TMR using DGM analysis. In presenting implied nominal figures, BT has simply uplifted our real TMR estimates by an assumed CPI inflation rate of 2 per cent. It therefore has not applied the Fisher formula in adjusting between nominal and real returns. Applying the Fisher formula correctly would imply a nominal TMR range, based on our DGM analysis, of 8.5 to 8.8 per cent.

Comparison with Bank of England DGM figures

BT's submission wrongly implies that our DGM results were all reliant on UK GDP growth estimates (as implied by paragraph 2.27, where it states "Europe Economics uses projections of UK GDP growth to forecast dividend growth rate"). This is only true of two of our three DGM models; the remaining DGM model is based on actual annual growth in dividends and buybacks (rather than GDP forecasts). It is also this latter model which informs the upper end of our range from the DGM analysis, i.e. 6.7 per cent.

The Bank of England's TMR estimates using DGM rely on spot figures, which may be too unstable as a basis for regulatory decisions. We believe our approach is preferable in this respect, because we have focused on a five-year rolling average DGM analysis which is more stable over time than the Bank of England's spot figures.

In our view, another limitation of the Bank of England DGM figures is that it uses analyst dividend growth forecasts for its short-run growth assumption. Academic literature has suggested that these analyst forecasts tend to be upwardly biased, which would in turn tend to bias upwards estimates of the TMR.[7]

[7] One of the seminal studies to provide evidence of a positive bias in analyst estimates for the US market was: DeBondt and Thaler (1990), "Do Security Analysts Overreact?", *American Economic Review*, vol. 80, pp. 52-57. This triggered

It has additionally been argued by PwC that the Bank of England's TMR estimates are less fit for regulatory purposes because "[The Bank of England] is interested in whether risk premia are rising, or whether analysts are cutting their forecasts of earnings and dividends… [and] is less concerned with the absolute level of the equity return predicted in its model".[8,9]

As noted in the previous section, the Bank of England used weighted average international GDP growth forecasts to proxy long-run dividend growth, while we make use of UK GDP growth (in two of our three DGM model variants).

The first point to recognise is that GDP growth (whether UK or international) is only a proxy for dividend growth and hence there is always likely to be a degree of subjectivity and debate around any long-run growth assumptions made.

In that context, it is our view that the choice between a UK GDP figure (as we adopted) and a FTSE All-Share weighted figure for international GDP growth (as adopted by the Bank of England) can be debated. Given that the dividend yield figures relate to the FTSE All-Share index, it can be argued that for consistency we want a long-run dividend growth rate assumption that relates to the FTSE All-Share index. It has been claimed that an approach using international GDP growth assumptions is preferable, as FTSE All-Share listed companies derive their revenues internationally. However, it may not be the case the GDP growth rates for other economies are necessarily a good proxy for the growth of activities of FTSE All-Share companies in those economies. In addition, the need to correct for expected changes in exchange rates when deriving a sterling figure for weighted international GDP growth complicates this approach further. Instead, it could be argued that the UK growth rate is a reasonable proxy for the growth of FTSE All-Share companies insofar as it is the country in which the highest share of FTSE All-Share revenues are derived. Either way, it should be recognised that there is no perfect approach for proxying dividend growth with GDP growth.

Comparison with Bloomberg DGM figures

As noted earlier, there is little detail provided on how the Bloomberg TMR figures have been calculated, and therefore we are not in a position to comment on how the methodology compares to our own.

Other comments on BT's response

BT appears to have been selective in citing two sources of DGM TMR estimates that give higher figures than Europe Economics' estimates, given that there are other DGM TMR estimates that are more in line with Europe Economics' figures. The Civil Aviation Authority's (CAA) proposals for NATs published in February 2019 provide a summary of the results of several recent DGM and DDM analyses (by Ofwat, Ofcom, Europe Economics, CEPA and PwC) which together give RPI-deflated TMR estimates in the range of 4.0 to 6.3 per cent.[10] Using the OBR's long-run estimate of the CPI-RPI wedge of 1 per cent, this equates to a range for the real TMR (i.e. calculated on a CPI basis) of 5.0 to 7.3 per cent. Applying the Fisher formula, this implies an estimated range for the nominal TMR of 7.1 to 9.4 per cent. The top end of this range lies a percentage point below the Bank of England's estimate, and 3.6 percentage points below the Bloomberg estimate, while Europe Economics' range (of 8.5 to 8.8 per cent) lies within the range reported by the CAA.

subsequent research efforts in this area. PwC also recognise that "analyst forecasts have been found to be both biased and inefficient". See: PwC (2019) "Estimating the cost of capital for H7 - Response to stakeholder views". Page 53. In support of this, PwC cite work done by the Bank of England in the past which found analyst forecasts to be excessively optimistic during economic downturns and too pessimistic in recoveries.

8 PwC (2019), "Estimating the cost of capital for H7 - Response to stakeholder views". A report prepared for the Civial Aviation Authority (CAA). Page 10.

9 The CAA also cite this argument made by PwC in their recent proposals for NERL. See: CAA (2019), "Appendices to Draft UK Reference Period 3 Performance Plan proposals: For consultation". Page 35.

10 CAA (2019), "Appendices to Draft UK Reference Period 3 Performance Plan proposals: For consultation". Page 35.

It appears that the overarching argument in BT's response is that it does not support the use of DGM in estimating the TMR due to its sensitivity to different assumptions. However, we note that this is merely one of the approaches that we, and Ofcom, adopt in coming to a judgement on the TMR. Moreover, the UKRN report notes that "there is in principle no conflict between the CAPM and the DDM: if carefully applied, they are mutually supportive and complementary".[11]

[11] UKRN (2018), "Estimating the cost of capital for implementation of price controls by UK regulators". Page 42.

3 Relationship between the TMR and Risk-Free Rate

3.1 What approach did Europe Economics' take?

We investigated the relationship between the real (CPI-deflated) risk-free rate and real (CPI-deflated) TMR over time, comparing monthly estimates of the real TMR from our DGM variants with monthly real yields on 5, 10 and 20-year zero coupon government bonds. Specifically, we used the results from our DGM model based on GDP growth, and our DGM model based on dividend growth.[12] The results are reproduced in Table 3.1, and show a statistically significant relationship, with the coefficient ranging from +0.3 to +0.6. (We calculated equivalent results using RPI-deflated data, though given the problems with RPI discussed in the appendix of our report we did not consider that much weight should be placed on the RPI-deflated results.)

Table 3.1: Estimated coefficients for real TMR and real risk-free rate relationship (all CPI deflated)

	Real risk-free rate (5-year gilt)	Real risk-free rate (10-year gilt)	Real risk-free rate (20-year gilt)
Real TMR (DGM based on GDP growth)	0.33*	0.42*	0.55*
Real TMR (DGM based on dividend growth)	0.33*	0.43*	0.57*

Source: Bank of England data, Europe Economics' analysis. Asterisk (*) denotes statistical significance at 95% confidence level.

We also noted that PwC studied this relationship on behalf of Ofwat,[13] finding a negative correlation between the real risk-free rate and the real ERP, with a coefficient of -0.62 (using monthly data from 2000 to 2017). This corresponds to a coefficient of +0.38 between the risk-free rate and the TMR, which lies at the lower end of the range of statistically significant coefficients that we estimated using CPI-deflated figures.

3.2 What was recommended by Ofcom in its BCMR consultation?

In its BCMR Consultation, Ofcom noted the evidence presented by Europe Economics on the relationship between the real TMR and the real risk-free rate (as well as other evidence supporting the relationship, such as Dimson, Marsh and Staunton). Ofcom concluded that "there is empirical evidence (albeit mixed) of a positive relationship between the RFR and the TMR". This is one of the pieces of evidence that Ofcom then used when considering the level of the TMR.

[12] We used monthly data from January 2004 to July 2018, such that we were solely analysing the period since the Bank of England introduced CPI targeting. This is because we used the Bank of England CPI target as the best proxy for investors' inflation expectations over the lifetime of the government bonds.

[13] PwC (2017), "Updated analysis on cost of equity for PR19". Available at: https://www.ofwat.gov.uk/wp-content/uploads/2017/12/PwC-Updated-analysis-on-cost-of-equity-for-PR19-Dec-2017.pdf

3.3 What did BT say in response to Ofcom's BCMR consultation?

BT believes that the correlation analysis by Europe Economics is based on a very short period of data. It contends that, since DGM estimates tend to be volatile over time, a long data series is required to determine a robust link between the risk-free rate and the TMR. It quotes Siegel (1998), who looked at two centuries worth of US stock market data, and found, in BT's words "a remarkable degree of stability in equity returns over time, in contrast to the risk-free rate".

BT also states that "a number of studies have found that the negative relationship between the risk-free rate and ERP is one-for-one in the long run (which implies that the TMR is stable over time)". It references the 2018 UKRN study, claiming that the study highlights the relative stability of equity returns compared to bond returns and that this means the risk-free rate and equity risk premium (ERP) have a one-for-one inverse relationship in the long-run.

Finally, it says that, given the expected TMR is inherently unobservable, it does not consider Europe Economics' analysis over only 14 years of data as appropriate. It places emphasis instead on the long-run historical data analysis which it claims shows a one-for-one inverse relationship between the risk-free rate and the ERP, and hence a stable TMR.

3.4 Europe Economics' response to BT

There are two key issues we raise with BT's consultation response:

- Criticism of Europe Economics' analysis as covering too short a timeframe.
- Conflating the argument that the TMR is more stable than the risk-free rate, with the idea that there is no link at all between the TMR and risk-free rate.

Criticism of Europe Economics' analysis as covering too short a timeframe

First of all, we do not believe it is obvious why just over 14 years of monthly data (175 observations) should be considered too short a period to investigate the link between the risk-free rate and the TMR. Since the real TMR figures used in our correlation analysis come from a forward-looking estimate (i.e. DGM analysis), the need for a long historical time series (a century plus of data) as is necessary when looking at ex post out-turns is less relevant here.

Conflating the argument that the TMR is more stable than the risk-free rate, with the idea that there is no link at all between the TMR and risk-free rate

BT's response seems to make an (unfounded) jump from the notion that the TMR is more stable than the risk-free rate, to claiming that this means the risk-free rate and ERP have a direct inverse relationship while the TMR is itself stable. The former statement simply implies that the TMR moves less than any given change in the risk-free rate; with the latter implying that the TMR is stable irrespective of any changes in the risk-free rate. Our own analysis is indeed consistent with the first of these two points. Our finding of a positive coefficient of less than one does indeed imply that the TMR is more stable than the risk-free rate.

We also believe that BT's response mischaracterises the findings of the 2018 UKRN report by saying the evidence it presents implies a one-for-one relationship between the risk-free rate and TMR. While the 2018 UKRN report claims that the TMR is comparatively more stable, it does not claim that there is no change at all in the TMR over time. Indeed, the report explicitly states that evidence suggesting the ERP is counter-cyclical "should not be taken as a claim that the ERP instead moves precisely one-for-one in the opposite direction to the RFR".[14] The report also mentions "a consensus amongst financial practitioners that expected returns on global stock markets have been weakening in recent years (although the extent of this weakening

[14] UKRN (2018), "Estimating the cost of capital for implementation of price controls by UK regulators". Page 39.

is not especially dramatic)". Both statements would imply that there is some change in the TMR over time. While BT's response claims that "a number of studies" have found evidence of the one-for-one relationship, the only specific example it provides is the 2018 UKRN report (which we have already shown to be an incorrect interpretation of that report).

We should again acknowledge here, as we did in our original report, that we are not the only party to have found evidence of a relationship between the risk-free rate and the TMR. PwC (in its report for Ofwat) also did so, with an implied coefficient between the risk-free rate and TMR that lies within our own estimated range.