

## Appendix B: Cost of capital

### Introduction

- B.1 The approach to assessing profitability, as set out in CMA guidelines for market investigations (CC3 (Revised)),<sup>1</sup> is to compare the profitability earned with an appropriate cost of capital. In this appendix, we set out our estimates of the cost of capital for the 12 largest housebuilders<sup>2</sup> operating in GB from January 2003 to December 2022 inclusive.
- B.2 In this appendix, we cover the following:
- (a) Our approach to estimating the cost of capital.
  - (b) Our estimates of the cost of capital.
  - (c) Other cost of capital evidence.

### Our approach to estimating the cost of capital

- B.3 There are several factors we considered to estimate an appropriate benchmark cost of capital for the large housebuilders. These included:
- (a) how to estimate the cost of capital;
  - (b) specification of the cost of capital; and
  - (c) the time period over which the cost of capital should be measured.

### *How to estimate the cost of capital*

- B.4 As set out in CC3 (Revised),<sup>3</sup> we generally look to the Capital Asset Pricing Model (CAPM) when calculating the cost of capital since this is a widely understood technique with strong theoretical foundations.<sup>4</sup> We have adopted the CAPM approach in estimating the cost of capital for the large housebuilders.
- B.5 The CAPM relates the cost of equity ( $K_e$ ) to the expected return on a risk-free asset (risk-free rate or  $R_f$ ), the expected return on the market portfolio overall (total

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<sup>1</sup> CC3 (Revised), paragraphs 9 and 16. We consider that these guidelines are relevant to our profitability analysis in this market study.

<sup>2</sup> Countryside was acquired by Vistry in late 2022. However, Vistry supplied separate responses to the CMA in respect of its own historic operations and therefore, we have assessed Vistry and Countryside separately for the purposes of our profitability analysis.

<sup>3</sup> CC3 (Revised), Annex A, paragraph 16.

<sup>4</sup> CC3 (Revised), paragraph 116.

market return or  $R_m$ ), and a firm-specific measure of investors' exposure to systematic risk (beta or  $\beta$ ) as follows:

$$K_e = R_f + \beta(R_m - R_f)$$

- B.6 The difference between the total market return ( $R_m$ ) and the risk-free rate ( $R_f$ ) is the equity risk premium (ERP), which captures the additional returns investors require for investing in the stock market overall.
- B.7 If a business was entirely funded by equity, the expected return on equity could be considered to be its 'cost of capital'. However, in certain years over the period we have considered, the large housebuilders were funded by a combination of both debt and equity, such that the appropriate cost of capital to consider is the weighted average cost of debt and equity. The cost of capital, or Weighted Average Cost of Capital (WACC), is given by the following expression, where  $K_e$  is the cost of equity (as defined above),  $K_d$  is the cost of debt, and  $D$  and  $E$  are market values of debt and equity respectively:

$$WACC = K_e \times E/(D+E) + K_d \times D/(D+E)$$

- B.8 The cost of capital must reflect the effects of tax on returns to capital providers. We measured profitability on an operating basis, thereby excluding the impact of interest and tax. As a result, profitability was assessed independently of the choice of capital structure of individual firms. The returns to equity holders (dividends) are taxed. Hence, where the cost of equity is expressed 'pre-tax', the cost of equity used must reflect the fact that the actual return to shareholders will be reduced by the rate of tax ( $t$ ). We therefore estimated the cost of capital on a nominal pre-tax basis to ensure consistency when comparing profitability with the cost of capital:

$$\text{Pre-tax WACC} = [(1/(1-t)) \times K_e \times E/(D+E)] + [K_d \times D/(D+E)]$$

- B.9 One large housebuilder noted that our approach to calculating the cost of capital was broadly in line with the standard approach, however the use of a bottom-up approach means the results will be sensitive to specific assumptions. We recognise that the CAPM is reliant on a number of assumptions and there is uncertainty in the estimation of the cost of capital. This is why we have provided a range rather than a point estimate.

### ***Specification of the basis of the cost of capital***

- B.10 In keeping with the theoretical basis of the CAPM, our approach sought to estimate the cost of capital of the large housebuilders themselves. To calculate this we used market data, such as inflation, the risk-free rate, the tax rate, and the total market return.

- B.11 In addition, we used company specific parameters to measure the risk of the large housebuilders. We estimated beta based on the nine listed large housebuilders<sup>5</sup> over the period of review:
- (a) Barratt;
  - (b) Berkeley;
  - (c) Bellway;
  - (d) Countryside;
  - (e) Crest Nicholson;
  - (f) Persimmon;
  - (g) Redrow;
  - (h) Taylor Wimpey; and
  - (i) Vistry.
- B.12 One large housebuilder told us to consider third-party estimates, such as Bloomberg, of the cost of capital which were available for the listed large housebuilders. As set out in more detail below, we have calculated the cost of capital using a bottom-up approach, based on a widely accepted methodology and explaining the rationale behind our assumptions. Third-party estimates will inevitably also be based on assumptions, which are subject to uncertainty and are not always fully transparent. However, we considered third-party estimates for the cost of debt as a cross-check on our analysis.
- B.13 One large housebuilder stated that we should extend our analysis beyond the 12 largest housebuilders, as our methodology meant that we could not robustly draw conclusions as to whether there were features of the market that favoured the top 12 housebuilders. CC3 (Revised) acknowledges that in many cases, our focus will be on the largest ‘incumbent’ firms in the market.<sup>6</sup> In this case, we are particularly concerned that the features of the market favour large housebuilders.<sup>7</sup>

### ***Relevant time period***

- B.14 We estimated the cost of capital of the large housebuilders over the 20-year period between January 2003 and December 2022 inclusive in line with our profitability

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<sup>5</sup> The other three large housebuilders (Cala, Miller and Bloor Homes) are not listed on the London Stock Exchange and therefore do not have the daily pricing data required to calculate beta.

<sup>6</sup> CC3 (Revised), paragraph 114.

<sup>7</sup> See [Statement of Scope](#), paragraphs 2.23 c) and d) and 2.25.

analysis (see the Profitability Appendix, where we explain why we have decided to assess profitability over a 20-year period).

- B.15 Given the changes in macroeconomic conditions over the 20-year period considered, we calculated a cost of capital range for each year to reflect the changing market conditions and changes to investors' expected returns over the relevant period.

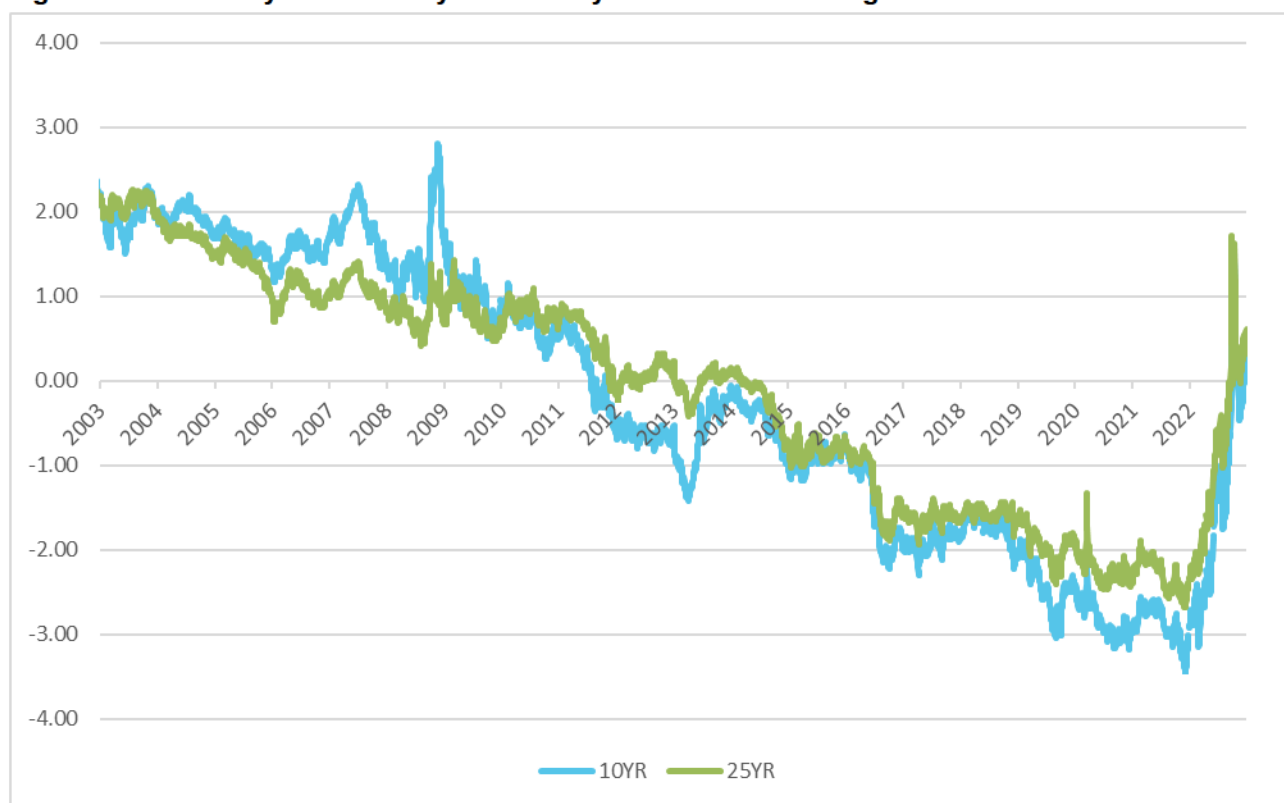
## **Our estimate of the cost of capital**

- B.16 In this section, we set out the analysis that we undertook to estimate the components of the cost of capital calculation, which includes both generic and industry-specific components. The former comprises the real risk-free rate (RFR), inflation and the total market return (TMR); the latter comprises beta and the tax rate.

### ***Risk-free rate***

- B.17 In order to estimate the RFR applicable over the period considered, we analysed UK index-linked gilt (ILG) yields, which have negligible default and inflation risk.
- B.18 We considered long-maturity gilts to provide the most relevant measure of the RFR. This is because equities have an indefinite maturity. Therefore, we considered yields on gilts with a maturity of between 10 and 25 years.
- B.19 Figure B.1 shows the yield on 10-year and 25-year ILGs over the period considered. The chart shows that gilt yields declined over most of the period, with the exception of a spike during the Global Financial Crisis (GFC), before a sharp rise in the final year.

**Figure B.1: RPI-real yields on ten-year and 25-year UK index-linked gilts**



Source: CMA analysis of [Bank of England](#), RPI-real spot yield curve data.

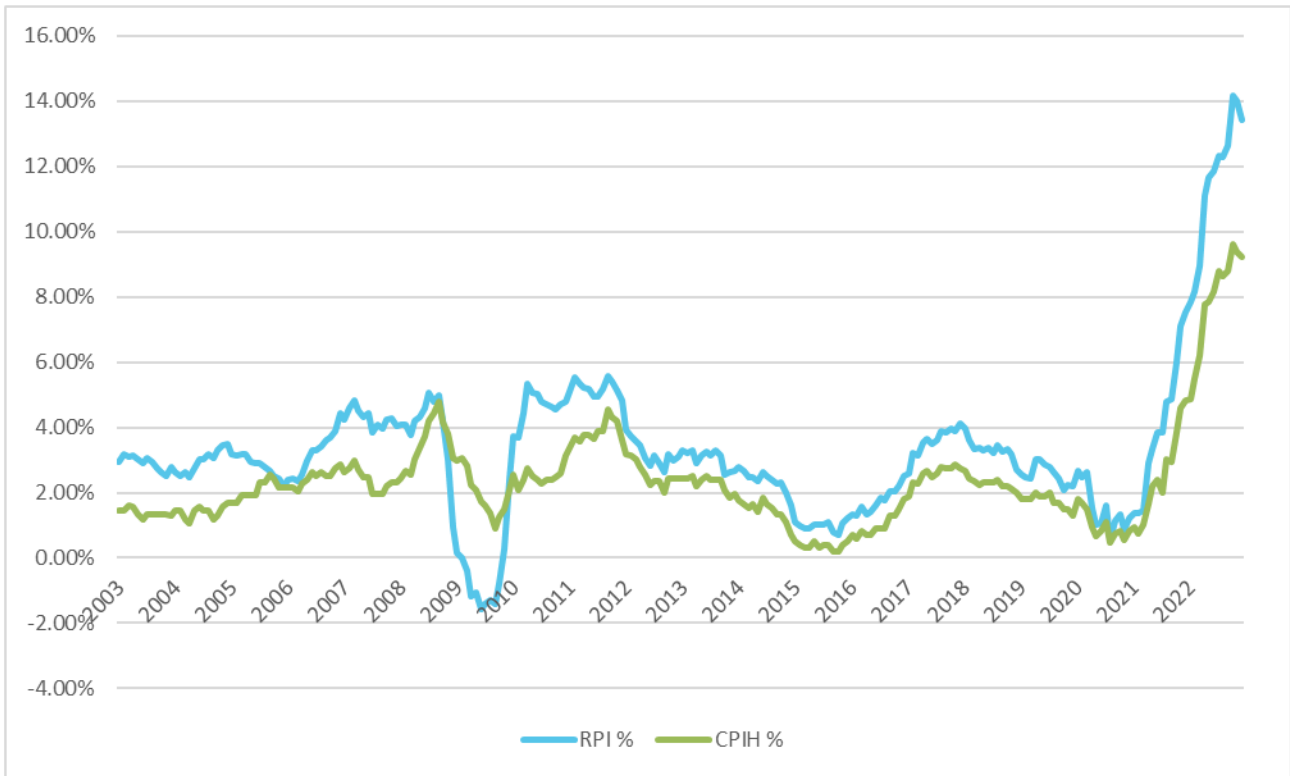
B.20 To calculate an annual estimate for the RFR, we took an average of the daily ILG yields for each year. We estimated a range using the 10-year and 25-year ILGs.

B.21 ILGs are indexed to RPI inflation rather than CPIH inflation, with the latter widely considered to be a better measure of price changes in the economy.<sup>8</sup> Therefore, for the purposes of our profitability and cost of capital analysis, we express real figures in CPIH-real terms. Figure B.2 shows these two inflation measures from 2003 to 2022. We calculate the difference between RPI and CPIH (the RPI-CPIH wedge) to inflate the RPI-real ILGs to CPIH-real ILGs. Over the 20-year period the wedge was in the range of -2.1% to 4.2%, with an average of 1.1%. This compares to most recent estimates of the long-term RPI-CPIH wedge of 0.9%.<sup>9</sup>

<sup>8</sup> See [UK Consumer Price Statistics: A Review – UK Statistics Authority](#) for a full discussion of the relative merits of RPI and CPI/CPIH inflation.

<sup>9</sup> See [CP 944 – Office for Budget Responsibility – Economic and fiscal outlook – November 2023 \(obr.uk\)](#) Table A.1, which shows a wedge of 0.9% between CPI and RPI in the long-term. The OBR does not prepare a forecast for CPIH, and we therefore use CPI as a proxy to determine the long-term wedge between RPI and CPIH.

**Figure B.2: RPI and CPIH inflation, 2003 to 2022**

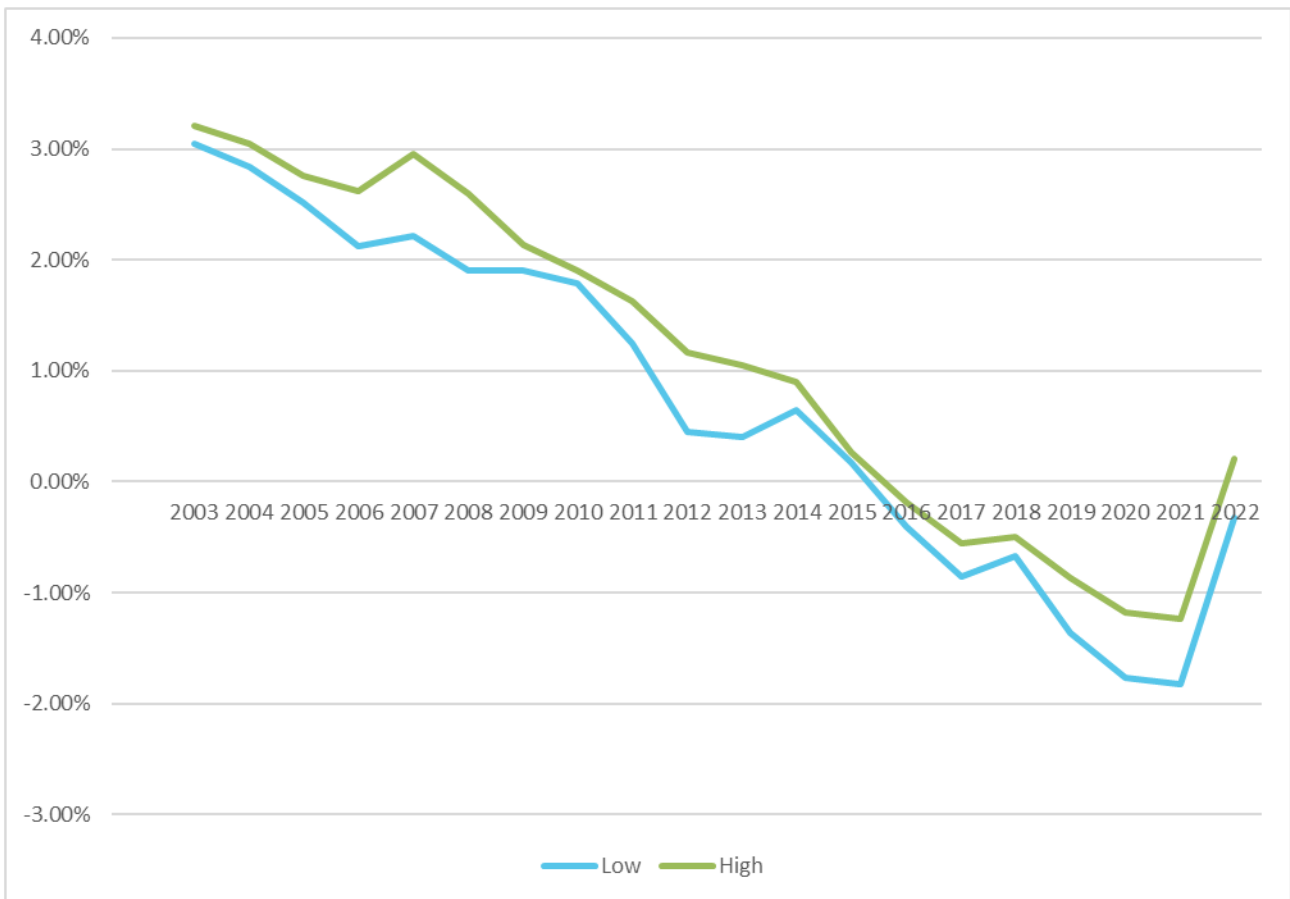


Source: CMA analysis of Office for National Statistics inflation data.

B.22 At a given point in time, the ILG yield will reflect expected RPI inflation over the tenor of the gilt (10 or 25 years). Therefore, to convert RPI-real yields into CPIH-real yields, a long-term estimate of the RPI-CPIH wedge is needed. As the average wedge over the 20-year period of 1.1% is reasonably close to the latest forecast of the long-run wedge, we have inflated the RPI-real ILG yields using the Fischer equation<sup>10</sup> for the average RPI-CPIH wedge of 1.1%. On this basis, we estimated a range for the CPIH-real RFR for each of the twenty years as shown in Figure B.3.

<sup>10</sup> CPIH-real yield = (1 + RPI-real yield) \* (1 + RPI-CPIH wedge) – 1.

**Figure B.3: CPIH-real risk-free**



Source: CMA analysis of [Bank of England](#), [RPI-real spot yield curve data](#) and [Office for National Statistics inflation data](#).

### **TMR and ERP**

- B.23 The ERP is the additional return that investors require to compensate them for assuming the risk associated with investing in equities rather than in risk-free assets. When seeking to understand what the ERP was over a historical period, it was necessary to identify the returns which investors expected to make on the market (the TMR) and deduct the relevant RFR (as estimated above).
- B.24 There are two types of approaches that can be used to estimate the TMR. Historical methods seek to derive the TMR from a long run of data on realised returns on equities. The realised returns on equities are then adjusted for historical inflation measures to arrive at a real TMR. Forward-looking approaches seek to estimate the expected TMR based on either the reported expectations of market participants or the TMR implied in asset prices at the start of the period. Forward-looking approaches are typically deflated using long run inflation assumptions to arrive at a real TMR.
- B.25 There is no universally accepted method for deriving the TMR or the ERP. Both concepts are concerned with investors' ex-ante expectations of returns, which are largely unobservable. The academic literature on the subject is large and can be categorised into three types:

- (a) Studies that assume that historical realised returns are equal to investors' expectations ('historical ex-post approaches').
- (b) Studies that fit models of stock returns to historical data to separate out ex-ante expectations from ex-post good or bad fortune ('historical ex-ante approaches').
- (c) Studies that use current market prices and surveys of market participants to derive current forward-looking expectations ('forward-looking approaches').

B.26 Each of the above methods have a large degree of uncertainty associated with them, and any results from these analyses require a large number of assumptions and significant amounts of judgement.

B.27 The CMA assessed the evidence on TMR in detail in its Ofwat PR19 price redeterminations<sup>11</sup>, and placed limited weight on the forward-looking approaches. It concluded that a (CPIH-)real TMR range of 6.2% to 7.5% was appropriate, with a midpoint of 6.8%. In that decision, the CMA considered in detail whether an assumption of a broadly constant TMR in the long run was appropriate and concluded that it was. We take the same approach here.

B.28 We considered that the CMA's assessment for the PR19 redetermination remains appropriate for this market-wide element of the cost of capital. We have included this range, of 6.2% to 7.5% (CPIH-real), in our cost of capital estimates. These estimates are applied for all years considered in our analysis.

### ***Tax Rate***

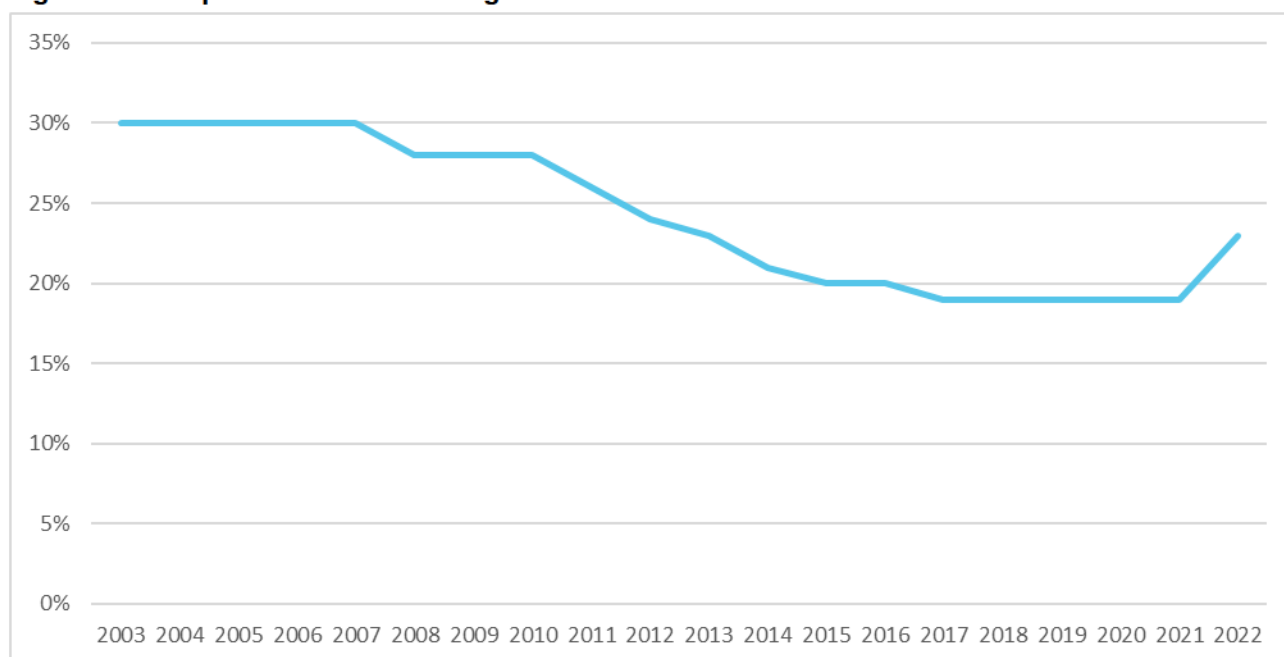
B.29 The corporation tax rates applicable over the period considered are set out in Figure B.4.

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<sup>11</sup> [CMA PR19 Redetermination - Final Report](#), 17 March 2021, pages 796 to 838.



**Figure B.4: Corporate tax rates for large housebuilders**



Source: [Main rates](#) for all profits except ring fence profits and [residential property developer tax](#) from HMRC.

- B.30 In addition to the standard rates of corporation tax, an additional residential property developer tax was introduced in April 2022, applicable to companies or groups of companies undertaking UK residential property development with annual profits in excess of £25 million.<sup>12</sup>
- B.31 For the calculation of the pre-tax cost of capital, we included both the corporate tax rate and the residential property developer tax. We used the annual tax rate for each year in the period considered.

### **Equity betas**

- B.32 The beta of an asset measures the correlation between the volatility of the returns on the asset and the returns on the market as a whole, or the exposure of the firm to systematic or 'non-diversifiable' risk. It is in return for assuming this (market) risk that investors require an (equity risk) premium over the risk-free return.
- B.33 The beta value of a listed firm can be directly estimated by regressing the stock's returns on the market's returns, using Ordinary Least Squares (OLS). When estimated in this way, the beta value reflects the full range of activities undertaken by a listed business. One large housebuilder queried how the non-listed housebuilders would be reflected in the beta calculations as our methodology paper only set out the methodology for the listed housebuilders. The beta for non-

<sup>12</sup> See [Residential property developer tax](#). Given the additional residential property tax applied in 2022 is only applicable to profits in excess of £25 million, we note the inclusion of the additional 4% tax in 2022 may overestimate the tax rate faced by the large housebuilders.

listed businesses cannot be calculated and therefore the beta of the large, listed housebuilders is taken as a proxy for the large housebuilders overall.

#### *Whole-period vs annual estimates*

- B.34 We estimated a single equity beta for the large housebuilders over the 20-year period. The equity betas of the large, listed housebuilders are shown in Table 1.1 and were estimated using total return data calculated on a daily and monthly<sup>13</sup> basis for the period considered. We estimated the betas against the FTSE All-Share index. We estimated the betas both for the individual companies and for a market-weighted portfolio.
- B.35 One large housebuilder noted that our methodology should recognise that the cost of capital will vary between companies, as evidenced by different equity betas. Another large housebuilder submitted that our methodology may underestimate the beta given the smoothing effect of averaging returns across a portfolio rather than for each individual company.
- B.36 We agree there is variation in the individual company betas, and some of this variation could be driven by differences in the risk profile of the individual large housebuilders. However, we also note that individual company beta estimates are more uncertain (as measured by the standard error in an OLS regression) and differences in equity betas may also reflect differences in capital structure between firms. Therefore, to estimate an average beta for the sector, we placed most weight on the portfolio beta in our analysis. The portfolio approach gave an equity beta range of 1.13 to 1.38, which we consider to be sufficiently wide to capture the variation in risk between firms and over time, recognising that the choice of the beta range inevitably involves some judgement.

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<sup>13</sup> The daily beta measures the correlation between daily returns on the stock and the FTSE All-Share index. The monthly beta measures the correlation between monthly returns on the stock and the FTSE All-Share index.

**Table B.1: Equity betas of listed large housebuilders (20-year beta 2003 to 2022)**

Housebuilder	<i>Levered / equity beta</i>	
	Daily	Monthly
Barratt	1.35	1.82
Bellway	1.02	1.32
Berkeley	0.91	0.95
Countryside <sup>14</sup>	0.53	0.96
Crest Nicholson <sup>15</sup>	0.39	0.66
Persimmon	1.19	1.27
Redrow	1.07	1.40
Taylor Wimpey	1.36	2.16
Vistry	1.04	1.55
<b>Portfolio beta</b>	<b>1.13</b>	<b>1.38</b>

Source: CMA analysis based on Bloomberg data.

- B.37 We note that 20-years is a long period over which to calculate the equity beta. We therefore analysed rolling 1-year and 2-year equity betas over the period to determine whether the large housebuilders had faced a fundamental change in risk exposure over the period.
- B.38 Figure B.5 below shows that shorter-term equity betas fluctuate over the 20-year period but generally remain in the range of 1.0 to 1.5. We therefore conclude that using the whole-period equity beta range of 1.13 to 1.38 is reasonable. We estimate the cost of equity using the observed capital structure of the market-weighted portfolio, which means we can use the estimated equity betas directly in our cost of equity estimates.

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<sup>14</sup> Within the 20-year period considered Countryside was listed from January 2003 to March 2005 and February 2016 to October 2022. Therefore, the betas presented in the table for Countryside do not cover the full 20-year period.

<sup>15</sup> Within the 20-year period considered Crest was listed from January 2003 to May 2007 and February 2013 to December 2022. Therefore, the betas presented in the table for Crest do not cover the full 20-year period.

**Figure B.5: Rolling equity betas**



Note: the sharp rise and the decline in the rolling betas in the chart above in 2017/2018 is due to the impact of the Brexit vote on 23 June 2016. The market capitalisation of the large housebuilders fell significantly more than the market overall following the vote. Source: CMA analysis based on Bloomberg data.

### *Impact of capital structure*

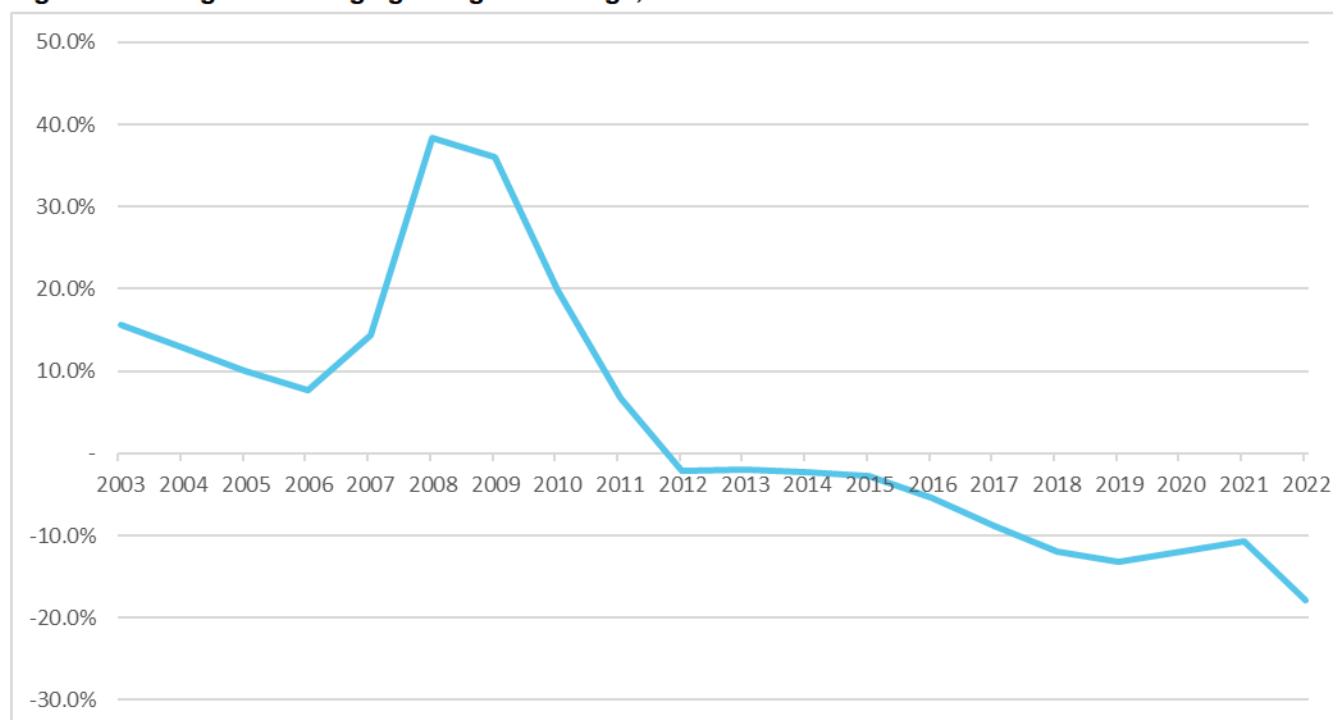
B.39 The large housebuilders were funded by a mix of debt and equity in the first 9 years we considered and then were predominantly fully equity-funded thereafter (Figure B.6). Gearing levels increased around the Global Financial Crisis, largely driven by falls in the market capitalisation of the large, listed housebuilders. In the second half of the period, the large housebuilders had negligible amounts of debt but held sizeable cash balances. This explains why our measure of gearing turns negative in that period (since we define gearing with reference to net debt).

B.40 A broadly stable equity beta (as shown in Figure B.6) over the period might suggest that the underlying business risk (as measured by the unlevered asset beta) may have increased over the period.<sup>16</sup> An increase in the underlying

<sup>16</sup> The underlying business risk of the firm is measured by the asset beta. When a firm is funded by a mix of debt and equity, equity risk increases due to the presence of debt in the capital structure. An asset beta can be obtained by un-levering the observed equity beta, typically using the following equation:  $\beta_{asset} = \beta_{equity} (1 - g) + \beta_{debt} g$ , where  $g$  is gearing, defined as net debt / (net debt + market capitalisation) and  $\beta_{debt}$  is the debt beta (which may be close to zero for firms with low levels of debt).

business risk would also be consistent with the move away from debt financing to equity.

**Figure B.6: weighted average gearing of the large, listed housebuilders<sup>17</sup>**



Source: CMA analysis based on Bloomberg data. Gearing defined as net debt / (net debt + market capitalisation).

### *Treatment of cash*

- B.41 Two large housebuilders submitted that it was inconsistent to exclude cash from the definition of capital employed when calculating Return on Capital Employed (ROCE) and to make no adjustment for cash in the calculation of beta.
- B.42 Another large housebuilder stated that it had held large cash balances over the last ten years and therefore not adjusting for excess cash may understate the risk of operating assets, assuming cash has negligible beta risk.
- B.43 It is often assumed that cash is not an operating asset and is therefore excluded from the definition of capital employed when calculating ROCE. This is the approach we adopted in our profitability analysis (see the Profitability Appendix for discussion on the treatment of cash in the calculation of ROCE).
- B.44 As we explained earlier, we define gearing with reference to net debt, which we consider to be consistent with our approach to capital employed. By netting off cash, it is assumed that the cash is available to pay down debt (for firms with positive debt balances) and is not part of capital employed. For a fully equity

<sup>17</sup> Average gearing is calculated as net debt divided by enterprise value. Average net debt is taken as the average of the opening and closing values. Enterprise value is taken as average market capitalisation plus net debt (as above). Average market capitalisation is taken as an average of the daily values over the year.

funded firm, we can similarly calculate the WACC using the WACC formula above to reflect a different risk profile for cash (eg assuming it is invested in relatively risk-free securities and is not used for operational purposes). This approach differs to the one suggested by the large housebuilder in the paragraph above, however the impact on the WACC is similar.

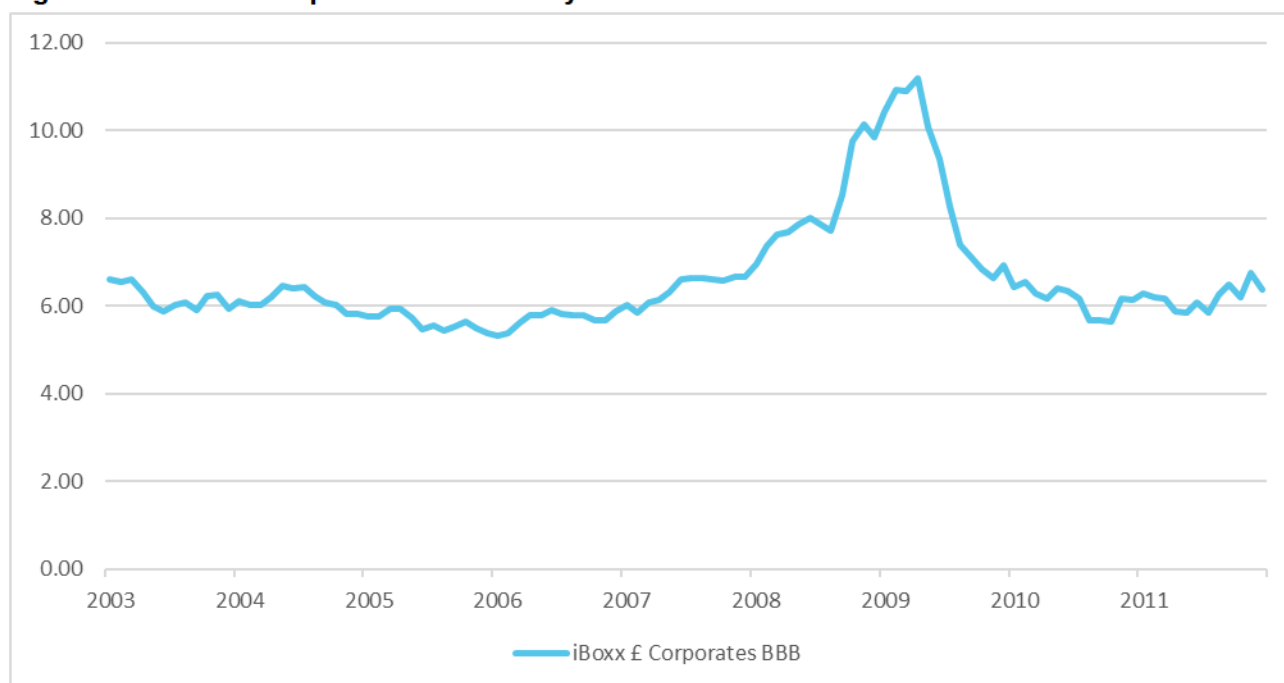
### ***Gearing***

- B.45 To capture the changes in the funding mix over time, we have used two sets of gearing assumptions in our WACC estimates. In line with the discussion above, we assumed positive gearing during the first nine years of our analysis, consistent with the observation that the large, listed housebuilders relied on a mix of debt and equity financing during this period. We estimated the annual WACC using the average observed gearing over that period for our market-weighted portfolio which was 17.9%, to smooth out the fluctuations in annual gearing figures.
- B.46 For the remaining 11 years, we estimated the annual WACC using the average observed gearing over that period for our market-weighted portfolio which was - 8.1%. The negative gearing assumption recognises that the large, listed housebuilders held relatively significant amounts of cash over the period. We have assumed that the cash was largely invested in risk-free securities and therefore assumed a return on the cash balances equal to the nominal risk-free rate (based on the methodology set out in the risk-free rate section from paragraph B.17 onwards). This is a simplifying assumption as in practice there is some uncertainty around the appropriate return on cash. However, this assumption is not very material to the overall WACC.

### ***Cost of debt***

- B.47 On average, the large housebuilders had positive gearing from 2003 to 2011 and then from 2012 onwards, the large housebuilders were solely equity financed. We therefore only needed to calculate a cost of debt for the large housebuilders from 2003 to 2011.
- B.48 During the period for which we estimated the cost of debt, only one large housebuilder held a credit rating. For the majority of this period, this large housebuilder held an investment grade credit rating. We therefore collected data on yields on GBP corporate bonds with investment-grade credit ratings over the relevant period as illustrated in Figure B.7 below.

**Figure B.7: Nominal corporate bond annual yields 2003 to 2011**



Source: CMA analysis of IHS Markit data.

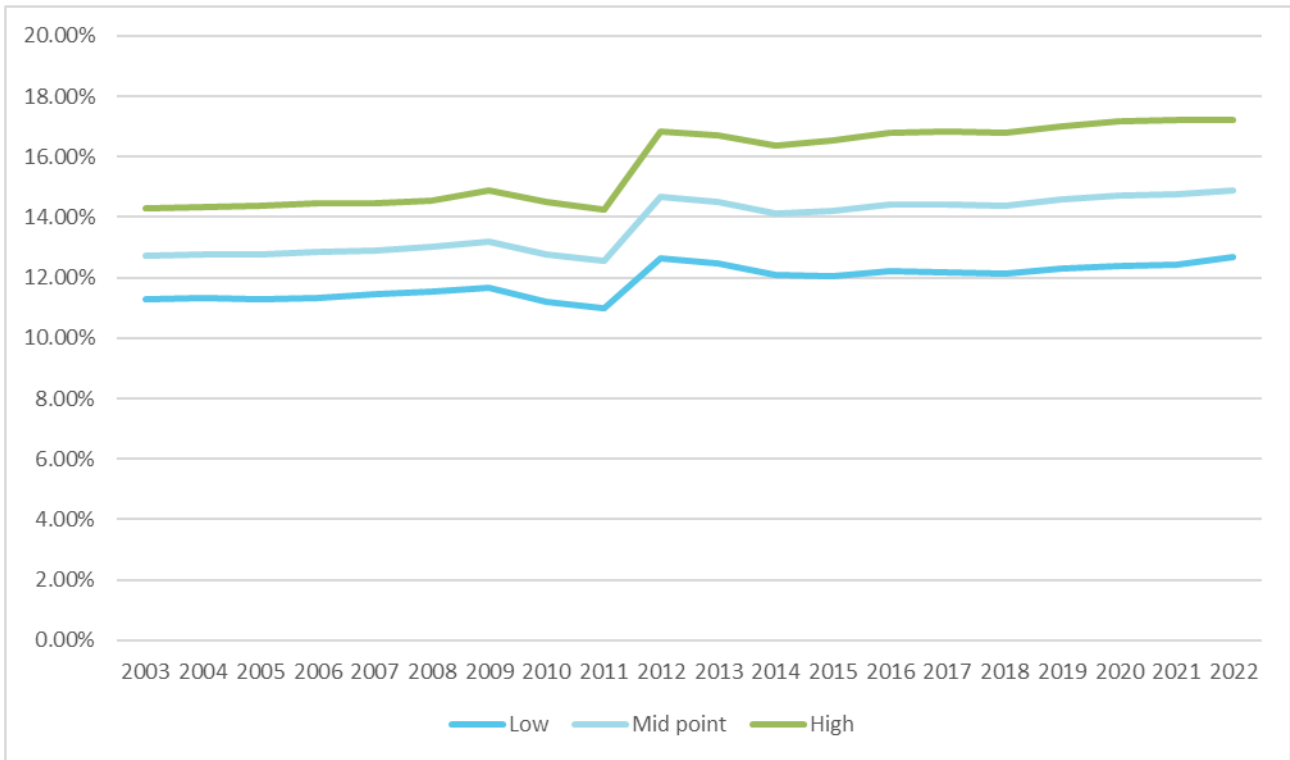
B.49 We took an average of the yields across each year to calculate an annual cost of debt. We cross checked these figures with the cost of debt sourced from Bloomberg.<sup>18</sup> The Bloomberg data was largely consistent with the iBoxx £ Corporate BBB index.

### ***Our estimates of the cost of capital***

B.50 Figure B.8 below shows the annual cost of capital range for the large housebuilders from 2003 to 2022. The upper end of the range is approximately 14.5% in the first nine years and then increases to approximately 17% in 2012 and remains at this level until 2023. The lower end of the range is approximately 3-5% lower than the upper end of the range throughout the period.

<sup>18</sup> Bloomberg provides a cost of debt for each of the listed large housebuilders. We calculated a weighted average based on the level of net debt for each of the large housebuilders.

**Figure B.8: nominal pre-tax nominal cost of capital for the large housebuilders**



Source: CMA analysis

B.51 Our detailed estimates of the cost of capital for the large housebuilders are set out in the tables below. For the purposes of our profitability assessment, we have used a range for the cost of capital for each year of the 20-year period. The methodology we set out above calculated the parameters for the cost of equity on a CPIH-real basis. To convert the cost of equity to nominal terms we therefore need to inflate the estimate by CPIH. We use long-term CPIH estimate of 2%<sup>19</sup> to calculate the nominal cost of equity.

<sup>19</sup> CP 944 – Office for Budget Responsibility – Economic and fiscal outlook – November 2023 ([obr.uk](https://obr.uk)), paragraph 1.4. The OBR does not prepare a forecast for CPIH, and we therefore use CPI as a proxy to determine the long-term CPIH forecast.



**Table B.2: CMA low estimate of nominal pre-tax cost of capital<sup>20</sup>**

	2003	2004	2005	2006	2007	2008	2009	2010	2011		
RFR (CPIH-real)	3.0%	2.8%	2.5%	2.1%	2.2%	1.9%	1.9%	1.8%	1.3%		
Equity beta	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13		
ERP	3.1%	3.3%	3.6%	4.0%	3.9%	4.2%	4.2%	4.4%	4.9%		
TMR	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%		
CPI Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%		
Tax	30.0%	30.0%	30.0%	30.0%	30.0%	28.0%	28.0%	28.0%	26.0%		
Gearing	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%		
Kd pre-tax (nominal)	6.2%	6.1%	5.6%	5.7%	6.4%	8.3%	8.8%	6.1%	6.2%		
Ke post-tax (CPIH-real)	6.5%	6.6%	6.6%	6.7%	6.7%	6.7%	6.7%	6.7%	6.8%		
Ke post-tax (nominal)	8.7%	8.7%	8.7%	8.8%	8.8%	8.8%	8.8%	8.8%	8.9%		
Ke pre-tax (nominal)	12.4%	12.4%	12.5%	12.6%	12.6%	12.3%	12.3%	12.3%	12.0%		
WACC pre-tax (nominal)	11.3%	11.3%	11.3%	11.3%	11.5%	11.5%	11.6%	11.2%	11.0%		
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
RFR (CPIH-real)	0.4%	0.4%	0.6%	0.2%	-0.4%	-0.9%	-0.7%	-1.4%	-1.8%	-1.8%	-0.3%
Equity beta	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
ERP	5.7%	5.7%	5.5%	6.0%	6.6%	7.0%	6.8%	7.5%	7.9%	8.0%	6.5%
TMR	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%
CPI Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Tax	24.0%	23.0%	21.0%	20.0%	20.0%	19.0%	19.0%	19.0%	19.0%	19.0%	23.0%
Gearing	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%
Risk-free rate (nominal)	2.5%	2.4%	2.7%	2.2%	1.6%	1.1%	1.3%	0.6%	0.2%	0.1%	1.7%
Ke post-tax (CPIH-real)	6.9%	6.9%	6.9%	6.9%	7.0%	7.0%	7.0%	7.1%	7.2%	7.2%	7.0%
Ke post-tax (nominal)	9.0%	9.0%	9.0%	9.1%	9.1%	9.2%	9.2%	9.3%	9.3%	9.3%	9.1%
Ke pre-tax (nominal)	11.9%	11.7%	11.4%	11.3%	11.4%	11.3%	11.3%	11.4%	11.5%	11.5%	11.8%
WACC pre-tax (nominal)	12.6%	12.5%	12.1%	12.1%	12.2%	12.2%	12.1%	12.3%	12.4%	12.4%	12.7%

Source: CMA analysis

<sup>20</sup> Note these tables are split such that the first 9 years, when gearing is positive, and the final 11 years, when gearing is negative, are shown separately.

**Table B.3: CMA high estimate of nominal pre-tax cost of capital**

	2003	2004	2005	2006	2007	2008	2009	2010	2011
RFR (CPIH-real)	3.2%	3.1%	2.8%	2.6%	2.9%	2.6%	2.1%	1.9%	1.6%
Equity beta	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
ERP	4.3%	4.4%	4.7%	4.8%	4.5%	4.9%	5.3%	5.6%	5.8%
TMR	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
CPI Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Tax	30.0%	30.0%	30.0%	30.0%	30.0%	28.0%	28.0%	28.0%	26.0%
Gearing	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%
Kd pre-tax (nominal)	6.2%	6.1%	5.6%	5.7%	6.4%	8.3%	8.8%	6.1%	6.2%
Ke post-tax (CPIH-real)	9.1%	9.1%	9.2%	9.3%	9.2%	9.3%	9.5%	9.6%	9.7%
Ke post-tax (nominal)	11.2%	11.3%	11.4%	11.5%	11.3%	11.5%	11.7%	11.7%	11.9%
Ke pre-tax (nominal)	16.1%	16.2%	16.3%	16.4%	16.2%	15.9%	16.2%	16.3%	16.0%
WACC pre-tax (nominal)	14.3%	14.4%	14.4%	14.5%	14.4%	14.6%	14.9%	14.5%	14.3%

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
RFR (CPIH-real)	1.2%	1.1%	0.9%	0.3%	-0.2%	-0.6%	-0.5%	-0.9%	-1.2%	-1.2%	0.2%
Equity beta	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
ERP	6.3%	6.4%	6.6%	7.2%	7.6%	8.0%	8.0%	8.3%	8.6%	8.7%	7.2%
TMR	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
CPI Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Tax	24.0%	23.0%	21.0%	20.0%	20.0%	19.0%	19.0%	19.0%	19.0%	19.0%	23.0%
Gearing	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%
Risk-free rate (nominal)	3.2%	3.1%	2.9%	2.3%	1.8%	1.4%	1.5%	1.1%	0.8%	0.7%	2.2%
Ke post-tax (CPIH-real)	9.8%	9.9%	9.9%	10.2%	10.3%	10.5%	10.5%	10.6%	10.7%	10.7%	10.2%
Ke post-tax (nominal)	12.0%	12.1%	12.1%	12.4%	12.6%	12.7%	12.7%	12.8%	12.9%	13.0%	12.4%
Ke pre-tax (nominal)	15.8%	15.7%	15.4%	15.5%	15.7%	15.7%	15.6%	15.8%	16.0%	16.0%	16.1%
WACC pre-tax (nominal)	16.9%	16.7%	16.4%	16.5%	16.8%	16.8%	16.8%	17.0%	17.2%	17.2%	17.2%

Source: CMA analysis

**Table B.4: CMA mid estimate of nominal pre-tax cost of capital**

	2003	2004	2005	2006	2007	2008	2009	2010	2011
RFR (CPIH-real)	3.1%	2.9%	2.6%	2.4%	2.6%	2.3%	2.0%	1.8%	1.4%
Equity beta	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
ERP	3.7%	3.9%	4.2%	4.4%	4.2%	4.6%	4.8%	5.0%	5.4%
TMR	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
CPI Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Tax	30.0%	30.0%	30.0%	30.0%	30.0%	28.0%	28.0%	28.0%	26.0%
Gearing	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%
Kd pre-tax (nominal)	6.2%	6.1%	5.6%	5.7%	6.4%	8.3%	8.8%	6.1%	6.2%
Ke post-tax (CPIH-real)	7.7%	7.8%	7.9%	7.9%	7.9%	8.0%	8.0%	8.1%	8.2%
Ke post-tax (nominal)	9.9%	9.9%	10.0%	10.1%	10.0%	10.1%	10.2%	10.2%	10.3%
Ke pre-tax (nominal)	14.1%	14.2%	14.3%	14.4%	14.3%	14.0%	14.1%	14.2%	14.0%
WACC pre-tax (nominal)	12.7%	12.7%	12.8%	12.8%	12.9%	13.0%	13.2%	12.7%	12.6%

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
RFR (CPIH-real)	0.8%	0.7%	0.8%	0.2%	-0.3%	-0.7%	-0.6%	-1.1%	-1.5%	-1.5%	-0.1%
Equity beta	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
ERP	6.0%	6.1%	6.0%	6.6%	7.1%	7.5%	7.4%	7.9%	8.3%	8.3%	6.9%
TMR	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
CPI Inflation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Tax	24.0%	23.0%	21.0%	20.0%	20.0%	19.0%	19.0%	19.0%	19.0%	19.0%	23.0%
Gearing	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%
Risk-free rate (nominal)	2.8%	2.7%	2.8%	2.2%	1.7%	1.3%	1.4%	0.9%	0.5%	0.4%	1.9%
Ke post-tax (CPIH-real)	8.3%	8.3%	8.3%	8.5%	8.6%	8.7%	8.7%	8.8%	8.9%	8.9%	8.5%
Ke post-tax (nominal)	10.5%	10.5%	10.5%	10.6%	10.8%	10.9%	10.8%	11.0%	11.1%	11.1%	10.7%
Ke pre-tax (nominal)	13.8%	13.6%	13.3%	13.3%	13.5%	13.4%	13.4%	13.6%	13.7%	13.7%	13.9%
WACC pre-tax (nominal)	14.7%	14.5%	14.1%	14.2%	14.4%	14.4%	14.4%	14.6%	14.7%	14.8%	14.9%

Source: CMA analysis

### ***Other considerations for our estimate of the cost of capital***

- B.52 In addition to calculating our estimate of the cost of capital, we reviewed the cost of capital submissions provided by large housebuilders and performed a desktop review of the large housebuilders annual reports for information which may be relevant to estimating the cost of capital.

#### *Cost of capital submissions from large housebuilders*

- B.53 The large housebuilders were asked for their cost of capital at the beginning and end of the period. Four large housebuilders did not provide a response to our cost of capital information request, one of these large housebuilders told us that the cost of capital was not a metric they used and therefore did not calculate it. Two large housebuilders only provided an estimate for 2023.

#### *Hurdle rates*

- B.54 One large housebuilder told us that there was a difference between project-specific hurdle rates and firm-wide profitability. The large housebuilder told us that it used hurdle rates to decide whether to go ahead with individual land acquisition. The large housebuilder noted that hurdle rates considered only project-specific costs and therefore did not include all other costs that affected firm-wide profitability. The large housebuilder stated that individual hurdle rates must be higher than firm-wide ROCE for its profitability to exceed its cost of capital overall.
- B.55 We recognise that there are inherent differences between the project specific hurdle rates used by large housebuilders when evaluating land acquisition and the firm-wide cost of capital that is used when assessing profitability. Therefore, no direct conclusion on the large housebuilders' profitability can be taken when comparing project specific hurdle rates and the cost of capital.

#### *Impairment discount rates*

- B.56 Several large housebuilders include discount rates for impairment<sup>21</sup> within their annual reports. In general, the large housebuilders had discount rates below our calculated cost of capital range throughout the ten-year period considered.
- B.57 The annual reports do not set out a detailed methodology for calculating the discount rates. However, we conclude that our cost of capital range is likely

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<sup>21</sup> Housebuilders test for impairment of their fixed assets. The exercise for testing for impairment involves forecasting costs that need to be incurred to realise the value of the development. This test for impairment involves comparing the currently expected profile of future payments less costs carrying values less forecast future costs discounted back to the present day. The discount rate should reflect the normal return for housebuilding development.

conservative and does not underestimate the cost of capital, when compared to the impairment discount rates.