

Cost of debt workshop

Water 2020: Risk and Return

20 January 2017

## **Introduction (10:30-10:40)**

- Aims and objectives
- Summary of consultation responses

## **How a cost of new debt indexation mechanism could work – Ofwat and United Utilities (10:40-11:30)**

- Presentation on some potential adjustment mechanisms
- Discussion on pros and cons of different mechanisms
- Discussion on in-period Vs end of period adjustments

## **Choice of index and adjusting for inflation – Ofwat and Anglian Water (11:40-12:40)**

- Presentation on principles to choose an index, possible indices and possible approaches to inflation
- Discussion on pros and cons of different indices
- Discussion on the pros and cons of different approaches to inflation

## **Wrap up and next steps (12:40-13.00)**

- Summary of main themes
- Next steps and forward workplan

## **Why do we want to have a workshop?**

- Consultation last year asked a number of questions on our future approach to setting the cost of debt
- Good engagement from respondents, including through our previous workshop in October
- Further engagement required on details on the mechanics of some of our proposals, if we adopt them at PR19

## **What do we want to get out of the day?**

- Explain some of the areas in more detail – how indexation of new debt could work, which indices we could use, how to take inflation into account
- Gather further feedback from stakeholders on these areas to inform our decision making

**This workshop will help us to develop our policy for PR19.**

**We have not yet made any decisions about the cost of debt.**

**We will publish these slides and a summary of the discussion on our website.**

Question	Agree	Conditional Agreement	Disagree	Unclear/neutral/no comment	Comments
1. Do you agree that the cost of debt allowance should be set on the basis of a notional capital structure and notional cost of debt for all companies as opposed to being based on the actual capital structure and debt costs of each company?	14	8	1	2	Some respondents noted concerns around embedded debt costs for debt raised in the past
2. We do not propose to introduce a specific benefit sharing arrangement for companies with securitised capital structures. Do you agree with this approach?	19	1	0	5	
3. Do you agree to the introduction of indexation for the allowance for the cost of new debt?	7	11	4	3	Some respondents disagreed on principle (ie should be companies risk); others wanted to find out further details of how indexation would work

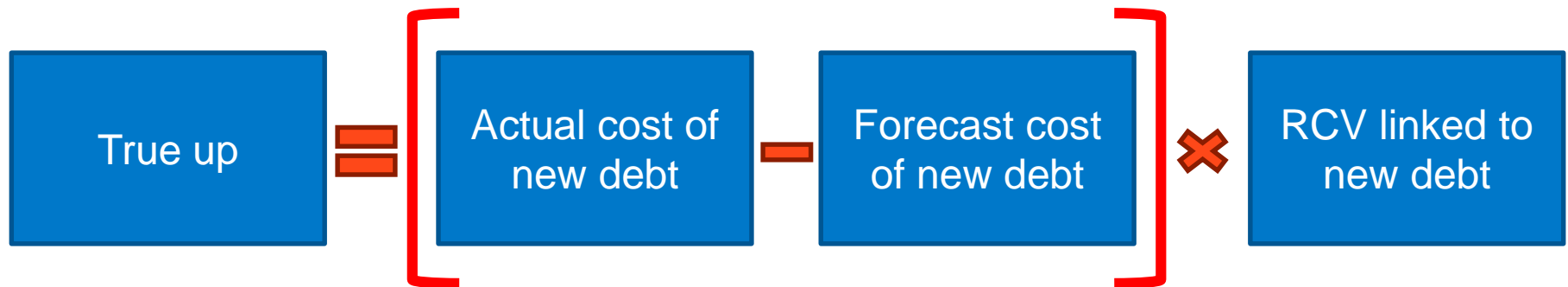
Question	Agree	Conditional Agreement	Disagree	Unclear/ neutral /no comment	Comments
4. Do you agree that indexation of the new debt allowance should have an end of period adjustment?	15	1	5	4	Some respondents preferred in period adjustments, or flexibility to choose
5. Do you agree to an adjustment to the inflation estimate to reflect out-turn inflation and so mitigate inflation forecast error for new debt only?	5	4	10	6	Some respondents agreed in principle but wanted further details of how things would work; others wanted to better understand the details
6. Do you agree that we should leave companies to develop their own company specific risk mechanisms on a voluntary basis for the 2019 price review and we should not mandate a company specific risk sharing mechanism?	14	7	0	4	Some respondents noted concerns over whether this would be required if cost of new debt indexed, or balance of upside/downside risk

How a cost of new debt only indexation  
mechanism could work

## What is a cost of new debt indexation mechanism?

Essentially this is the way we would calculate the indexed cost of new debt.

This would take the form of a 'true up' mechanism – a backwards looking adjustment based on an observed number, rather than adjusting a forecast allowed cost.



This would be separate from any other adjustment or true up mechanism we might have at PR19 (eg for RPI wedge).

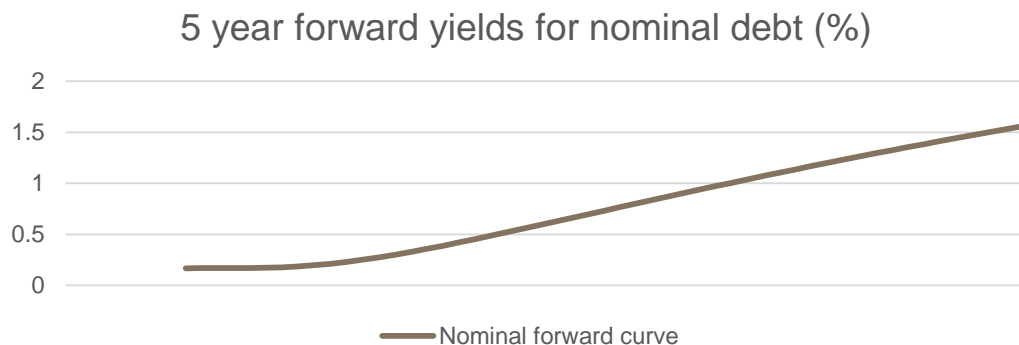
There is a range of ways we could make the true up work.

Our stated preference was for end of period adjustments only given that movements of the index are outside of management control. But some respondents preferred either in-period adjustments or flexibility to allow in-period adjustments (any in period adjustment would require a licence modification).

Our preference remains end of period adjustments. But we will listen to the case for company flexibility to propose in period adjustments in the business plan package. In reaching a view, we would think carefully about, for example:

- The implication of taking a different approach across companies (particularly in relation to customers)
- The specific issue of volatility of customers' bills is a key issue in discussion about in period ODI adjustments, and potentially more important in relation to the cost of debt and given current forecasts for borrowing costs (see chart below).

We would expect to decide on this issue for the methodology.



**Current expectations are that the cost of debt will increase over the next 5 years**

Source: Bank of England – data for 09/01/16

# Debt indexation: calculation options

Discussion slides

# Introduction



# Debt indexation – scope of these slides

- In setting an appropriate debt indexation mechanism for the water sector there are many elements to be determined/considered:

Element	Example points for discussion	In scope for these slides?
General principles governing debt indexation mechanisms	e.g. simplicity vs accuracy	✗ but reminder useful as framework for assessment of options
What rates could be used: <ul style="list-style-type: none"> <li>Which interest rate indices are appropriate</li> <li>How could inflation be stripped out to determine real interest rates</li> </ul>	These slides assume the real interest rate index is appropriate	✗ ✗
How could the calculation work: <ul style="list-style-type: none"> <li>What balance for 'new debt' is appropriate</li> <li>How should the index be averaged/weighted</li> <li>In-period/end of period adjustments</li> </ul>	Flat/increasing profile Flat/trailing averages Option for both?	✓ ✓ ✓

- The intention of these slides is not to give a definitive answer but to generate thought/debate on the possible options, with group discussions to follow
- 4 possible debt indexation mechanism calculations will be presented, illustrating differing profiles of 'new debt' balances and differing profiles of interest rate weightings

# Debt indexation – general principles

- Whilst general principles governing debt indexation mechanisms are not strictly in scope for these slides, we suggest the following principles as being helpful in the discussion / assessment of the options presented:

Principle	Example points for discussion
<b>Accuracy</b>	Index should reflect (as far as practicable) efficient sector debt costs in raising new debt for a tenor which is reflective of long life assets Calculations /weightings should be applied in a way that is reflective (as far as practicable) of the sector's refinancing profiles
<b>Simplicity</b>	Any mechanism should be capable of being easily administered, explained and understood
<b>Transparency</b>	Components are readily observable It is clear how any index is applied Calculations are understood and capable of being replicated Publication of detailed calculations?
<b>Flexibility</b>	Are both in-period and end of period adjustments possible
<b>Other principles?</b>	To be considered

- Certain principles conflict with others: e.g. simplicity versus accuracy, but could be resolved with publication of detailed calculations

# Calculation options

# Assumptions made for all options

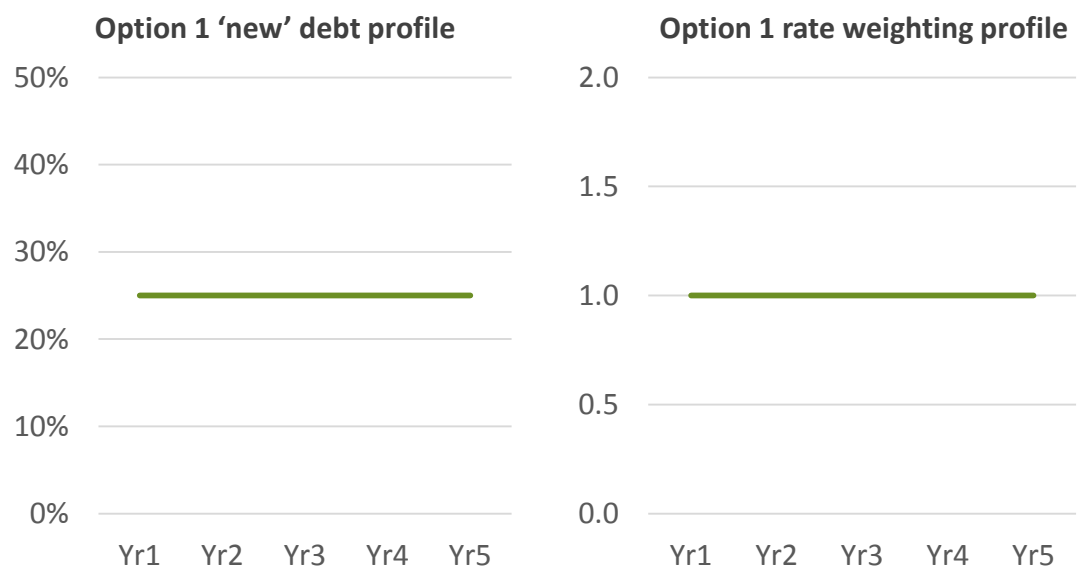
Assumption	Comment																								
Mechanism covers ‘new’ debt only	<p>In line with Ofwat’s cost of debt consultation preferred approach, all options presented assume that the indexation mechanism will only be applied to ‘new’ debt</p> <p>Mechanism for ‘embedded’ debt is not considered</p>																								
‘New’ debt is 25% of total debt on average	The PR19 proportion of debt to be treated as ‘new’ debt (and therefore subject to indexation) and ‘embedded debt’, is still to be determined. All options presented assume Ofwat’s PR14 split of 25:75 is maintained																								
Index reflects sector’s cost of raising long term debt	The assumption that the chosen index reflects a genuine long term rate is important as this significantly influences the period over which rates should be averaged																								
Assumed 12 month average index rates* for illustrative examples	<table><tr><th>Assumptions</th><th>Yr1</th><th>Yr2</th><th>Yr3</th><th>Yr4</th><th>Yr5</th></tr><tr><td>All scenarios: Assumed allowed cost of new debt set at price control</td><td>2.44%</td><td>2.44%</td><td>2.44%</td><td>2.44%</td><td>2.44%</td></tr><tr><td>Low scenario: 12m average of real index</td><td>2.39%</td><td>2.17%</td><td>1.83%</td><td>1.44%</td><td>1.18%</td></tr><tr><td>High scenario: 12m average of real index</td><td>2.49%</td><td>2.71%</td><td>3.05%</td><td>3.44%</td><td>3.70%</td></tr></table>	Assumptions	Yr1	Yr2	Yr3	Yr4	Yr5	All scenarios: Assumed allowed cost of new debt set at price control	2.44%	2.44%	2.44%	2.44%	2.44%	Low scenario: 12m average of real index	2.39%	2.17%	1.83%	1.44%	1.18%	High scenario: 12m average of real index	2.49%	2.71%	3.05%	3.44%	3.70%
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High scenario: 12m average of real index	2.49%	2.71%	3.05%	3.44%	3.70%																				

\* The assumed index rates have been based on the iBoxx NFC A/BBB 10yr + index deflated by RPI breakevens over the financial years 2010-2015 for the low scenario, the high scenario is simply the mirror image around the assumed allowed cost of new debt set at the price control of 2.44%, which itself is based on the iBoxx NFC A/BBB 10yr + index deflated by RPI breakevens over the period Jan-Mar 2010.

# Option 1 – simple mechanism

One of the most straight forward mechanisms simply assumes that:

- ‘New’ debt is 25% of total assumed debt for every year in the AMP; and
- The cost of ‘new’ debt equals the 12 month average of the index in any given year



	Option 1
Low scenario: adjustment	(240)
Low scenario: effective rate	1.79%
High scenario: adjustment	240
High scenario: effective rate	3.09%

The calculated adjustment for any given year would be:

$$\begin{array}{ccc} (25\% \times \text{debt proportion of RCV}) & \times & (12\text{m ave of index for year} - \text{PR19 assumed 'new' debt rate}) \\ \text{'New' debt balance} & & \text{Rate variance} \end{array}$$

# First issue with simple mechanism – ‘new’ debt balance

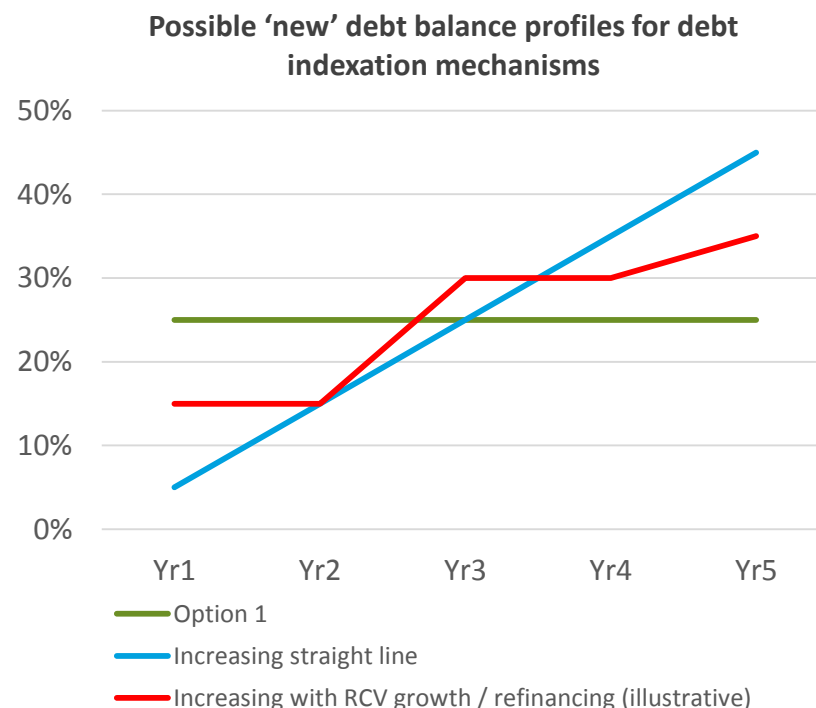
Whilst option 1 scores highly on simplicity, it may not score highly on accuracy:

Water companies are unlikely to have 25% ‘new’ debt on day one of the AMP, and are more likely to gradually refinance/raise new debt over the AMP

The choice of debt balance profile is important as it impacts which rates are most relevant

Possible alternatives to the option 1 flat assumption could be:

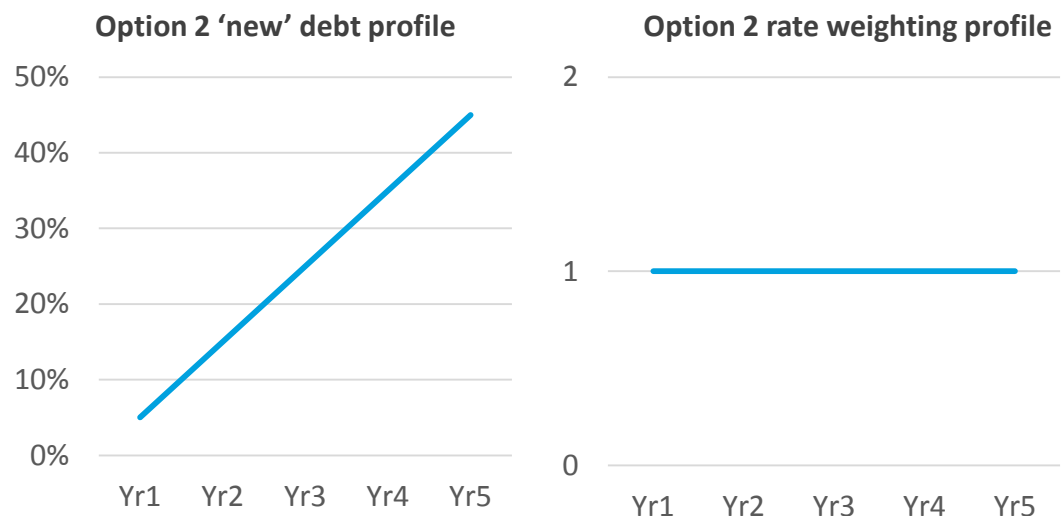
- Gradual increase in ‘new’ debt, i.e. increasing proportion of assumed debt (averaging 25% over AMP):
  - Increasing straight line
  - Increasing in line with company’s RCV growth and/or refinancing profile
  - A different increasing profile
- Other options?



## Option 2 – increasing debt profile

Option 2 seeks to 'correct' the debt profile assumptions under option 1, but keeps the rate weighting unchanged:

- The proportion of 'new' debt is assumed to increase straight line, starting at 0% on day 1 of the AMP and averaging 25% of total assumed debt over the AMP; and
- The cost of 'new' debt is unchanged equalling the 12 month average of the index in any given year



	Option 2
Low scenario: adjustment	(337)
Low scenario: effective rate	1.54%
High scenario: adjustment	337
High scenario: effective rate	3.34%

The calculated adjustment for any given year would be:

$$\begin{array}{c} \text{'New' debt \% for year} \times \text{debt proportion of RCV} \\ \text{'New' debt balance} \end{array} \times \begin{array}{c} \text{(12m ave of index for year - PR19 assumed 'new' debt rate)} \\ \text{Rate variance} \end{array}$$

## Second issue with simple mechanism – rate weightings

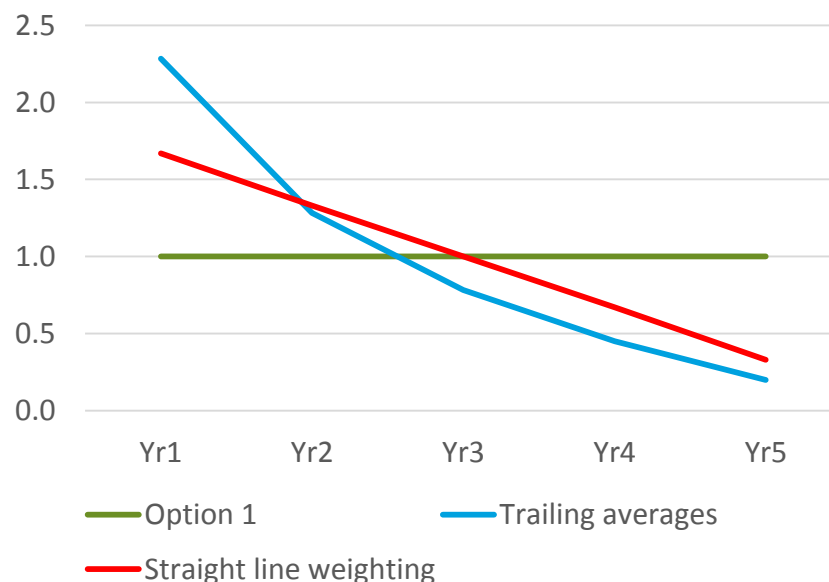
Option 1 assumes that companies' 'new' debt will incur a different effective cost in each year of the AMP equal to the average index for each year. This would only be the case if water companies raised debt in floating rate form\*

If a company were to raise debt in fixed rate form, then the rate at issuance will be incurred on that debt in each successive year irrespective of what happens to the underlying index, i.e. debt raised in year 1 will incur the year 1 rate for all 5 years of the AMP

Possible alternatives to option 1 assumption that 'new' debt is in floating rate form are:

- Higher weighting to rates in earlier years, reflecting fixed rate debt locking in rates at issuance for the rest of the AMP:
  - Trailing averages from start of AMP to end of the year in question (i.e. the year 2 rate is the 2-year average of the index, reflecting that part of the 'new' debt was raised in year 1 fixed at the year 1 rate and part was raised in year 2 fixed at the year 2 rate)
  - Straight line decreasing weighting (i.e. as per CEPA, the year 1 to 5 rates being weighted 5:4:3:2:1, reflecting that the year 1 rate is locked in for 5 years, the year 2 rate is locked in for 4 years, etc.)
- Other options?

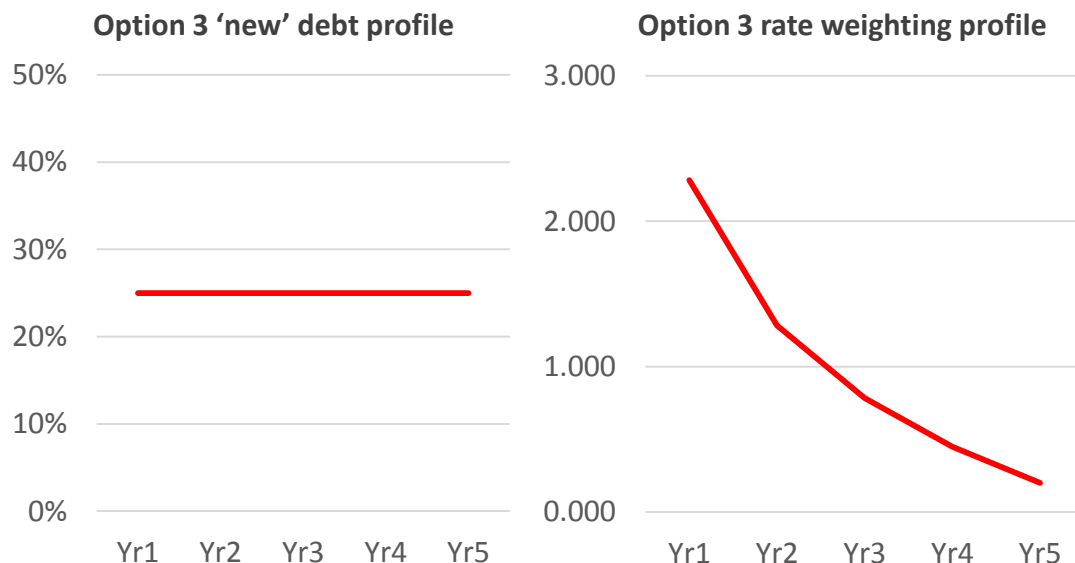
Possible yearly weightings of index rates for debt indexation mechanisms



## Option 3 – weighting of rate profile

Option 3 seeks to 'correct' the rate weighting profile assumptions under option 1, but keeps the 'new' debt profile unchanged:

- New' debt is 25% of total assumed debt for every year in the AMP; and
- The cost of 'new' debt is equal to the trailing average of the index from the start of the AMP to the end of any given year



	Option 3
Low scenario: adjustment	(123)
Low scenario: effective rate	2.10%
High scenario: adjustment	123
High scenario: effective rate	2.78%

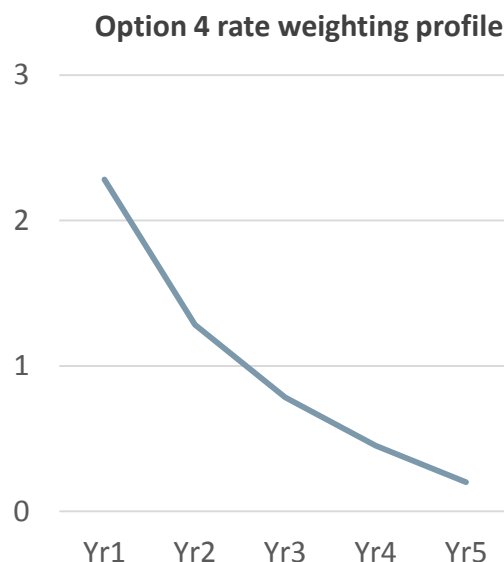
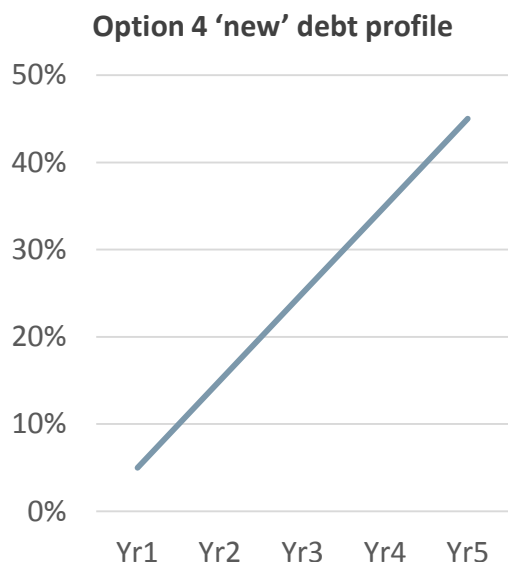
The calculated adjustment for any given year would be:

$$\begin{array}{c}
 (25\% \times \text{debt proportion of RCV}) \\
 \text{'New' debt balance}
 \end{array}
 \times
 \begin{array}{c}
 (\text{Trailing ave of index from AMP start to end of year} - \text{PR19 assumed 'new' debt rate}) \\
 \text{Rate variance}
 \end{array}$$

## Option 4 – increasing debt profile & weighting of rate profile

Option 4 seeks to 'correct' both the debt & rate weighting profile assumptions under option 1:

1. The proportion of 'new' debt is assumed to increase straight line, starting at 0% on day 1 of the AMP and averaging 25% of total assumed debt over the AMP; and
2. The cost of 'new' debt is equal to the trailing average of the index from the start of the AMP to the end of any given year



	Option 4
Low scenario: adjustment	(170)
Low scenario: effective rate	1.99%
High scenario: adjustment	170
High scenario: effective rate	2.89%

The calculated adjustment for any given year would be:

$$\frac{(\text{'New' debt \% for year} \times \text{debt proportion of RCV}) \times (\text{Trailing ave of index from AMP start to end of year} - \text{PR19 assumed 'new' debt rate})}{\text{'New' debt balance}} \quad \text{Rate variance}$$

# Debt indexation calculation options – pros and cons

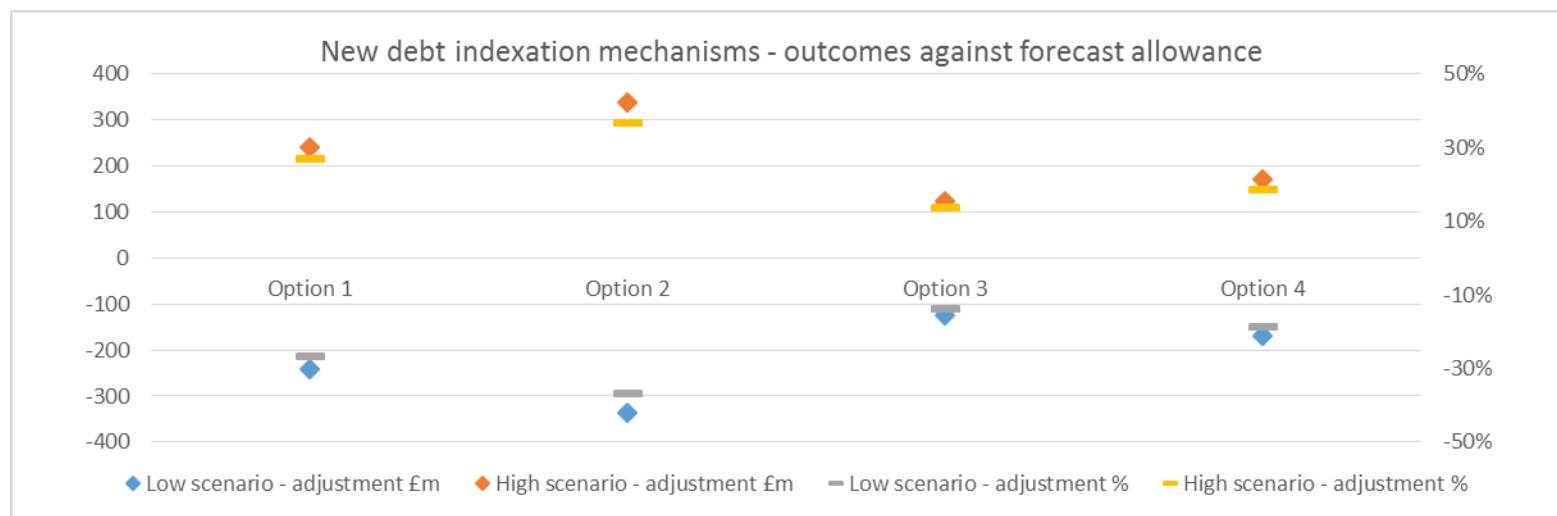
	Option 1	Option 2	Option 3	Option 4
Simple and easy to calculate	✓✓✓	✓✓	✓✓	✓
Reflects a more typical pattern of raising new debt gradually over AMP*	×	×	✓✓	✓✓
Assumes debt is raised in fixed as opposed to floating rate form, which is the current usual convention in the market/sector**	×	✓✓✓	×	✓✓✓
In period adjustments are available (see also slides 15-17)	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Other criteria?	?	?	?	?

\* Whilst each company will have its own refinancing / new debt profile which is likely to differ from the straight line increasing debt profile, this profile is likely to be a better match than a fixed new debt proportion across the AMP

\*\* Also it is not possible for a company to issue floating rate debt that tracks the 'floating' index as certain elements are fixed at issuance, e.g. credit spread

# Debt indexation calculation options – illustrative adjustments

Using illustrative high and low interest rate scenarios and illustrative RCV balances, the following debt indexation adjustments are calculated:



	Option 1	Option 2	Option 3	Option 4
Low scenario: adjustment	(240)	(337)	(123)	(170)
Low scenario: effective rate	1.79%	1.54%	2.10%	1.99%
High scenario: adjustment	240	337	123	170
Low scenario: effective rate	3.09%	3.34%	2.78%	2.89%

# In-period adjustments

# In-period vs end of period adjustments

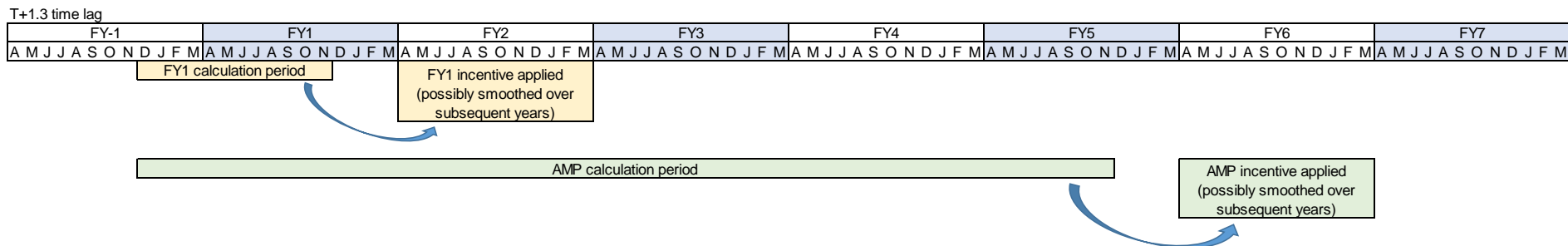
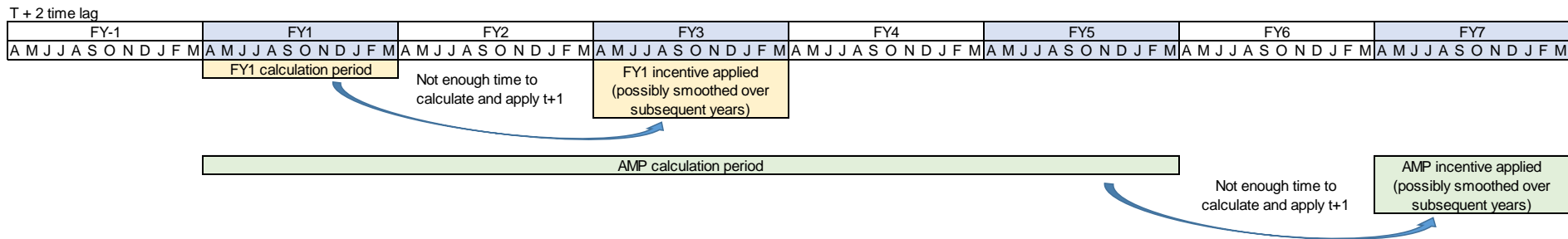
- Most debt indexation mechanisms are capable of both end of period and in-period adjustments:
  - The in-period adjustment would be the debt balance for the given year multiplied by the difference between the forecast new debt rate and the actual new debt rate as observed from the index for the given year
  - The in-period adjustment would need to be applied on a time lag basis
- End of period adjustments have the benefit of possibly reducing bill volatility for customers, although a number of in-period adjustments currently exist that cause volatility already or may offset this mechanism
- In-period adjustments have the benefit of possibly reducing financeability issues by applying the adjustment at the time when the company is benefitting/suffering from the differing cost of debt, although the smoothing of WACC across the AMP already results in some revenue/cost mismatch

It might not be appropriate to make in-period adjustments mandatory.

However companies, in conjunction with relevant stakeholders, could have the flexibility to decide whether in-period or end of period adjustments are more appropriate, including the ability to smooth in-period adjustments.

# Time lag for adjustments

- To get most benefit from in-period adjustments and also to ensure that end of period adjustments are known as early as possible, where feasible the time lag between the calculation and the application in-period / end of period should be minimised:
  - Forward looking mechanisms - create complexity and would require additional adjustments and therefore are not recommended;
  - Backward looking mechanisms - could either be T+2 (i.e. the rates for the year to 31 March 2025 would be applied in FY27) or could reduce lag by shifting the calculation year by (say) 4 months (i.e. the rates for the year to (say) 30 November 2024 could be applied in FY26)



# Questions for discussion

Pros and cons of the options presented?

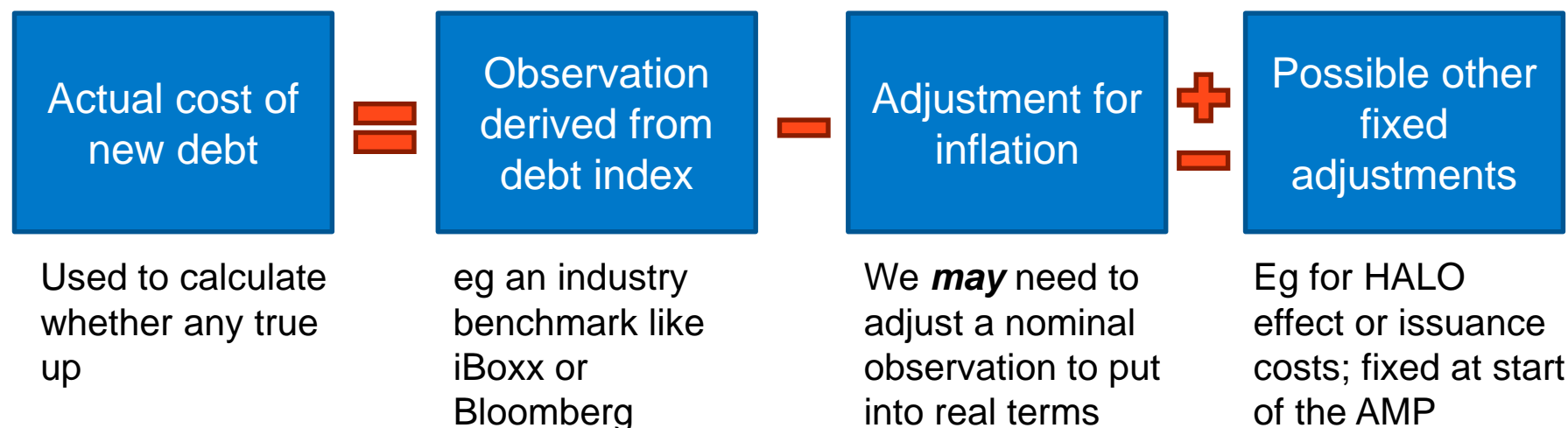
Any alternative options?

Views on allowing flexibility for in-period adjustments?

## Which index to use and what to do about inflation

We are not proposing to mechanistically set the cost of new debt allowance by reference to a benchmark index. However, we think that any true up should be mechanistic and based on a benchmark index to remove the risk associated with accurately forecasting new debt.

To calculate the actual cost of new debt, we would use an observation from an index but may need to adjust that observation:



Today we consider further:

- How we could choose an index and which indices we could use
- How to adjust for inflation

We are not considering 'other adjustments' as we expect to consider these further as part of setting the cost of capital at PR19 and do not expect these would vary within the AMP.

All our decisions are taken in line with our statutory duties. We have developed some specific principles for this workshop to help us appraise different indices given the number of potential candidates:

1. Transparent, meaning that, for example:
  - it should be based on publically available data (but not necessarily excluding market indices that must be paid for)
  - inputs and calculations of the index should also be clear and also in the public domain
2. Legitimate, meaning that, for example:
  - It should reflect a notional company's efficient costs
  - It should comprise sufficient data points to be robust, and, for example, not rely too heavily on debt issued by water companies themselves (ie to truly be a benchmark of efficient costs and provide appropriate incentives) or a small number of companies or debt instruments (eg only a small number of bonds)
  - we should have a reasonable expectation that it will remain useful for duration of the AMP (ie composition etc. will be stable and robust over time)
3. Simple, meaning that, for example:
  - it should require a limited amount of manipulation to derive any adjustment (ie should rule out multiple calculation steps where possible)

These principles are aligned to our cost of debt decision criteria from our consultation, as well as our Water 2020 objectives.

All the indices we've seriously considered track the cost of debt in nominal terms. We therefore need to consider inflation, particularly in the context of the transition to CPI or CPIH.

In our May 2016 decision document on Water 2020 we outlined that:

- 50% of the RCV as at 1<sup>st</sup> of April 2020 will be linked to RPI; 50% to CPI/H.
- All RCV growth will be in the CPI/H part of the RCV; the RPI side will run off over time.

### RCV linked to CPI/H:

- Starts at 50% of RCV, increases over the AMP with new additions
- RCV indexed to actual CPI/H over the AMP

### RCV linked to RPI:

- Starts at 50% of RCV, declines over the AMP as RCV runs off
- RCV indexed to actual RPI over the AMP

We therefore expect that, as we are only considering indexing the cost of **new debt**, any inflation adjustment should be in terms of **CPI/H** (linked to the growing section of the RCV).

In May 2016 we also committed to setting a **single nominal WACC** for PR19. We will then deflate this by:

- CPI/H for the CPI/H linked part of the RCV
- CPI/H plus the RPI wedge for the RPI linked part of the RCV

In setting the single nominal WACC, one input is the allowed cost of debt, both new and embedded. We think we have two broad options:

1. Use **real inputs**, for example by deflating a nominal index, looking at companies' cost of debt in real terms etc. or
2. Use **nominal inputs**, for example by using observations from a nominal index, companies' nominal cost of debt.

For the latter approach **we may not need to adjust an observed cost of new debt by inflation** – if the input to set the forecast cost of new debt allowance is a nominal input, the adjustment should also reflect changes in a nominal index. This depends on whether we expect long term CPI/H to be stable over the AMP.

For the former approach we would need to both set the forecast new debt allowance and the actual cost of new debt in real terms. We would then need to adjust the actual cost of new debt by CPI/H over the period.

# Water 2020 Debt-indexation & inflation adjustment

January 2017

**Gagan Gulati**



1. Which index and why?
  - i. Key considerations
  - ii. Potential indices
  - iii. iBoxx non-financial vs utilities index
2. Inflation adjustment
  - i. A case for simplicity
  - ii. Possible options to adjust for inflation
  - iii. CPI break-even inflation is affected by demand & supply
  - iv. A case for Bank of England's target as inflation assumption
  - v. Selection of a suitable method
3. Conclusion

## Key considerations

➤ In the selection of indices, we have looked to satisfy the following criteria:

- **Must have**

- Reflect industry pricing
- Appropriate tenor for the Water sector

- **Good to have**

- Ease of availability
- Consistency
- Stability

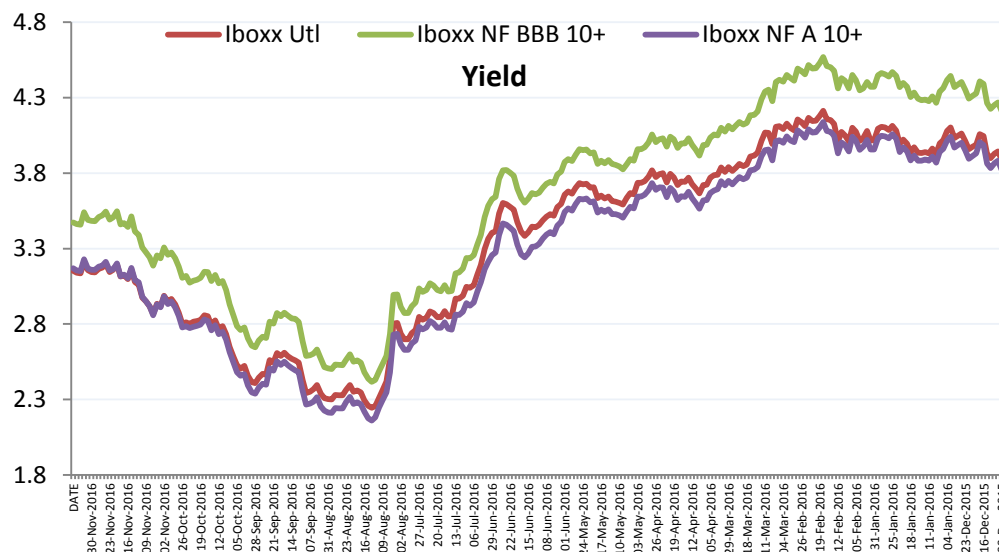
## Which index is most suitable for the sector?

Indices	Reason to consider	Transparency	Legitimacy	Simplicity
iBoxx Corporate Non-financial	<ul style="list-style-type: none"> <li>Used by Ofgem, Ofwat</li> </ul>	<ul style="list-style-type: none"> <li>Easily available</li> <li>Stakeholders familiar</li> </ul>	<ul style="list-style-type: none"> <li>A/BBB rating</li> <li>High proportion of utility (50%)</li> <li>Used by other regulators, including Ofwat for TTT</li> <li>High no of bonds (&gt;100)</li> </ul>	<ul style="list-style-type: none"> <li>No manipulation required by user</li> </ul>
iBoxx Utilities	<ul style="list-style-type: none"> <li>Mainly reflect utilities</li> </ul>	<ul style="list-style-type: none"> <li>Easily available</li> </ul>	<ul style="list-style-type: none"> <li>Dominated by a single highly rated utility (EDF forms c14% of the index)</li> <li>Not used by any other regulator</li> <li>New index</li> </ul>	<ul style="list-style-type: none"> <li>No manipulation required by user</li> </ul>
BoAML Corporate/ Non-gilt	<ul style="list-style-type: none"> <li>Used by CAA to set kD</li> </ul>	<ul style="list-style-type: none"> <li>Relatively expensive to access</li> </ul>	<ul style="list-style-type: none"> <li>A/BBB rating</li> <li>High no. of bonds (&gt;200)</li> <li>Includes fin. and lower proprn utility relative to iBoxx</li> </ul>	<ul style="list-style-type: none"> <li>Less user friendly than iBoxx</li> </ul>
Bloomberg	<ul style="list-style-type: none"> <li>Considered by Ofgem at RIIO controls</li> </ul>	<ul style="list-style-type: none"> <li>Relatively expensive to access</li> </ul>	<ul style="list-style-type: none"> <li>A/BBB rating</li> <li>Value based on point on yield curve - potentially less applicable/ robust for setting kD for portfolio of water bonds</li> </ul>	<ul style="list-style-type: none"> <li>Less user friendly than iBoxx</li> </ul>

We consider **iBoxx non-fin** or **iBoxx Utilities** for further analysis..

# iBoxx Non-financial index vs iBoxx utilities?

- iBoxx utilities index is heavily dominated by one large highly rated issuer (EDF, nearly 14% weighting).
- **Tenor:** Average maturity of the water industry debt is over 25 years. iBoxx Non-Financial (10+) more closely match the maturity of the water sector debt.



Credit spreads (indicative):

- iBoxx– A rated non-fin (10+) : 120bps
- iBoxx BBB : 148bps
  - Average of 10y+ A and BBB = 134bps
- iBoxx utility : 136bps

**Source:** Market iBoxx (COB 11<sup>th</sup> Jan)

Given dominance of the iBoxx utilities index on one large issuer, and familiarity of stakeholders (banks/investors/regulators) with the iBoxx non-financial index, in our view the average of iBoxx A and BBB (10+, 1 year trailing) is most suitable index for the sector.

Source: iBoxx

# Inflation adjustment

## A case for simplicity

- Investors and Banks tell us that the Water sector has benefitted from the simplicity of RCV based regulation.
- Inflation adjustment, as proposed in the Ofwat consultation, will create an additional ex-post adjustment that stakeholders will need to track and follow.
- If CPI Break-even (BE) inflation is derived to calculate an ex-post adjustment, as proposed by CEPA, this will create additional complexity and uncertainty in our view.
- Any impact of these adjustments is likely to be small as it is proposed to apply to the new debt only (25% of 62.5% gearing).
- As new debt will become part of the embedded debt portfolio after five years, long-term BE inflation assumptions appears less valid in the water sector, than say in gas/electricity price setting where a trailing index remunerates all debt.
- We prefer a simple assumption of Bank of England's target rate as proxy for long-term inflation. This option is explained further.

## Three options to adjust for inflation

Which inflation for debt indexation?		Calculations / adjustments required
1	Outturn CPI/(H) (Ofwat consultation)	<ul style="list-style-type: none"> <li>• Compare FD CPI vs actual published CPI</li> <li>• Adjust ex-post</li> </ul>
2	CPI Break-even inflation (CEPA proposal)	<ul style="list-style-type: none"> <li>• Observe RPI break-even at 20 yr tenor</li> <li>• Calculate CPI-RPI wedge (tenor?)</li> <li>• Derive CPI break-even inflation</li> <li>• Compare FD CPI vs CPI break-even</li> <li>• Calculate and apply an ex-post adjustment</li> </ul>
3	Bank of England 2% target	<ul style="list-style-type: none"> <li>• No adjustment needed</li> </ul>

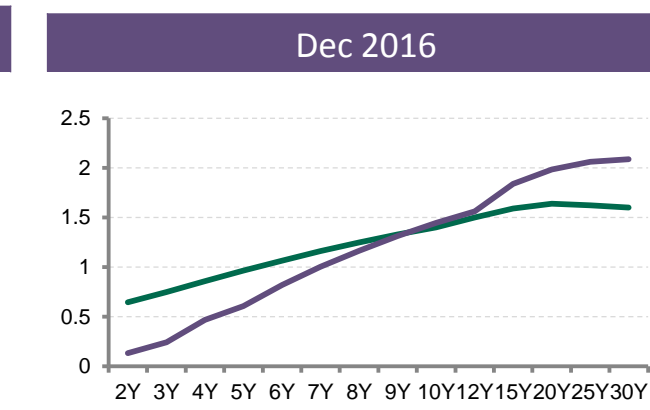
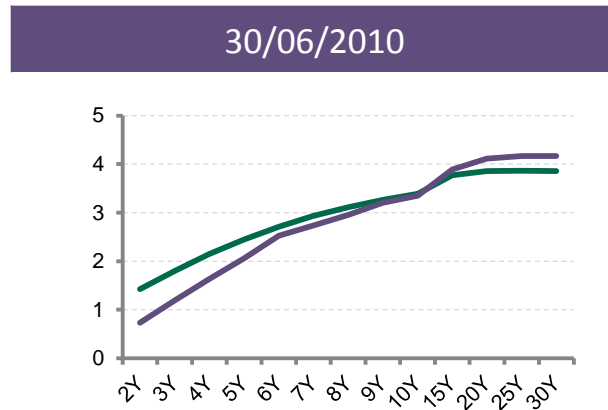
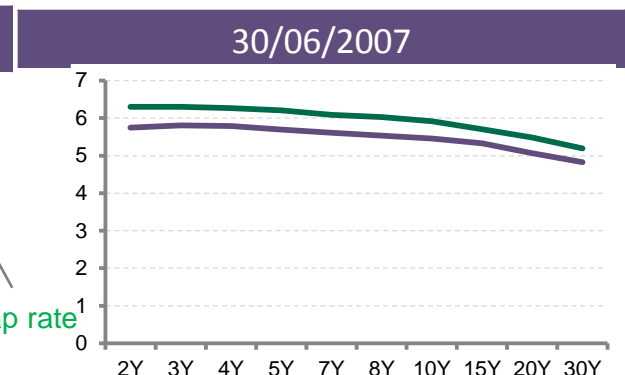
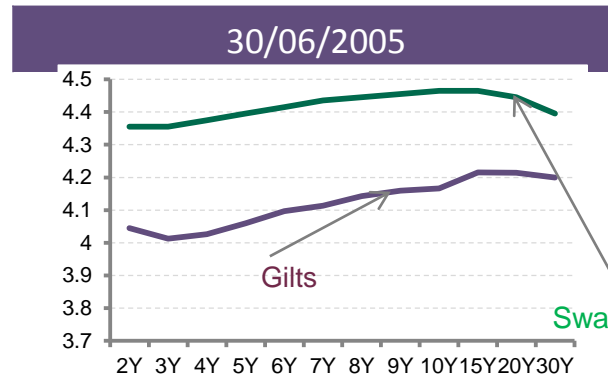
Given the inflation adjustment will apply to new debt only (impact will be small), we are mindful of balancing the need for accuracy, with the added complexity of calculating CPI break-even inflation & ex-post adjustments.

# CPI break-even inflation is affected by demand and supply

- Economic theory supports the use of break-even inflation, however, limitations of CPI/H makes it less pragmatic (there is no reliable source to observe long-term CPI breakeven inflation).

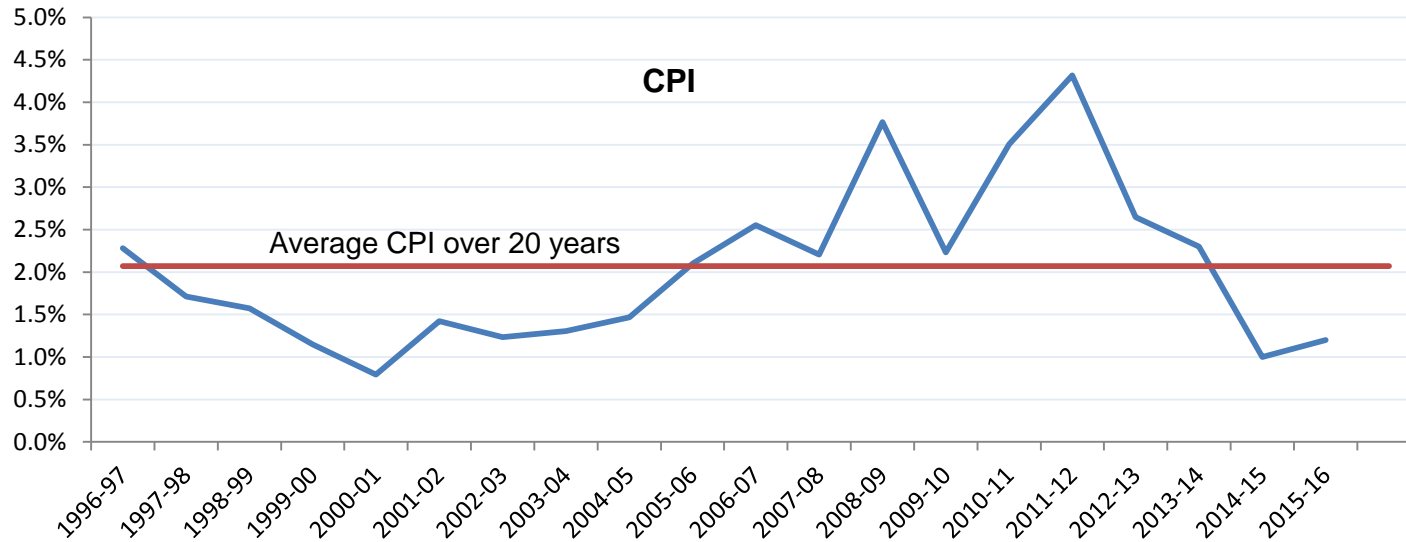
## How good a predictor of inflation is break-even?

- Break-even inflation is calculated as the difference between the yield of a nominal gilt and an inflation linked gilt of same maturity.
- Theoretically, break-even is seen as best gauge of long-term inflation, however, this is influenced by recent market abnormalities.
- Gilt prices traditionally had a lower yield than swaps reflecting higher credit quality of the Government debt.
- Subsequent to the Global Financial Crisis, other factors such as supply/demand and QE have affected the pricing (see graphs).
- Consequently the gap between Nominal and Inflation linked gilts may not truly reflect expected inflation.



CPI Break-even inflation is complex to derive, and is not without flaws..

## A case for Bank of England target as inflation assumption



- Over last 20 years, average CPI has been around 2% (Bank of England's target rate).
- Over longer-term it could be argued that Central Bank's target is a better predictor of inflation than a complex and previously untested derivation of CPI break-even inflation. We prefer the stability and simplicity of BoE target over other options.

This option removes the need for derivations and ex-post adjustments, unless the Bank of England changes its inflation target. This will retain simplicity and remove uncertainty, and therefore in our view, this will benefit customers and other stakeholders.

## Which method is most suitable for the sector?

	Indices	Reason to consider	Easily observable	Legitimate	Simple
1	<ul style="list-style-type: none"> <li>Outturn CPI</li> </ul>	<ul style="list-style-type: none"> <li>Ofwat consultation proposal</li> </ul>	<ul style="list-style-type: none"> <li>✓ Easily observable (published by the ONS)</li> </ul>	<ul style="list-style-type: none"> <li>✓ Based on spot rates – inconsistent tenor to the iBoxx debt index (duration &gt; 20yrs)</li> </ul>	<ul style="list-style-type: none"> <li>✓ Spot CPI is widely used and understood</li> </ul>
2	<ul style="list-style-type: none"> <li>Break-even inflation (Ofgem method, however, for CPI)</li> </ul>	<ul style="list-style-type: none"> <li>Few companies suggested to use break-even inflation</li> </ul>	<ul style="list-style-type: none"> <li>Not observable for CPI</li> </ul>	<ul style="list-style-type: none"> <li>✓ Possible to derive a CPI break-evens</li> <li>Less valid for Water than Gas, electricity due to the way embedded debt is funded</li> </ul>	<ul style="list-style-type: none"> <li>Complex calculation (RPI breakeven – wedge = CPI breakeven)</li> </ul>
3	<ul style="list-style-type: none"> <li>Bank of England's long-term CPI target (2%)</li> </ul>		<ul style="list-style-type: none"> <li>✓ BOE's long-term target</li> </ul>	<ul style="list-style-type: none"> <li>✓ In a stable economy, central bank's CPI target is a credible estimate.</li> <li>Supported by historic data</li> </ul>	<ul style="list-style-type: none"> <li>✓ No complicated calculations or derivations</li> <li>No ex-post adjustment needed</li> </ul>

Given the complexity involved in option 2, and legitimacy issues around options 1, we believe option 3 provides a simple and credible solution.

## Conclusion

- In our view, the average of iBoxx non-financials indices A and BBB (10+, 1 year trailing) provides the most suitable index for the sector.
- Our preference is to retain the simplicity of the existing regime and assume Bank of England's CPI target as proxy for the long-term CPI inflation assumption. This option removes the need for complex calculations and ex-post adjustments.

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Wrap up and next steps