NERA
ECONOMIC CONSULTING

# COST OF DEBT AT RIIO-2
## A REPORT FOR ENA

14 MARCH 2019

ENA, London



Insight in Economics™

# We set out expected sector cost of debt performance over RIIO-1 & RIIO-2 under existing mechanisms; updated evidence on “halo effect”; and evidence on transaction and liquidity costs

- On behalf of ENA, we have been asked to:
  - Collate networks actual cost of debt
  - Forecast expected allowed cost of debt over RIIO-2, under different RIIO-1 mechanisms
  - Forecast sector cost of debt over RIIO-2, taking into account assumed debt issuance
  - Assess evidence for the “halo effect”

- Structure of report:
  - Data collection and modelling assumptions
  - GDN, DNO and TO sector level performance, under both simple or equally-weighted and RAV/notional debt-weighted approach, over RIIO-2 under existing mech.s
  - Updated evidence on the halo effect, including evidence on cost-of-carry and operational liquidity costs
  - Conclusions

# 1 Data collection and modelling approach

# Our modelling approach broadly follows Ofgem's approach at ED1 to assessing companies' kD performance

## Our modelling assumptions for sector as a whole

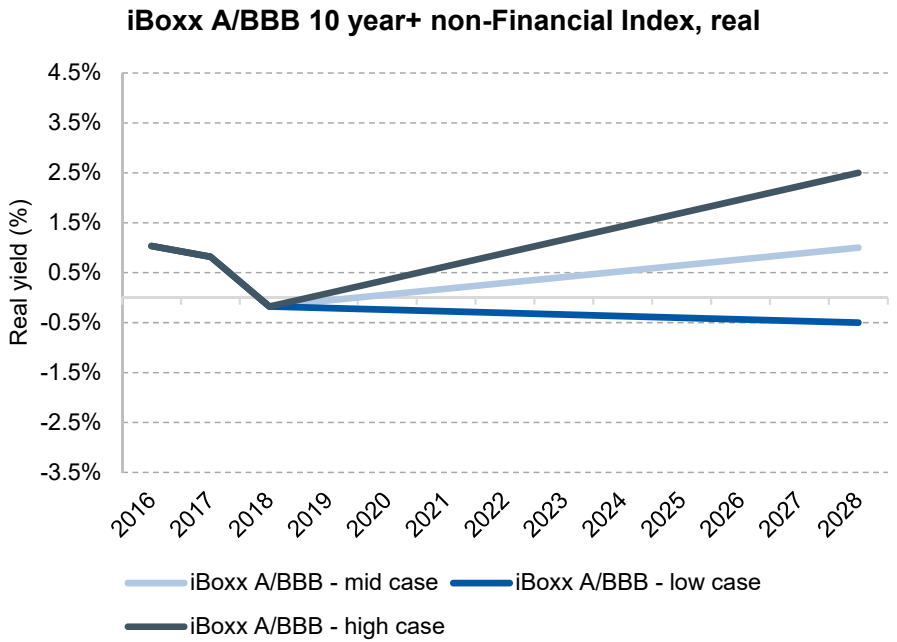
- We have collected companies' existing and expected debt issuance, and derivative costs for all bar two Groups (drawing on R8a of RFPR)
- We assume companies issue new debt at iBoxx A/BBB 10Y+ rate
  - To be reconsidered in light of sector/company credit metrics and actual rating
- For trans., liquidity and cost-of-carry, we adopt holding assumption of 20bps for both embedded and new debt, as per Ofgem's assumption for these costs at RIIO-1
  - We show 20bps substantively understates costs: cost-of-carry and operational liquidity alone supports allowance of 23 to 56 bps, not counting trans. costs
- We assume allowance also based on A/BBB 10Y+, but no trans./liquidity allowance, as per RIIO-1. Results show co.s require explicit allowance
- We forecast future debt issuance costs and allowances under three different iBoxx scenarios: -0.5%, 1% and 2.5% per cent real by 2028 (see next slide)
- Inflation based on OBR, as per Ofgem Sec Con

## We compare real cost of debt to real iBoxx allowance

- To analyse performance, we calculate the nominal interest cost both with and without derivatives, and convert to real terms for comparison with a real cost of debt allowance, that is:
  - *Calculate real cost of debt*: deflate forecast nominal cost (applies to nominal debt only) using OBR forecasts for the relevant year of RIIO-1 and 2
    - We calculate debt costs with and without derivative costs (see App. for detail)
  - *Real allowance*: for historical years, deflate nominal iBoxx with break-even inflation as per Ofgem's approach. For forecast years, deflate nominal iBoxx using forecast inflation for the relevant year of the regulatory period

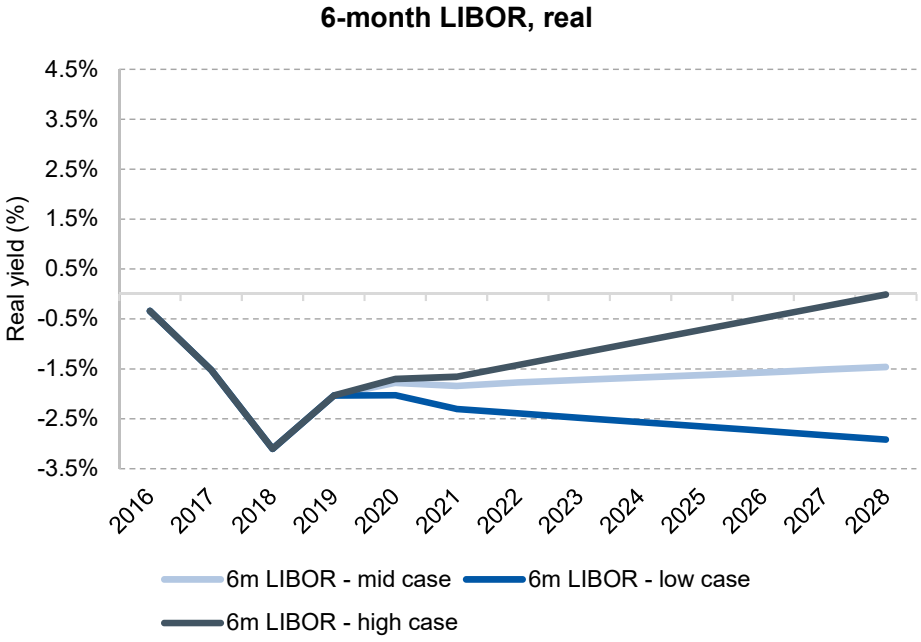
# We forecast iBoxx and LIBOR mid-case based on market forecasts, and form scenarios based on +/- 150 bps relative to mid-case

**We forecast real A/BBB iBoxx index to be 1.0% by 2028 using forward uplift implied by 10-year gilt spot and forward curves (125 bps increase), and assume scenarios +/- 150 bps**




*Source: NERA analysis based on Bloomberg and Factset data*

**We forecast real 6m LIBOR to be -1.3% by 2028 using LIBOR forward rates, and assume scenarios +/- 150 bps**

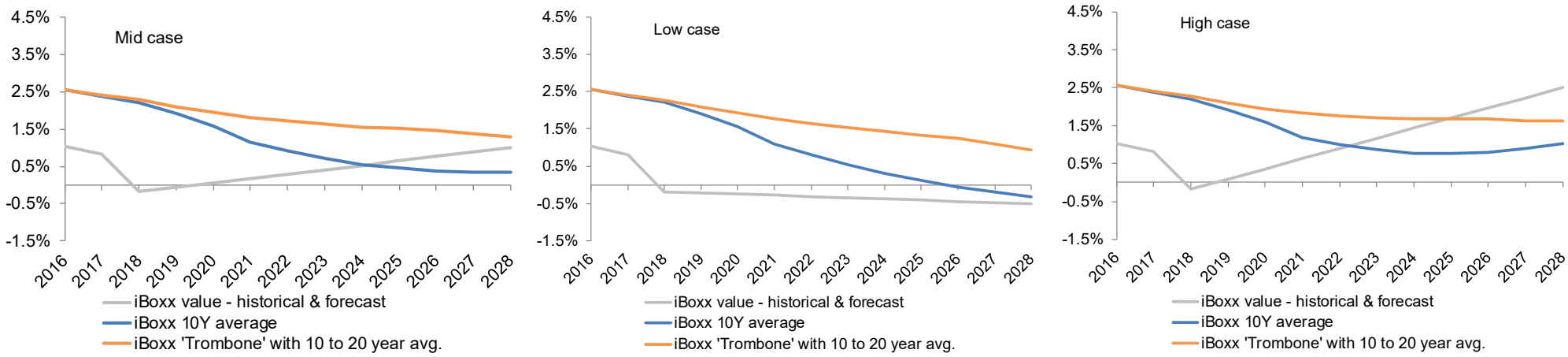



*Source: NERA analysis based on Bloomberg and Factset data*

# Based on market forecast and scenarios, we model cost of debt allowance under RIIO-1 specific mechanisms

**We model allowance under GD1/T1/WPD 10 year trailing average and ED1 trombone as shown, as well as SHET plc specific mechanism**

- ED1 trombone provides higher allowance as higher value historical years retained within index for longer period



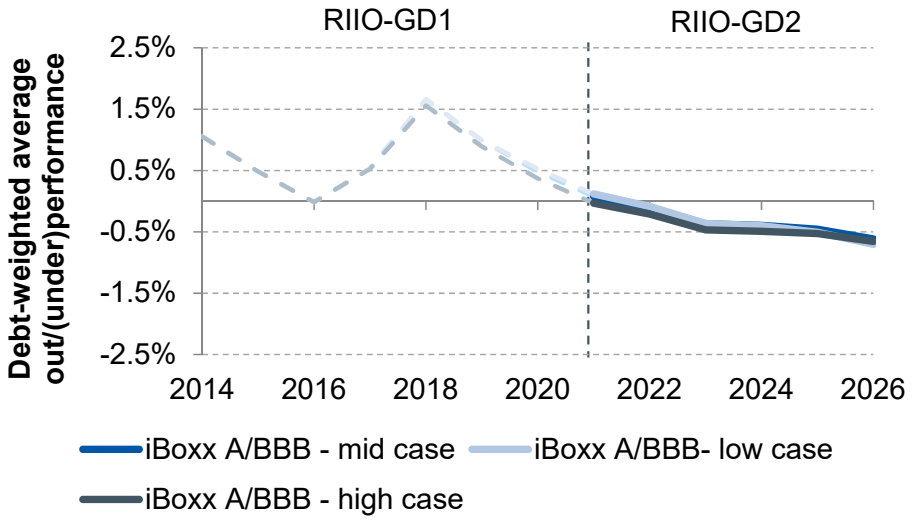

*Source: NERA analysis based on Bloomberg and Factset data*

# 2 Sector level performance over RIIO-1 and RIIO-2

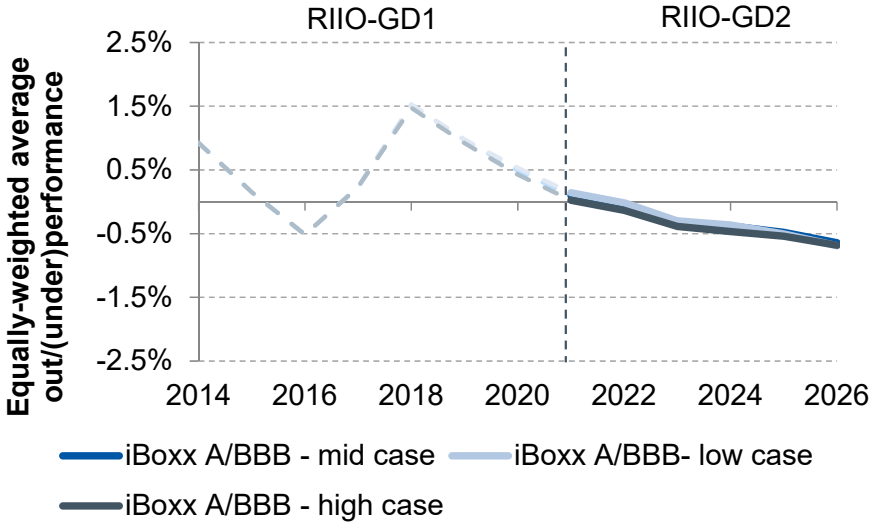
# We expect GDNs as a sector to underperform over GD2 under existing mechanism

- Sector average based on RCV/ notional debt-weighted average and simple or equally-weighted of GDN groups' – i.e. based on four observations. Includes Cadent "cost of refinancing"
- Our analysis shows that GD sector will outperform on debt costs by ca 60 to 65 bps over RIIO-1, but underperform by 40 to 50 bps over RIIO-2, based on *debt-weighted average*, excluding effect of derivatives
- Based on *equally-weighted average* performance, GD sector will outperform on debt costs by ca 45 to 50 bps over RIIO-1, but underperform by 35 to 45 bps over RIIO-2, excluding effect of derivatives
- Performance declines over period as higher value iBoxx historical years fall out of trailing average but no commensurate decline in debt costs, as mis-match between debt issuance profile and trailing average
- Variation in performance over GD1 largely driven by variable outturn inflation, i.e. used to calculate real kD
- GD sector performance is relatively invariant to the interest rate scenario as industry's embedded debt cost is largely fixed and new debt issuance is relatively low

**Sector underperforms by 40-50 bps in RIIO-2 (excl. derivatives) based on debt-weighted average performance**



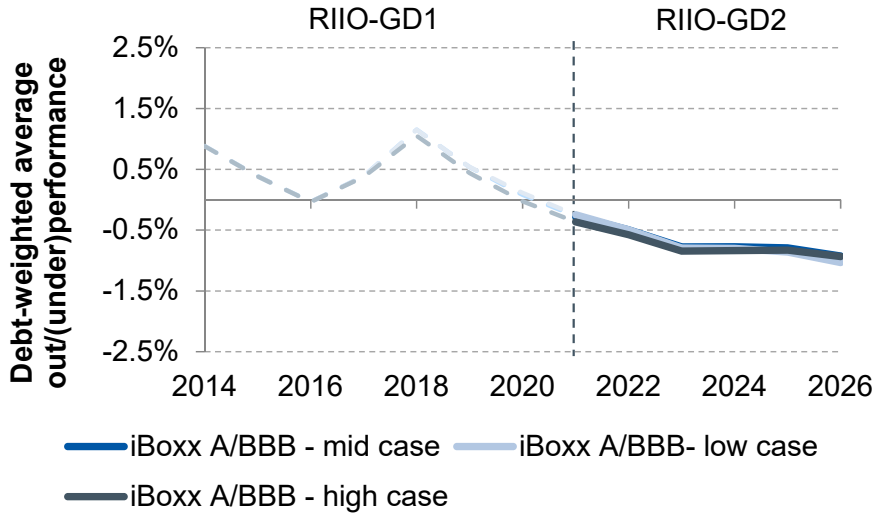

**Sector underperforms by 35-45 bps in RIIO-2 (excl. derivatives) based on simple average performance**



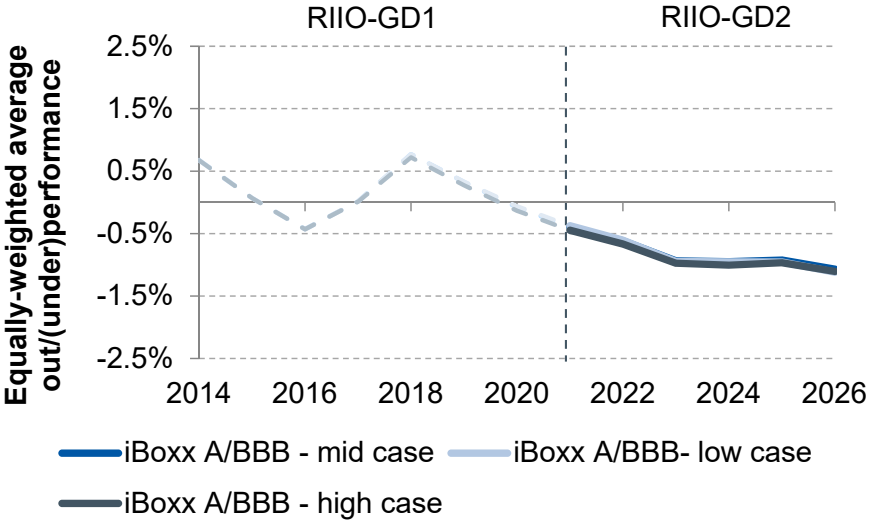
# Including derivatives, GDNs as a sector would further underperform over GD2 under existing mechanism

- Taking into account the derivatives, sector outperformance would be ca 35 to 40 bps over RIIO-1 (decrease by ca 25 bps), and underperformance would further decrease to ca 75 to 80 bps over RIIO-2 (30 to 35 bps decline), based on the *debt-weighted average* sector performance
- Using the *equally-weighted average* sector performance, outperformance would be ca 5 to 10 bps over RIIO-1 (decrease by ca 40 bps), and underperformance would further decrease to ca 90 to 95 bps over RIIO-2 (ca 50 bps decline)
- There is divergence in individual group/licensee performance, e.g. companies with debt pre-dating trailing average period are underfunded

**Including derivatives, sector underperforms by 75-80 bps in RIIO-2 using debt-weighted average performance**



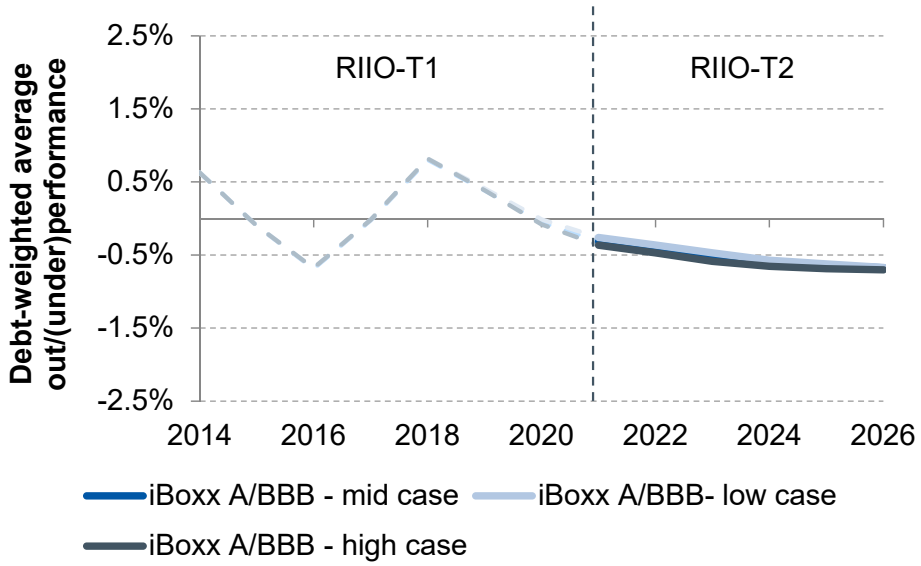

**Sector underperforms by 90-95 bps in RIIO-2 (incl. derivatives) using simple average performance**



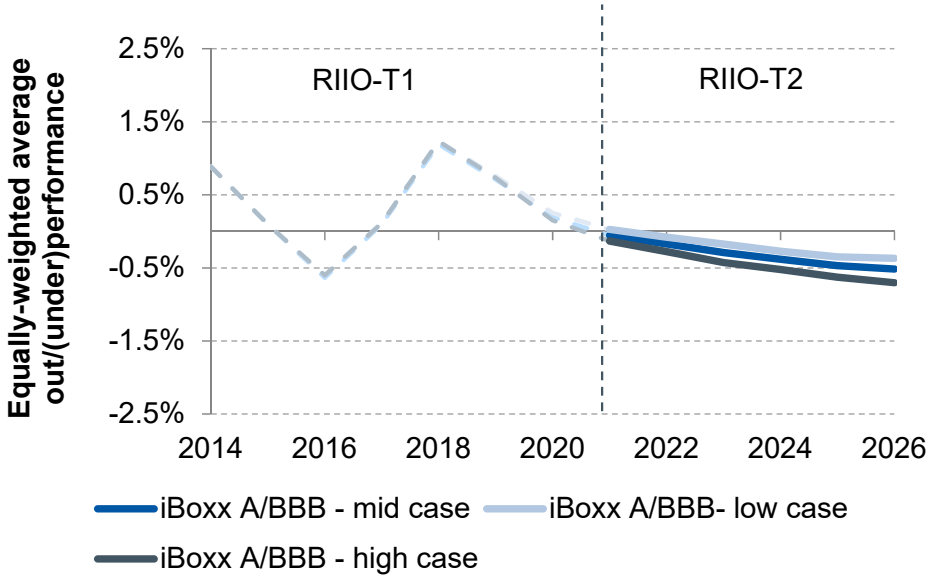
# TOs will also under-perform over RIIO-2 depending on interest rate scenario

- We calculate sector performance by taking the debt-weighted average and equally-weighted average of TO's performances (NGET, NGGT, SPT, SHET plc) relative to their specific mechanism, i.e. analysis combines separate mechanisms. TOs either do not have/have not provided derivative data
- Based on *debt-weighted average* performance, TOs will underperform on debt costs by ca 10 bps over RIIO-1, excluding effect of derivatives. Over RIIO-2, TOs will underperform by 55 to 60 bps in low/high interest rate scenarios
- Based on *equally-weighted average* performance, TOs will outperform on debt costs by ca 30 to 35 bps over RIIO-1, excluding effect of derivatives. Over RIIO-2, TOs will underperform by 25 to 50 bps in low/high interest rate scenarios
- As with GDNs, performance declines over period as higher value iBoxx historical years fall out of trailing average but no commensurate decline in debt costs, as mis-match between debt issuance profile and trailing average
- There is divergence in individual group/licensee performance

**Sector underperforms by 55-60 bps in RIIO-2, based on debt-weighted average**



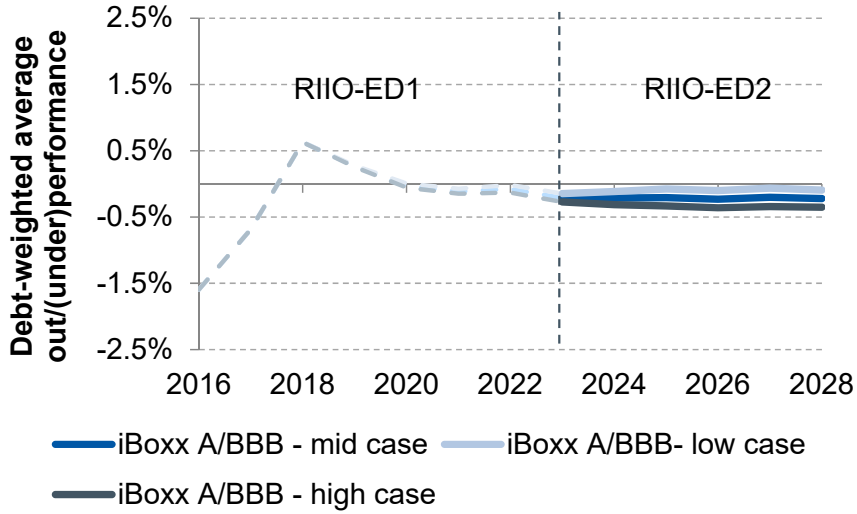

**Sector underperforms by 25-50 bps in RIIO-2, based on simple average**



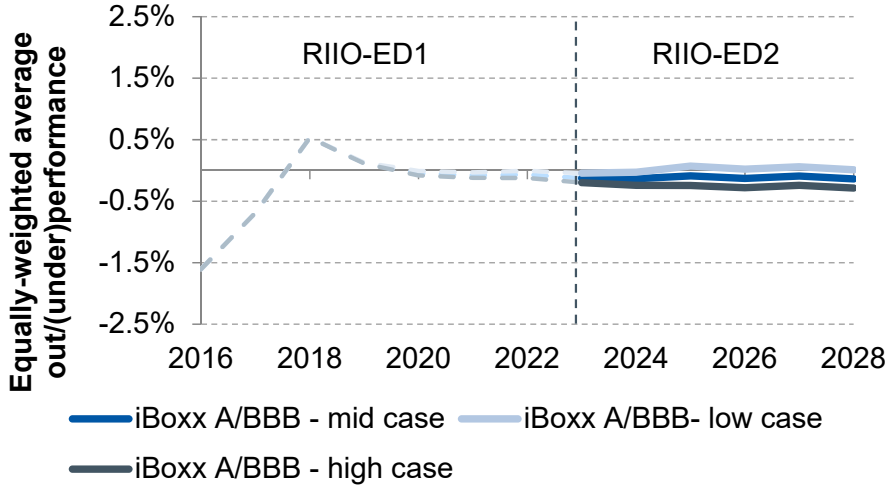
# We expect DNOs as a sector to underperform at RIIO-2 under existing trombone mechanism

- As with other sectors, we calculate sector performance by taking debt-weighted and equally weighted average of DNO groups. Analysis includes WPD under its 10Y trailing average mechanism
- Our analysis shows that under debt-weighted average, ED sector will underperform on debt costs by ca 20 to 25 bps over RIIO-1. For RIIO-2, ED sector will underperform by 10 to 30 bps, excluding derivatives
- Under equally-weighted average, ED sector will underperform on debt costs by ca 25 to 25 bps over RIIO-1. For RIIO-2, performance ranges from 5 bps outperformance to 25 bps underperformance, excluding derivatives
- As with GD, variation in performance over ED1 driven by variable inflation
- There is divergence in individual group/licensee performance, e.g.
  - companies with debt pre-dating trailing average period are underfunded
  - WPD underperforms over RIIO-1&2 under 10-year trailing

**Sector underperforms ca 10-30 bps in RIIO-2 (excl. derivatives) based on debt-weighted average**



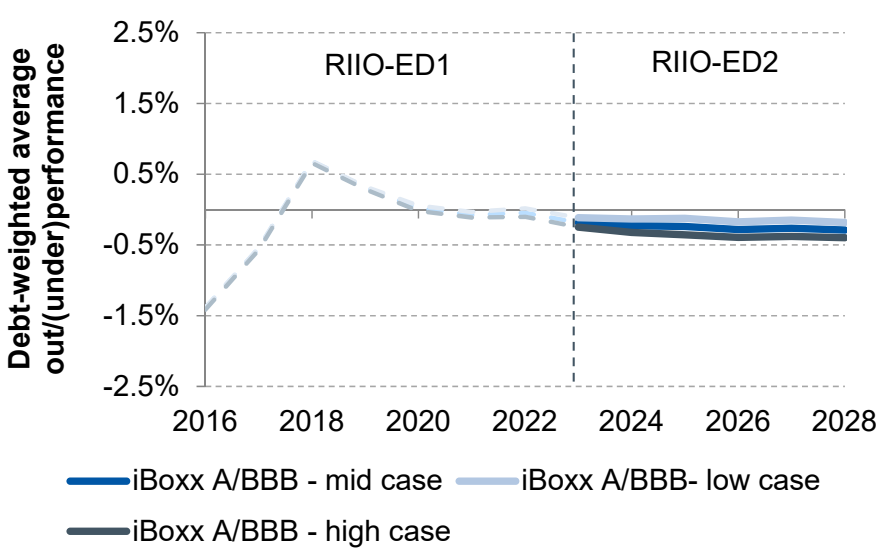

**Sector performance ranges from 5 bps outperformance to 25 bps under performance at RIIO-2 (excl. derivatives) based on equally-weighted average**



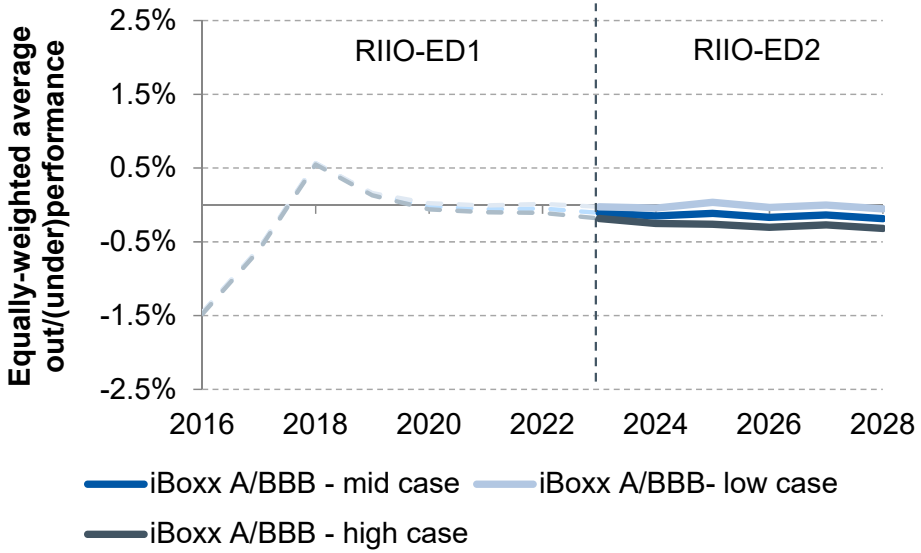
# We expect DNOs as a sector to underperform at RIIO-2 under existing trombone mechanism

- ED sector performance does not change materially with derivatives
- Under both debt-weighted average and equally-weighted average, ED sector performance would improve by ca 5 bps over RIIO-1, and would worsen by ca 5 bps over RIIO-2

**Including derivatives, sector underperforms by 15 to 35 bps based on debt-weighted average performance**



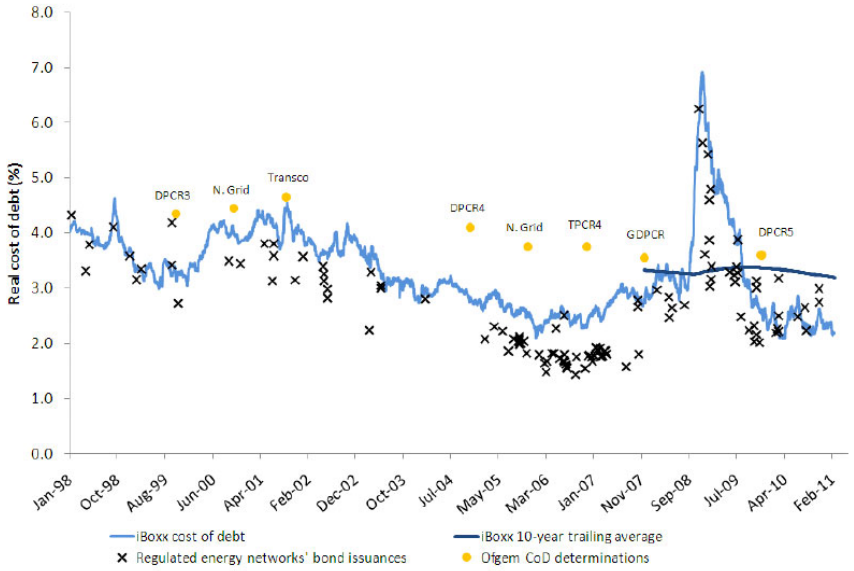

**Including derivatives, sector underperforms by 0 to 30 bps based on equally-weighted average performance**



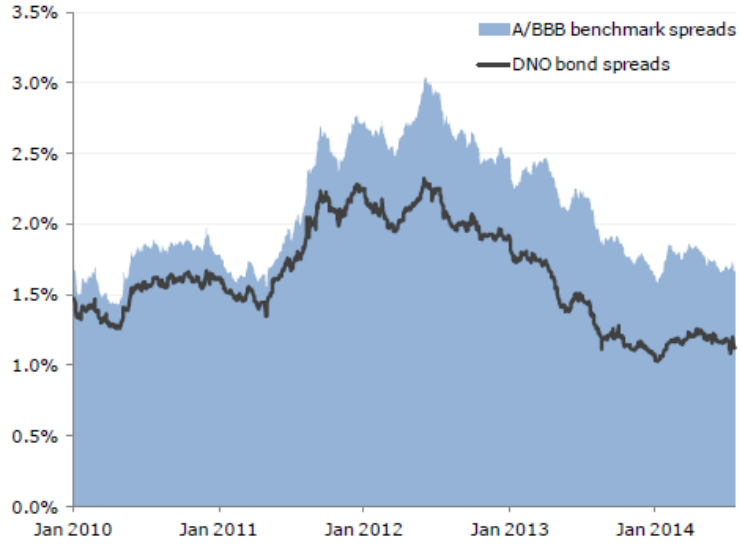
# 3 Evidence on the halo effect

# At RIIO-1, Ofgem did not provide explicit transaction cost allowance, as it considered covered via energy companies' outperformance of benchmark index ("halo effect")

- At RIIO-1 controls, Ofgem concluded that energy companies were able to issue debt below iBoxx benchmark due to beneficial impact of regulatory regime on credit risk ("halo effect")
- Ofgem presented two types of analysis to support its estimates of "halo effect" at RIIO-1 controls
  - T1/GD1: Comparison of yield at issue for utility bonds to A/BBB iBoxx benchmark (LHS)
  - ED1: Comparison of remaining yield to maturity for DNO bonds to iBoxx benchmark (RHS)




*Source: Ofgem (March 2011), Strategy decision GD1/T1 Financial Issues, p.29*

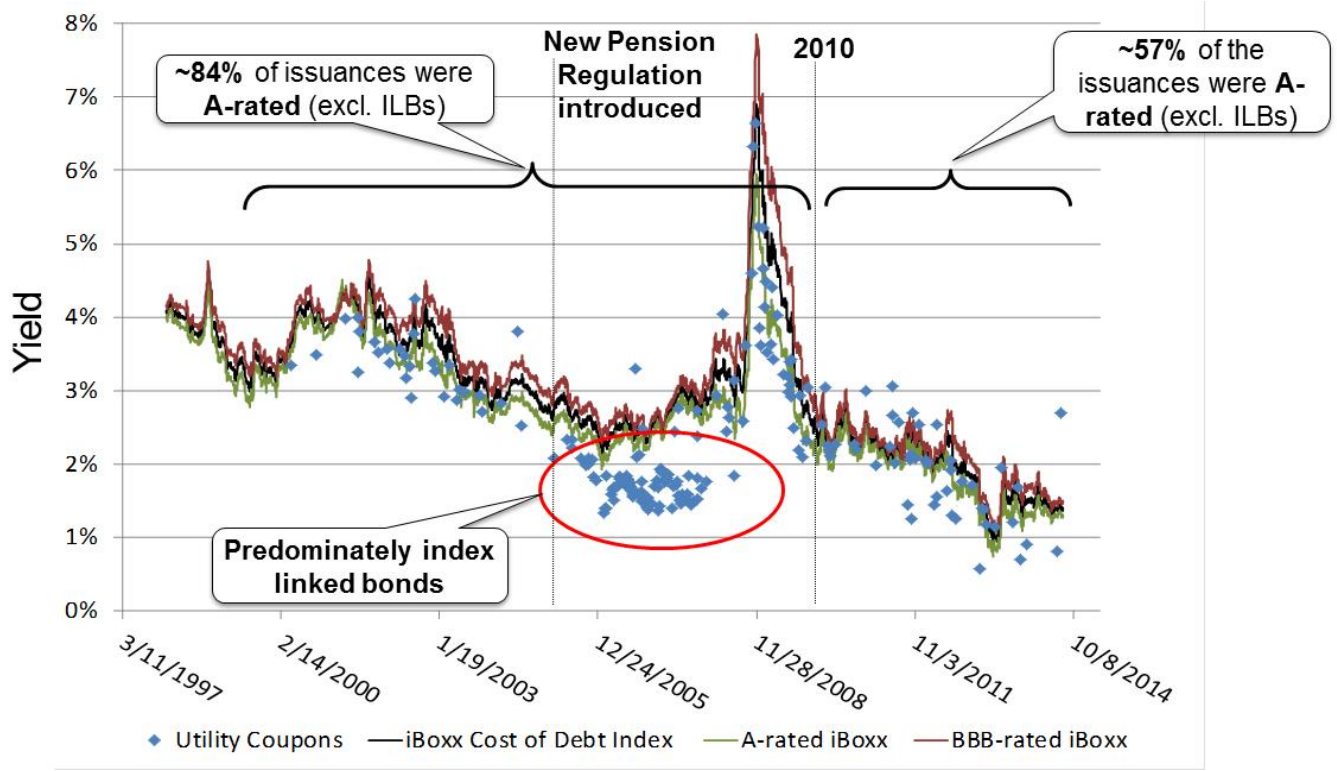



*Source: Ofgem (July 2014), RIIO-ED1 Draft Determinations Financial Issues, p.15*

- Ofgem used "halo" argument to justify not including explicit allowance for debt transaction costs of around 20bps

# At GD1/T1, we have shown that Ofgem's analysis of halo reflects failure to compare bonds on a like-for-like basis, notably control for tenor and/or rating

**Ofgem GD1/T1 "halo" driven by i) inclusion of ILD from mid 2000s and ii) failure to control for rating differences between utility bonds and iBoxx. The issuance of relatively inexpensive ILD/wrapped debt in mid 2000s was one-off event, and ILD debt issuance has fallen away (particularly under CPI switch)**

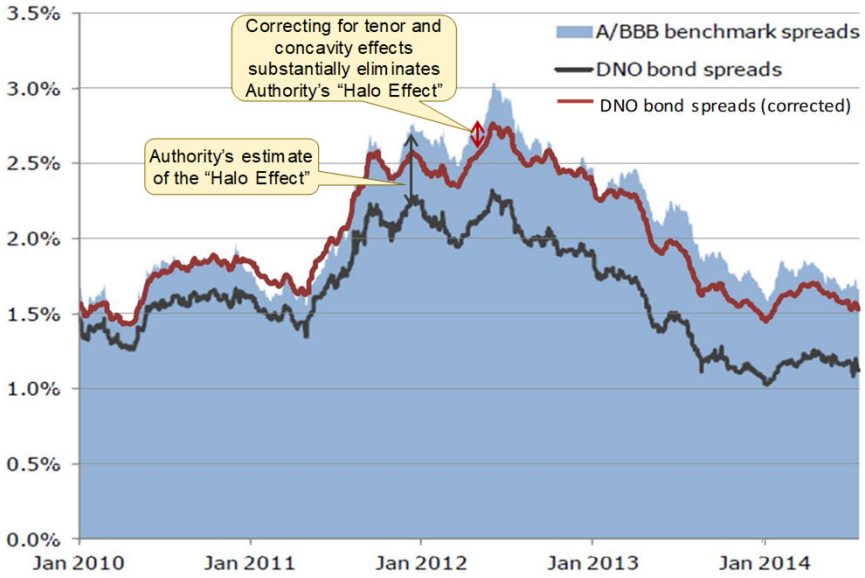



| | Entire period (2000 - ) | Recent (2010 - ) |
|---|---|---|
| Ofgem "halo effect" | 57 bps | 11 bps |
| Excluding ILDs | - 29 bps | -2 bps |
| Correct benchmark | -23 bps | - 6 bps |
| **Final "halo effect"** | **5 bps** | **3 bps** |

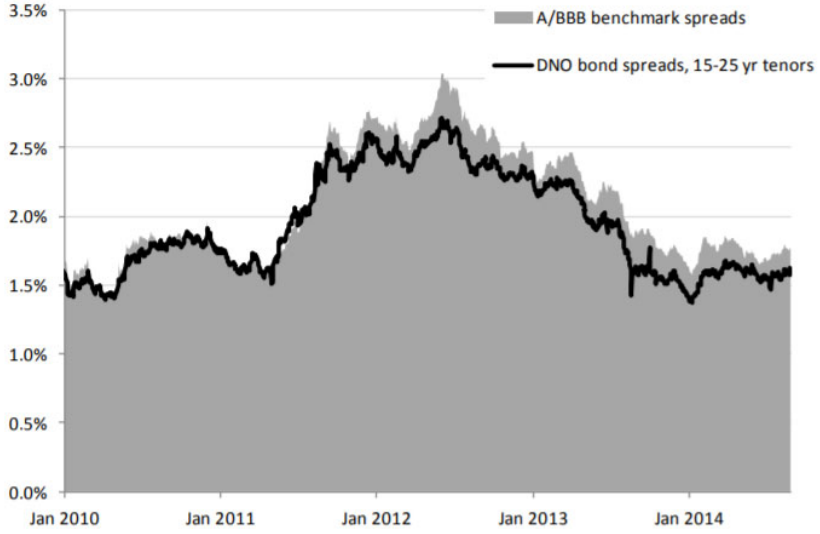
# For ED1, we have shown that Ofgem's analysis of halo reflects failure to compare bonds on a like-for-like basis, notably tenor

- For ED1, Ofgem presented alternative analysis, comparing *yield to maturity* data (i.e. trading data) for DNO bonds and iBoxx index
  - Ofgem concluded DNO bonds' spread over UK gilts systematically smaller than iBoxx index.
- We show apparent halo reflects:
  - Shorter tenor: Ofgem's estimate of the halo increases over period; but this reflects the declining tenor of the sample (the sample was fixed at Jan 2010 and declines by ca 5 years over period)
  - Concavity effects: Ofgem's sample of bonds includes bonds of variable maturity. But average yield of two bonds with a maturity of 5 years and 25 years is less than the yield on a 15-year bond (i.e. a bond with their average maturity), given concavity of yield curve
- Ofgem's revised analysis in FD takes account of tenor issues, and finds that halo effect is negligible before 2012. However, Ofgem determined that there is 20bps halo effect post 2012
  - Ofgem final conclusion at odds with CMA, as per next slide

**Ofgem's initial analysis on halo failed to control for tenor and concavity effects**

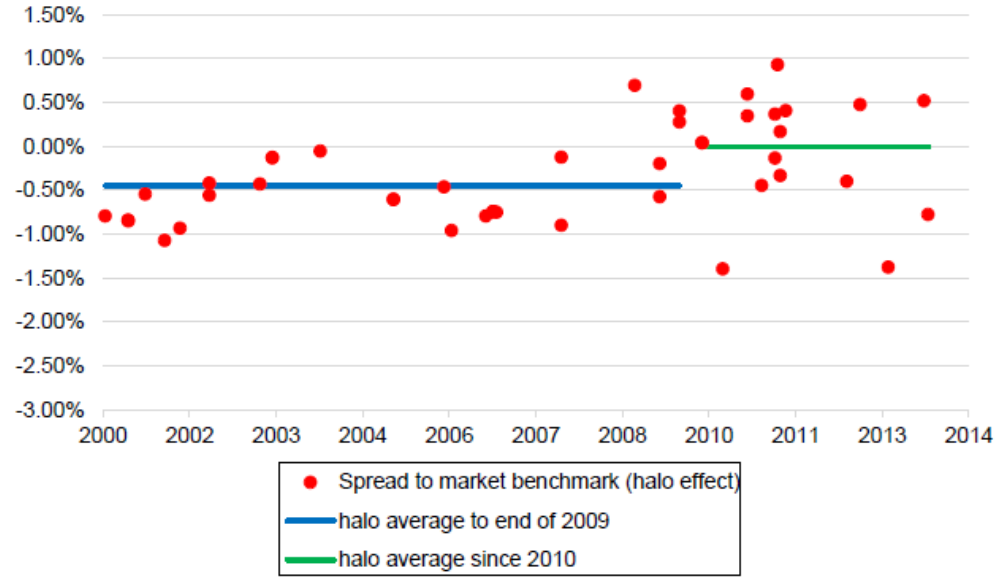



**Ofgem revised downwards halo estimate at FD**



# At BGT appeal, CMA considered no evidence for halo over recent period

- In the RIIO-ED1 appeal by BGT, the CMA also considered the halo effect:
  - BGT argued that halo was around 50 bps (based on Ofgem's analysis that failed to control correctly for tenor), and considered that Ofgem's approach allowed for over-recovery of efficient debt costs
  - CMA undertook its own halo analysis – based on comparison of yield at issue of DNO bonds and iBoxx (as per Ofgem GD1/T1 approach). The CMA found some evidence of halo before 2009 (blue line below) and no evidence of "halo" since (green line below), and upheld Ofgem position
  - We consider CMA's evidence pre-2009 fails to control for stronger company rating relative to benchmark; whereas companies average rating moves into line post 2010

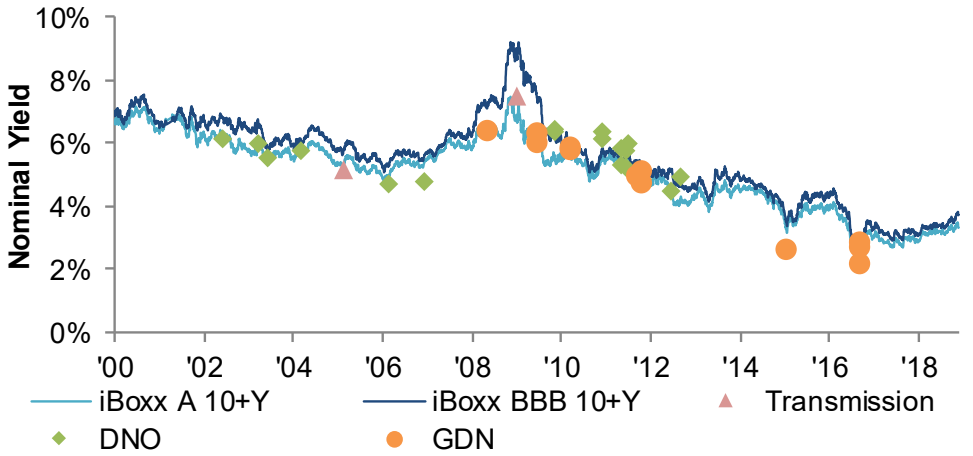



*Source: CMA (September 2015), CMA BGT vs GEMA Final determination, p.150*

# Updating analysis to end 2018, we find no evidence of halo in line with our previous studies and CMA BGT conclusion

- In Feb 2018 report for Ofgem, CEPA estimates halo effect of 38 bps for nominal bonds
  - CEPA proposes 10-25 bps downward adjustment to iBoxx allowance for perceived outperformance
- We have updated halo analysis, and considered CEPA's findings: We identify two flaws, when corrected, eliminate halo:
  - *CEPA uses coupon as its measure of the cost of debt:* understates companies' cost of debt because many of the GBP bonds were issued below par
  - *CEPA fails to correctly control for bonds' rating at issue:* Energy networks' bonds were predominantly A rated *at issuance*, especially during the pre-2010 period (80 per cent of the energy bonds A rated*)*
    - Unsurprisingly, a comparison of predominantly A rated bonds at issuance to the average of A and BBB rated iBoxx indices will show "outperformance"
- CEPA also identified halo effect for ILD issuance. We show CEPA's ILD analysis has similar problems, around use of coupon and controlling for rating
  - ILD issuance has disappeared, and under CPI indexation future CPI ILD may be issued at a premium to benchmark given illiquidity

**No halo effect when we use yield at issue, and control for stronger network rating**

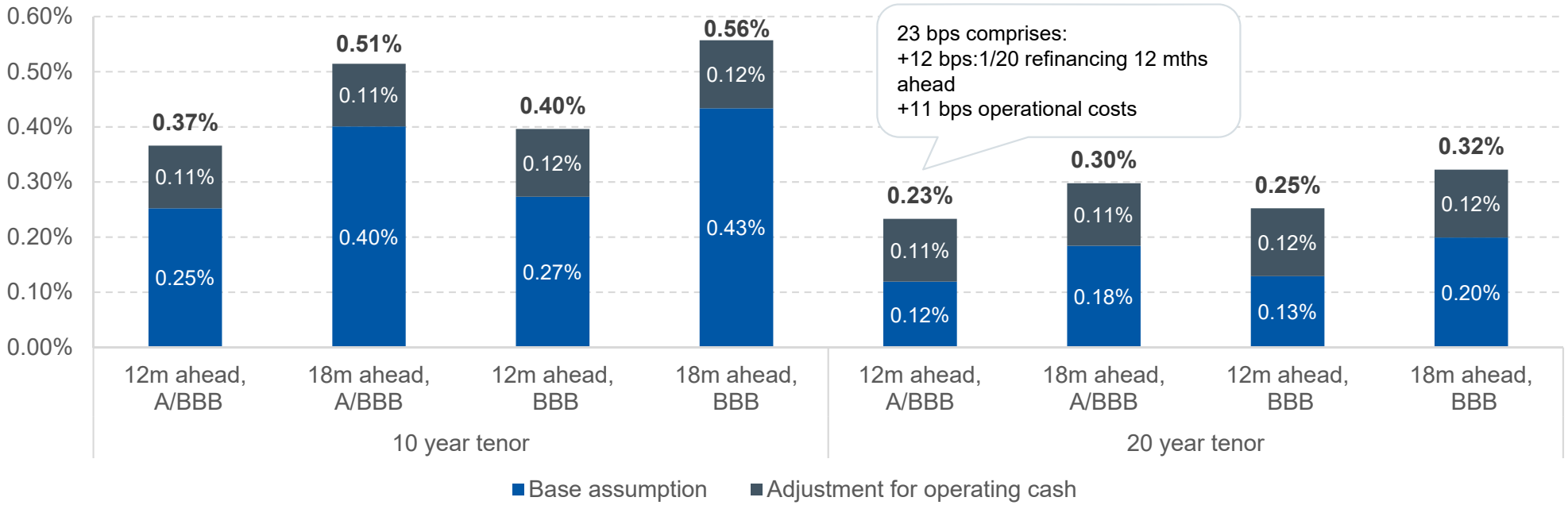



| | NERA analysis |
|---|---|
| CEPA "halo effect" | 38 bps |
| NERA replicating CEPA (wider sample) | 20 bps |
| *Correcting for yield at issue* | *-8 bps* |
| *Controlling for rating at issue* | *-15 bps* |
| Final "halo effect" for nominal bonds | -3 bps (negative halo) |

*Source: NERA analysis based on Bloomberg and Factset data*

# Ofgem should allow for transaction, liquidity, and cost-of-carry. We show that cost-of-carry and operational liquidity costs alone support uplift to iBoxx of at 23-56 bps

- In absence of halo, Ofgem needs to allow for transaction, liquidity and cost-of-carry. We set out estimates for liquidity cost and cost-of-carry
- Cost-of-carry driven by requirement to issue debt ahead of maturity to meet sufficiency of resources requirement, rating agency and debt covenant requirements etc. Liquidity costs driven by requirement to manage day-to-day cash flow operations; we assume equal to 3% RAV
- Cost-of-carry depends on assumed tenor (refinancing 1/10 or 1/20 of debt each year); net carry cost (A/BBB or BBB iBoxx rating less Libor on cash-deposits, providing ca 230-250 bps net cost); and, pre-financing period: 12 or 18 months
  - E.g. assuming refinancing of 1/20$^{th}$ notional debt each year pre-financed 12 mths ahead, cost is 12 bps. Operational cost @ 3% RAV = 11 bps, so total carry-cost = 23 bps
  - Company actual re-financing costs may be higher than notional assumptions, e.g. if companies re-finance entire debt book in RIIO-2, costs would be approx. twice 10 year tenor assumptions (=2*25bps or 50 bps + operational cash cost)
  - Costs could be higher for smaller companies



# 4 Conclusions

# Conclusions

- Our analysis shows that GD, ED and TOs expect to underperform cost of debt indexation over RIIO-2 on a debt-weighted average basis
  - There is variation in group/licensee performance
- Ofgem needs to consider how to address underperformance.  Options include:
  - Extension of trailing average/ change to starting point trailing average to encompass greater share of historical debt issuance
  - Bespoke company adjustments to reflect company specific issues, e.g. issuance profile, size, etc.
  - Ofgem need to also consider adopting BBB notional index, if overall package inconsistent with A/BBB credit rating
- There is no evidence to support a halo effect, which means that Ofgem need to make explicit allowance for transaction cost, liquidity cost and cost-of-carry in full
  - NERA modelling for cost of carry and operational liquidity costs supports an allowance of of 23 to 56 bps

# Appendix | Calculating real cost of debt, including derivatives

# I. Our model accounts for derivatives held by the companies (both Inflation-Linked Swaps and Interest Rates Swaps) using a 3-step approach

### Step 1: Convert the nominal cost of debt (without derivatives) to a real cost of debt measure

*nominal cost of debt (%)* —*Fisher Formula*→ *real cost of debt (%)*

### Step 2: Compute swap interest rates in real terms

#### Interest Rate Swaps (IRS)

IRS – receive leg

*nominal interest rate (%)* —*Fisher Formula*→ *real interest rate (%)*

IRS – pay leg

*nominal interest rate (%)* —*Fisher Formula*→ *real interest rate (%)*

IRS – net

*pay-leg real interest rate (%) - receive-leg real interest rate (%)*

#### Inflation Linked Swaps (ILS)

ILS – receive leg

*nominal interest rate (%)* —*Fisher Formula*→ *real interest rate (%)*

ILS – pay leg

*real interest rate (%)*

ILS – net

*pay-leg real interest rate (%) - receive-leg real interest rate (%)*

### Step 3: Incorporate derivative interest into real cost of debt

$$kD^{\text{with derivatives}} = kD^{\text{without derivatives}} + \frac{\text{Notional principal}}{\text{Total Nominal Debt}} * \text{net IRS interest} + \frac{\text{Notional accreted principal}}{\text{Total Nominal Debt}} * \text{net ILS interest}$$

NERA

ECONOMIC CONSULTING