RA Report Chapter 5 - WACC

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List of Abbreviations

C

CoD *Cost of Debt*

D

DMS *Dimson, Marsh, Staunton*

E

ERP *Equity Risk Premium*

M

MSCI *Morgan Stanley Capital International*

Q

QE *Quantitative Easing*

R

RFR *Risk Free Rate*

S

S&P *Standard & Poor Credit Rating Agency*

T

TMI *Total Market Index*
TMR *Total Market Return*

5. The Weighted Average Cost of Capital (WACC)

5.1 Introduction and main goals of the section

A specific in-depth focus on WACC in BEREC's Regulatory Accounting reports started with Chapter 5 of the 2017 RA Report (BoR (17) 169), which surveyed legacy WACC values, benchmarking final rates and methodologies for single parameters estimation within the WACC formula computed by NRAs - specifically in market 1 and, more in general, in fixed markets.[1] It also provided information on the evolution of the WACC value over time.

The 2020 and 2021 RA report (BoR (20) 210, BoR (21) 161) provided an update of the information reported since BoR (17) 169 both for parameter values and methodologies with a cut-off date respectively of 1st April 2020 and 2021 including a monitoring exercise of the adoption of the Commission WACC Notice (hereafter WACC Notice). The 2022 RA report (BoR (22) 164) started to benchmark the adoption of the WACC Notice and the 2023 and 2024 RA report (BoR (23) 196, BoR (24) 166) were mainly focussed on the application of the Commission Notice by NRAs. The current report provides an updated status of the 2024 chapter five, with an up-to-date version of the WACC benchmark at the cut-off date of 1st April 2025.

Theoretical and practical issues concerning WACC were also covered in the opinion BoR (18) 167[2] issued by BEREC in response to the public Consultation launched by the European Commission.

During 2019 BEREC also provided further input to the Commission's considerations for the non-binding WACC Notice for legacy infrastructure which was published on 7 Nov. 2019 (hereinafter referred to as WACC Notice). The WACC Notice is an instrument for the review of national notifications by NRAs to the Commission in the EU electronic communication sector. In 2020, 2021, 2022, 2023, 2024 and 2025 BEREC calculated the main WACC parameters according to the methodology foreseen in the non-binding WACC Notice (BoR (20) 116) (BoR (21) 86), (BoR (22) 70), (BoR (23) 90), (BoR (24) 102), (BoR (25) 64).

In line with the before mentioned BEREC input to the Commission consultation on the non-binding WACC Notice (BoR (18) 167), it is important to point out that NRAs must retain flexibility within the multidimensional details of their WACC estimation depending on national economic conditions, availability of data, the degree of wholesale and retail competition (which influences the beta), regulatory goals/strategy, judicial reviews, etc., whilst the importance of consistent application of the methodology foreseen in the WACC Notice is acknowledged. NRAs must, of course, be able to substantiate individual approaches to the Commission, the regulated entity, competitors and other market participants, not least to provide legal certainty of their decisions. The WACC Notice aims to ensure a consistent calculation of the WACC by NRAs – which is a core element of any regulatory pricing decision NRAs take - thereby contributing to the development of the internal electronic communications market. The BEREC report on WACC parameter calculations (BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102, BoR (25) 64) provides a specific guidance on the application

[1] The information collected and presented in the report refers to market 1. In some cases, due to country specificity issues, data provided can refer to the fixed market (i.e. market 1-2, ex-market 3b-). Where different data sets have been provided by NRAs this will be highlighted in the text.

[2] https://BERECBEREC.europa.eu/eng/document_register/subject_matter/BERECBEREC/opinions/8257-BERECBEREC-position-paper-input-to-the-commission8217s-wacc-consultation-2018.

of the WACC Notice to NRAs, providing values for the RFR and ERP and range of values for the beta, gearing and cost of debt.

The WACC is also a relevant topic in the new Gigabit Recommendation. BEREC released the requested opinion in BoR (23) 83, where it emphasised the benefit of the actual framework provided by the (non-binding) WACC Notice on efficient application of WACC calculation, which already gives a sustainable and consistent framework with the adequate flexibility for NRAs in application (see cases DE/21/2339, ES/22/2419 and IT/23/2435).

Compared to the BEREC WACC parameters Reports (BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102, BoR (25) 64), the present BEREC Regulatory Accounting Report WACC chapter is of a more descriptive nature, aiming at reporting and analysing NRAs WACC calculations "as is" as well at showing the evolution over time, in line with previous versions.

The following analysis is based on an updated replies to a recurrent questionnaire targeted to collect information on:

- parameter values to evaluate the WACC;
- main methodologies currently used to estimate each parameter (based on predefined options) and adjustments that NRAs may apply to their standard approach in order to take into account country specificity;
- evolution over time of methodologies and parameter values used by NRAs.

The questionnaire asked NRAs to provide updated information on pre-tax WACC for the legacy copper network and other fixed products if calculated (i. e. civil infrastructures)[3] and the following main parameters of the WACC formula based on CAPM methodology – in force in April 2025: i) Risk Free Rate (RFR); ii) Cost of Debt (CoD); iii) Beta; iv) Equity Risk Premium (ERP); v) Gearing; vi) Tax.

In Figure 1 the year of information available for the recorded fixed market WACC calculation is reported for each country as well as their frequency of updating (the RA EWG started to collect in-depth information about single parameters and the WACC calculation in 2016).

Figure 1 displays the information collected for each country (the cut-off date is 1st April).[4] The cells marked "X" indicate that in that year single values of each WACC parameter were collected in the RA EWG data base and a new value is in charge. Colours provide information on the years where NRAs have taken a decision for the fixed market WACC since 2008: green marks for decisions, red for public consultations[5], blue for decisions in force in 2024, after the cut-off date of the 1st April 2025, orange for the cases where NRAs declared that a regulated WACC is no longer in charge[6].

[3] No NRA calculates a different WACC for civil infrastructure access even if a risk premium may be applied for ducts and pole access products (DE). BE calculates, other than legacy WACC, also a WACC for cable, broadcasting and mobile, while IE and ES also calculate a WACC for broadcasting.
[4] The table (Figure 1) reports the year of adoption [April N-1 to April N], or, when differing, of application.
[5] In the following analysis the latest available information is displayed in line with each NRA's information on the appropriate value to be considered for the 2025 report. This approach allows the report to be updated taking into account the information on the current status and time of adoption of the information provided.
[6] This is the case for BG, DK, RO and NL. BG and RO no longer evaluate the WACC, as all fixed markets (1 and 2) have been found to be competitive. DK declared that it is currently subject to a commitment period which has begun since 2021. The prices and the conditions are therefore framed in the applicable commitment periods in such a case. It means that a regulated WACC has not been calculated by the NRA since that time. NL no longer regulates the fixed market (see RA section) and therefore does not estimate WACC. For RO the value reported is in charge for the fixed termination market even though it is not effective due to the current Eurorate.

WACC methodologies and values for the fixed market are recorded for 30 NRAs[7]. Most EU-NRAs (12[8]) update the WACC in line with their market analysis or when pricing decisions have been taken. In these cases, a market-specific WACC may be in force for 2 or more years. Some NRAs update yearly (10), but in some cases the update only comes into force when new pricing decisions will be taken.

The dataset used for the following analysis takes into consideration 182 observations for the fixed market of all 6 parameters previously listed and 1 final value based on information collected and related to the period 2008-2025. The collected data refers to information provided by NRAs and is updated for the 2025 report.

All values provided by NRAs are consistent with their final nominal pre-tax WACC calculation meaning that in some cases parameters also contain country specific adjustments applied mainly in the past to the cost of equity - attributed mainly to RFR, ERP or Beta according to the provided information. Technical adjustments are also reported.

Since the application of the Notice by NRAs, the differences in values among NRAs are mainly due to time of decisions and different risk on national bond conditions. In relation to the sector specific parameters, differences are also present, but generally explained to better reflect the national conditions (and, in most of the cases, with modest impact of final WACC values).

The 2025 report, in line with past reports, provides statistics on NGA/VHCN WACC where separately evaluated by NRAs. According to the outcome of the survey, the decreasing trend in the WACC premium seems less evident (e. g. the case of DE for civil infrastructure access).

Since the report focuses on the application of the WACC Notice, the current WACC in charge clearly differentiates NRAs that completely apply the WACC Notice, NRAs that partially apply the WACC Notice and NRAs that do not (yet) apply the WACC Notice. Reasons given for non-application of the WACC Notice include: i) the WACC has been evaluated before the WACC Notice came into force; ii) NRAs have made use of the transition period specified within the WACC Notice; iii) other reasons. Overall, the application of the WACC Notice promotes methodological convergence among NRAs, reducing differences in single parameters' estimation.

In line with the previous year's report a specific analysis on the dispersion of the values over the years is included. The main objective is to obtain a more detailed quantitative picture of the convergence path of the values. With longer time series a general reduction of the dispersion for all values may be observed. It shows over the years a reduction of the relevance of certain parameters to explain the differences between NRAs WACC estimation. Differences are explained mainly by (in the following order) RFR, beta, tax, gearing, and to a lesser extent the ERP[9] and debt premium.

The scope of the Notice is to provide NRAs with a methodology that reflects an efficient rate of return on capital employed that should be allowed when a price control obligation is imposed on legacy infrastructures, reflecting the point of view of a medium/long-term international investor in the EU telecoms sector.

Appendix II of the current report contains a recurrent more in-depth analysis of WACC parameters in terms of correlations as a follow-up from the previous year's report (see appendix 2) as a year-by-

[7] EE states that its final WACC value is obtained using a benchmark of NRAs following the BEREC calculation rather than applying a formula: the actual value is equal to 5.56 % on data collected by BEREC in the recurrent report for 2023.
[8] Considering only EU countries' information.
[9] Since the adoption of the Notice the same ERP estimation has been used by most NRAs, thus reducing consistently the spread in the estimation year by year.

year tool to better understand the relevance of the parameters that explain differences between NRAs. The information is reported for all countries that have provided information and separately for EU member states.

Figure 1 - WACC database and frequency of update/calculation[10]

		Fixed Market (Year of adoption)																	Frequency Update
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
EU member state	AT		X			X			X						X	X	X	X		MA/RP
	BE	X		X					X				X							MA/RP
	BG						X			X										
	CY				X				X		X	X	X	X	X	X				MA/RP
	CZ									X			X			X	X	X	X	YEARLY
	DE				X						X	X	X	X	X	X	X	X	X	YEARLY
	DK								X	X	X	X	X	X					X	
	EE																			
	EL						X		X		X	X		X						MA/RP
	ES		X				X			X	X	X	X	X	X	X	X	X		YEARLY
	FI		X				X				X	X								MA/RP
	FR					X	X			X		X			X			X		MA/RP
	HR						X			X				X		X		X		MA/RP
	HU								X	X	X	X	X	X	X	X	X	X		YEARLY
	IE		X					X						X		X	X	X		YEARLY
	IT			X					X				X			X		X		MA/RP
	LT								X			X	X	X	X	X	X	X		YEARLY
	LU									X					X					MA/RP
	LV														X	X	X	X	X	YEARLY
	MT					X							X							MA/RP
	NL					X				X										
	PL										X	X	X		X			X		YEARLY
	PT								X	X	X		X	X	X	X	X	X		YEARLY
	RO						X							X						
	SE											X	X		X					MA/RP
	SI							X					X		X		X			MA/RP
	SK						X			X		X	X			X	X	X	X	YEARLY
NO EU memebr	CH	X					X				X	X	X						X	
	IS											X				X	X			
	LI							X									X			MA/RP
	MK		X																	
	ME														X	X				
	NO						X				X	X			X	X	X	X		MA/RP
	RS							X	X	X	X	X	X	X	X	X	X	X		YEARLY
	UK			X					X			X	X							MA/RP
	XK																			
Number of observations Totals		2	5	3	2	4	10	4	11	12	12	17	18	12	16	17	15	16	6	

x	**New data reported with respect to 2024 RA report**
x	**Available in the RA database**
	Adopted decision
	Public consultation
	In charge for the year report, but adopted after the cut-off date of 1 April
	No WACC in charge

Source: BEREC RA database 2025

[10] BNetzA WACC decisions are taken on the 30.06. of each year, therefore values stated are in use and valid for Q1/Q2 of the current year only. CH have provided updated information for 2017 (2018 RA report), 2018 (2019 RA report), and for 2019; in those cases, WACC has been updated by the SMP operator even if no specific decision has been taken into account by the NRA: for this reason, in figure 1 the corresponding cell is white (figures on WACC in the following refer to the last WACC figure provided for 2024), moreover CH provided new data for the present year report.

Focus on the application of the WACC Notice

In line with the past years, the present report provides information mainly on the application of the WACC Notice and on the use of the corresponding parameters estimated by BEREC Reports BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102, BoR (25) 64. For EU and EEA countries when the WACC is updated the WACC Notice is the reference framework for the update[11].

The WACC Notice was adopted on 19th November 2019. Therefore, most NRAs that have updated their WACC since 2020 have fully or partially taken into account the methodology proposed in the WACC Notice, even if making use of the transition period starting from the 1st July 2020 to 30th June 2021[12].

The following table reports the main methodology for legacy WACC estimation available in the WACC Notice and the corresponding relevant values included in the BEREC WACC parameters Reports BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102, BoR (25) 64[13].

[11] Only IE, LT are EU countries that have updated the WACC this year without following the WACC Notice; this is due to specific national circumstances that will be described in the following.

[12] Point 71 of the WACC Notice: "*When reviewing notifications under the Article 7 procedure, the Commission will, as a rule, use the methodology described in the present Notice from 1 July 2020. However, in justified cases and at the request of the notifying NRA, the Commission will not base its review of draft measures on this methodology during a transitional period of up to one year (starting from 1 July 2020). For example, this may be justified when the review based on this methodology, if applied by the national regulator, would result in significant changes in the WACC value undermining regulatory stability and predictability. During the transitional period of one year, the Commission will also take into consideration if the full set of WACC parameters to be published by BEREC is available and the possibility for the NRAs to rely on those parameters in their analysis*".

[13] This report refers also to the BEREC WACC parameters Report 2025 published in June 2025 as, even if published after the cut-off date of 1st of April 2025, NRAs may have adopted a WACC decision retroactively for 2024-2025, using the last available data reported in the WACC parameters Report 2025 (BoR (25) 64).

Figure 1b - WACC Notice approach and WACC BEREC reports BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102, BoR (25) 64 main values

	Commission Notice methodology (by points)	BEREC WACC BoR(20)116 (values)	BEREC WACC BoR(21)86 (values)	BEREC WACC BoR(22)70 (values)	Berec WACC Bor(23)90 (values)	Berec WACC Bor(24)102 (values)	Berec WACC Bor(25)64 (values)
RFR	-Own country bond; -10 Year bond, -weekly sampling period; -five years time windows for the average.	Eurostat based calculation on monthly data for each country	Eurostat based calculation on monthly data for each country	Eurostat based calculation on monthly data for each country	Eurostat based calculation on monthly data for each country	Eurostat based calculation on monthly data for each country	Eurostat based calculation on monthly data for each country
Debt premium	Peer group of companies usually including national SMP: -maturities closer to 10 years, -weekly sampling period, -five years time windows for the average	14 comparable companies: 1.30% (arithmetic average); 3.02%(max); 0.42% (min)	14 comparable companies: 1.15% (arithmetic average); 3.12%(max); 0.44% (min)	15 comparable companies: 1.31% (arithmetic average); 3.17%(max); 0.41%(min)	15 comparable companies: 1.48% (arithmetic average); 3.29%(max); 0.52%(min)	14 comparable companies: 1.21% (arithmetic average); 2.34%(max); 0.60%(min)	14 comparable companies: 1.17% (arithmetic average); 2.23%(max); 0.53%(min)
ERP	Single European Equity risk premium based on historical data (arithmetic average of historical equity premium)	Single EU ERP: 5.31%	Single EU ERP: 5.50%	Single EU ERP: 5.70%	Single EU ERP 5.92%	Single EU ERP 5.95%	Single EU ERP 5.98%
Equity Beta	Peer group of companies usually including national SMP -estimation starting from unlevered beta; - weekly sampling period, - five years time windows - European market index for regression estimation and - Miller formula including 0,1 for beta debt for beta levered and unlevered estimation	14 comparable companies: 0.52 (arithmetic average) asset beta; 0.69 (max) asset beta; 0.38 (min) asset beta; 0.79 (arithmetic average) equity beta; 1.12 (maximum) equity beta; 0.59 (minimum) equity beta.	14 comparable companies: 0.47 (arithmetic average) asset beta; 0.57 (max) asset beta; 0.33 (min) asset beta; 0.74 (arithmetic average) equity beta; 1.12 (maximum) equity beta; 0.42 (minimum) equity beta.	15 comparable companies: 0.41 (arithmetic average) asset beta; 0.5 (max) asset beta; 0.22 (min) asset beta; 0.67 (arithmetic average) equity beta; 1.02 (maximum) equity beta; 0.33 (minimum) equity beta.	15 comparable companies: 0.38 (arithmetic average) asset beta; 0.47 (max) asset beta; 0.22 (min) asset beta; 0.64 (arithmetic average) equity beta; 1.07 (maximum) equity beta; 0.31 (minimum) equity beta.	14 comparable companies: 0.36 (arithmetic average) asset beta; 0.48 (max) asset beta; 0.23 (min) asset beta; equity beta; 1.06 (maximum) equity beta; 0.30 (minimum) equity beta.	14 comparable companies: 0.36 (arithmetic average) asset beta; 0.50 (max) asset beta; 0.21 (min) asset beta; equity beta; 1.08 (maximum) equity beta; 0.32 (minimum) equity beta.
Gearing	- Peer group of companies usually including national SMP Debt component from Book value (only long term debt); - Equity component through market value; - five years time windows; - weekly sampling period	14 comparable companies: 36.95% (arithmetic average); 63.8% (max); 13.51% (min).	14 comparable companies: 39.2% (arithmetic average); 63.24% (max); 13.61% (min).	15 comparable companies: 42.42% (arithmetic average); 70.52% (max); 13.28% (min).	15 comparable companies: 45.36% (arithmetic average); 75.02% (max); 13.04% (min).	14 comparable companies: 46.66% (arithmetic average); 78.06% (max); 12.57% (min).	14 comparable companies: 47.35% (arithmetic average); 76.52% (max); 12.62% (min).

Source: BEREC RA database 2025

27 NRAs have provided information on their final fixed market WACC estimation in the 2025 survey, in which 14[14] NRAs have provided updated values, as shown in Table 1 (AT, CZ, DE, ES, HR, HU, IE, LT, LV, PT, SK, CH, NO, RS) and reported in red, and then 11 NRAs (AT, CZ, DE, ES, HR, HU, LV, PT, SK, NO, RS). Of those 14 NRAs have updated the value since last year's report fully or almost completely apply the WACC Notice and calculate parameters according to the corresponding BEREC parameters report.

In comparison to last year's outcomes, the number of NRAs that have applied the Notice has not changed (DK provided a new value in line with the Notice, including the parameters evaluation using the relevant BEREC report, but just for internal use, with no effect on price decisions). CH provided a new value in this year's report, declaring that the methodology described in the EC Notice is not

[14] DK have also reported a WACC estimation fully in line with the Commission Notice approach this year, but it is only for internal estimation as it is currently not used in official matters.

applied in Switzerland. Nevertheless, in case of corrective measures in relation to prices (ex-post regulation), the Swiss regulator follows the same fundamentals and applies similar calculation methods for most of the WACC parameters.

The full group of NRAs that have applied the WACC Notice last year, and the corresponding relevant BEREC parameters estimation, is made by 19 NRAs, even including some adjustment in some cases (AT, CZ, DE, ES, FR, HR, HU, IS, IT, LI, LU, LV, NO, PL, PT, SE, SI, SK, DK). 13 out of 19 NRAs (CZ, DE, ES, HR, IT, NO, PT, FR, LI, PL, SI, SE, LU) notified once or more times the WACC calculation: either in a specific notification procedure on WACC (CZ, DE, ES, HR, PT, PL, SI, LU), or when price decisions are taken (NO, FR, SE) or in case of full market analysis adoption (IT, LI).

The EU Commission made comments in all cases where a deviation from the BEREC calculation was noticed, i. e.: i) when adjustments to the RFR have been adopted due to current macroeconomic conditions (DE, ES, FR, LI, SI), ii) on frequency of update in combination with adjustment to RFR (IT); in all cases the Commission accepted in principle the adaptation of the methodology, but at the same time asked to modify the approach as soon as possible when macroeconomic conditions were to allow evaluating the RFR coherently with the WACC Notice and the BEREC calculations.

Summing up, 18 NRAs, in line with past years reports, plus DK this year, are considered to fully apply the WACC Notice (AT, CZ, DE, ES, FR, HR, HU, IS, IT, LI, LU, LV, NO, PL, PT, SE, SI, SK, DK), including countries that use the appropriate flexibility considering the fact that those cases have been commented and accepted by the Commission in the notification process according to Art 32 of the EECC.

The following table reports all NRAs that fully or partially apply the WACC Notice and the relevant BEREC WACC parameters report. Green highlights, in the next sections, show when the WACC Notice is fully applied. It summarises the situation at the cut-off date of 1st April 2025: in red, 19 NRAs (including DK) that fully apply the Commission Notice, in blue 3 NRAs that partially apply the Commission Notice, the rest in black. Notification details, the main deviation that drew a comment from the Commission and main comments are briefly reported.

Figure 1c – Adoption of the WACC Notice

	Year of adoption	Did you apply the Commission Notice of 6th November 2019?	Did you use the transisition period for not appling or partially applying the Notice?	Did you notify the WACC after the adoption of the Commission Notice	-if yes did you receive comments from the Commission?	Deviation from the Notice commneted by the Commission	Please provide further details on the comments received	Last relevant Wacc Berec report ussed when Commission Notice is adopted or partially adopted
CZ	2025	Yes completly		Yes	No			Bor(24)102
DE	2025	Yes Partially	No	Yes	Yes	RFR adjustment	Case DE/2024/2530: The Commission notes that BNetzA deviates from the Notice methodology when determining the risk-free rate used for calculating the WACC and urges BNetzA to calculate its WACC in full alignment with the guidelines from the WACC Notice, considering the trend set by the ECB in the last six months	Bor(24)102
DK	2025	Yes Partially	No	No				Bor(25)64
LV	2025	Yes completly	No	No				Bor(24)102
SK	2025	Yes completly	No	No				Bor(25)64
AT	2024	Yes completly	No	No				Bor(25)64
ES	2024	Yes completly	No	Yes	Yes	RFR adjustment	The Commission noted that the CNMC deviated from the CMPC methodology when calculating the WACC, but acknowledged its justification. Furthermore, it called on the CNMC the CNMC to fully apply the CMPC methodology in the future.	Bor(24)102
HR	2024	Yes completly	No	Yes	No			Bor(24)102
HU	2024	Yes completly	No	No				Bor(25)64
IT	2024	Yes completly	No	Yes	Yes	RFR adjustment	https://circabc.europa.eu/sd/a/23947763-04f4-46d0-a884-9c5bcad3f9a0/IT-2024-2497%20Adopted_EN_Redacted%20%252b%20corrigendum.pdf The comment was mainly related on the frequency of the upadted not on the methology adjustment it self	Bor(23)90
NO	2024	Yes completly	No	Yes	No			Bor(24)102
PL	2024	Yes completly	No	Yes	Yes	Directly equity beta estimation	Need to consider asset beta estimation, the NRA have taken into account the commnent of the commission	Bor(23)90
PT	2024	Yes completly	No	Yes	No			Bor(24)102
FR	2023	Yes completly	No	Yes	Yes	RFR adjustment	ARCEP in general follows the principles outlined in the Notice. As at April 1st 2025, the WACC in place follows the principle argued by Arcep in 2023 and noted by the Commission, that an averaging of two periods for the risk-free rate (5 years + more recent 5 months period) was necessary to better reflect current macroeconomic conditions for the risk free rate calcultation.	Bor(23)90
LI	2023	Yes completly	No	Yes	Yes	RFR adjustment	Adjsument to the risk free rate: ask to be more consistent with the approch with the notice, but acknowledged the need to take into account recent inflationary situation at the time of update	Bor(23)90
SI	2023	Yes Partially	No	Yes	Yes	RFR adjustment	RFR When calculating the risk-free rate, the agency took into account both the 5-year (April 2018 – March 2023 in the value of 0.77%) and the 6-month (April 2023 – September 2023 in the value of 3.37%) averages of long-term government bond yield. The average of the stated average yields of long-term government bonds thus amounts to 2.07%, which represents the value taken into account when calculating the risk-free rate of return.	Bor(23)90
IS	2022	Yes completly	No					Bor(21)86
SE	2021	Yes completly	No	Yes	No			Bor(21)86
LU	2020	Yes completly	No	Yes	No			Bor(20)116
RS	2024	Yes Partially	Yes	No				Bor(24)102
CY	2022	Yes Partially	Yes	No	No			
RO	2020	Yes Partially	Yes	Yes	Yes		EC considered ANCOM justification for non-application of the Notice	
MT	2019	Yes Partially	No	No				
CH	2025	No						
IE	2024	Value in charge before the issue of EC notice	No	No				
LT	2024	No	No	No			Calculations of WACC are based on legal basis of legislations in Lithuania	
EL	2020	No		No				
BE	2019	Value in charge before the issue of EC notice		No				
FI	2017	Value in charge before the issue of EC notice						

Source: BEREC RA database 2025

Comment Box – main new EU notifications and received comments (see Figure 1c).

In the case of DE, FR, ES, SI the estimation of the RFR has considered a weighted average between two time windows: i) in case of DE a 2/3 weighting between the RFR estimated by BEREC in the relevant BEREC report and a three month period (April-June 2024) to better reflect current macroeconomic conditions (DE/2024/2530), with a reduced weight for the more recent data ; ii) FR considered that the economic situation justified a departure from the Notice for the calculation of the RFR. The arithmetic average of the - average yield of long-term

French government bonds over 5 years (from 1 April 2018 to 31 March 2023) - as estimated in the relevant BEREC report - and the average yield of the same bonds over 5 months (from 1 April 2023 to 31 August 2023) (FR/2023/2455) better reflected macroeconomic conditions;[15] iii) ES has used a weighted average for the estimation of the RFR considering a weight of ¾ for the BEREC estimation and ¼ of six month from April to September 2024 (ES/2024/2544)[16]; iv) in case of SI the RFR has been estimated considering the arithmetic average of the national bond yield as estimated by BEREC in the relevant report over a five year time windows (April 2018 – March 2023) and a 6-month average (April 2023 – September 2023) (SI/2024/2488). In all of these cases the Commission noted the deviation from the standard approach for calculating the RFR and commented on the fact that in justified cases the deviation may be temporary accepted in light of regulatory objectives and the macroeconomic conditions.

In IT (IT/2024/2497) the RFR estimated in the relevant BEREC report has been adjusted taking into account a forward -looking long-term inflation rate in the relevant five years' time window of April 2018 – March 2023 used by BEREC. The Commission comment focussed mainly on procedural aspects related to understanding whether the updated value was needed over the whole timeframe of the market review to better reflect current macroeconomic condition.

The other notified relevant case was PL (PL/2024/2496), where the Commission commented on the way the NRA estimated the equity beta, highlighting that the equity beta should be estimated from the asset beta and not directly from an average of the equity beta of companies in the peer group. The NRA subsequently adapted its approach[17].

Three NRAs declared to apply the WACC Notice partially or with some adaptations (CY, MT, RS).

- CY calculations seem to deviate from the strict application of the Notice and related BEREC reports, but no WACC decision has been notified yet since the Notice was adopted.
- RS used the ERP and beta estimations from the BEREC calculation but adapting the whole methodology to national circumstances.
- MT calculated the WACC when the Notice was at a draft stage and the draft document was considered to be a form of benchmark and reference.

The NRAs that have not yet applied the Notice justify the approach with the fact that the WACC decision was adopted before the Notice entered into force including the transitional period. This is the case for IE, EL[18], FI, BE.

[15] For FR a public consultation ended for WACC relevant for legacy copper network and civil infrastructure access with adopted decision on the 28 October 2025. The adjustment has been removed and the relevant RFR calculated by BEREC is used. This decision will be applicable from 2026.

[16] 2/3 the relevant BEREC estimation and 1/3 the average yield for five months from April 2023 to September 2023 in the previous data collection.

[17] The adjustment requested by the Commission has been taken in consideration by PL: in the present report the new estimation is considered and refers to 2024 in line with the adoption the 24th of April 2024.

[18] EL notified a WACC decision including remedies for Leased lines in March 2024 where a closer estimation of WACC based on the Notice has been considered (case EL/2024/2492). The approach has been modified with respect to the one notified and analysed by the Commission. In the final decision all WACC parameters have been estimated according to BoR (23) 90, taking into account only an adjustment for the RFR to address recent macro-economic condition. In the present report for statistics evaluation and further analysis, in line with the declaration of the Greek NRA, the old WACC estimation reported in last year's report for market 1 has been considered for EL.

IE updated the WACC in 2021, 2022, 2023, 2024 following the methodology defined in an NRA decision dated 2020 - before the Commission Notice and BEREC calculations entered into force. This methodology will be in charge for a maximum four years.[19]

In case of LT the WACC calculation is regulated by national law.

EE evaluate the WACC through a benchmark based on the BEREC report but in this case there was no notification in relation to a price decision that needed a WACC estimation, since the Notice on WACC was adopted.

RO has notified a new WACC to the Commission using the transition period, since at the time of the national consultation the BEREC parameter calculation was not yet available (in any case, access markets have been found competitive in RO. Therefore, the WACC is no longer relevant, as Market 1/2020 is currently deregulated; the latest WACC was calculated in 2020 for fixed termination rates (currently superseded by the EU-wide euro-rate).

AT, SK, HU and DK used BoR (25) 64 as the relevant BEREC WACC report for parameter estimation even if final proceedings were published later than the cut-off date of 1st of April 2025 (but for AT, HU the WACC estimation retroacted for 2024, as reported in Figure 1).

5.2 WACC Nominal pre-tax synthetic value

Figure 2 reports the main statistics related to nominal pre-tax WACC for all NRAs for which information is available in 2024 (28 NRAs[20] for the fixed market) and, separately, for the EU members states (23 NRAs for the fixed market) which are subject to the same Regulatory framework (including the WACC Notice). Main statistics are shown for the 18 NRAs that fully apply the WACC Notice and the corresponding BEREC WACC Report (AT, CZ, DE, ES, FR, HR, IT, HU, IS, LI, LU, LV, NO, PL, PT, SE, SI, SK), DK is reported in the pictures, but not included in the following statistic, due to the fact that is a value calculated for internal use only, not notified to the Commission and not official.

[19] In this case the methodology has been defined in 2020 and notified well before the Notice came into force; the annual update is done in line with the methodology approved at that time (Case IE/2020/2250). https://www.comreg.ie/publication/review-of-weighted-average-cost-of-capital. The IE approach is based on very wide sources of evidence where the Commission Notice approach and BEREC estimations represent only one input. Moreover, the estimation of the final WACC, on an annual basis is produced by IE adjusting the final cost of debt and cost of equity of the 2020 estimation. So, in the present report the values for each parameter are reported in line with the ones calculated for the 2020 estimation, where adjustments of the cost of debt and the cost of equity, are taken into account to arrive at the final WACC value.

[20] AT, BE, CY, CH, CZ, DE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, LU, MT, PL, PT, RO, SE, SI, SK, IS, LI, NO, RS.

Figure 2 - Main statistics nominal pre-tax WACC

2025	Average	Median	Standard Deviation	Relative Standard Deviation	Maximum	Minimum
WACC fixed Nominal Pre-tax 28 NRA;						
(2024-27)	**6.07%**	**5.62%**	**1.67%**	**27.53%**	**10.27%**	**2.84%**
(2023-28)	**(6.04%)**	**(5.51%)**	**(1.70%)**	**(28.14%)**	**(9.81%)**	**(2.84%)**
(2022-27)	**(5.82%)**	**(5.13%)**	**(1.79%)**	**(30.78%)**	**(9.98%)**	**(2.84%)**
(2021-29)	**(5.82%)**	**(5.51%)**	**(1.62%)**	**(27.79%)**	**(9.73%)**	**(3.75%)**
(2020-31)	**(6.58%)**	**(6.51%)**	**(1.50%)**	**(22.82%)**	**(10.28%)**	**(4.04%)**
(2019-32)	**(7.22%)**	**(7.1%)**	**(2.06%)**	**(28.53%)**	**(13.40%)**	**(3.33%)**
(2018-32)	**(7.71%)**	**(7.28%)**	**(2.23%)**	**(28.87%)**	**(13.45%)**	**(4.04%)**
	(7.96%)	**(7.73%)**	**(2.34%)**	**(29.39%)**	**(14.30%)**	**(4.04%)**
WACC fixed Nominal Pre-tax 23 EU NRAs						
(2024-23)	**6.08%**	**5.66%**	**1.38%**	**22.71%**	**8.49%**	**3.71%**
(2023-23)	**(5.94%)**	**(5.51%)**	**(1.42%)**	**(23.85%)**	**(8.65%)**	**(4.09%)**
(2022-23)	**(5.56%)**	**(5.01%)**	**(1.40%)**	**(25.23%)**	**(8.49%)**	**(3.63%)**
(2021-25)	**(5.73%)**	**(5.51%)**	**(1.49%)**	**(26.02%)**	**(8.64%)**	**(3.75%)**
(2020-24)	**(6.47%)**	**(6.51%)**	**(1.28%)**	**(19.84%)**	**(8.64%)**	**(4.45%)**
(2019-26)	**(7.07%)**	**(7.13%)**	**(1.40%)**	**(19.81%)**	**(10.68%)**	**(4.54%)**
(2018-26)	**(7.60%)**	**(7.28%)**	**(1.87%)**	**(24.60%)**	**(13.45%)**	**(4.62%)**
	(7.86%)	**(7.73%)**	**(1.96%)**	**(25.00%)**	**(14.30%)**	**(14.30%)**

Source: BEREC RA database 2025

The average WACC values currently in force for fixed markets are quite stable: the WACC EU average value is increasing for 2024 and 2025 in line with the current dynamic of the interest rate. Considering the period 2018-2023, the WACC decreased, in particular when considering EU NRAs.[21] A dispersion diagram is reported in the box-plot in Figure 4.[22]

In Figure 3, WACC values for the fixed markets have been ranged (from lowest to highest including the year of the adoption for the fixed market). The current country credit ratings (source: Moody's)[23] are also shown. The eighteen NRAs that calculate an official WACC fully or partially applying the WACC Notice as well as the BEREC WACC parameters estimation in BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102, BoR (25) 64 have been highlighted in green. It should be pointed out that estimating a different mobile WACC is becoming less relevant due to the introduction of the Delegated Act for mobile and fixed voice termination rates.[24] Nevertheless, the RA survey included a question on other WACC values in charge for services other than the legacy WACC and NGA premium. Only three NRAs replied that they evaluate a different WACC for other services (BE, ES, EL): BE estimates a different WACC for cable services other than a WACC for fibre that includes a risk premium on top of the legacy WACC; ES estimate a different WACC for broadcasting services (which is out of

[21] In the tables the information of previous year's statistics is also given providing the year of estimation and the corresponding number of countries included.

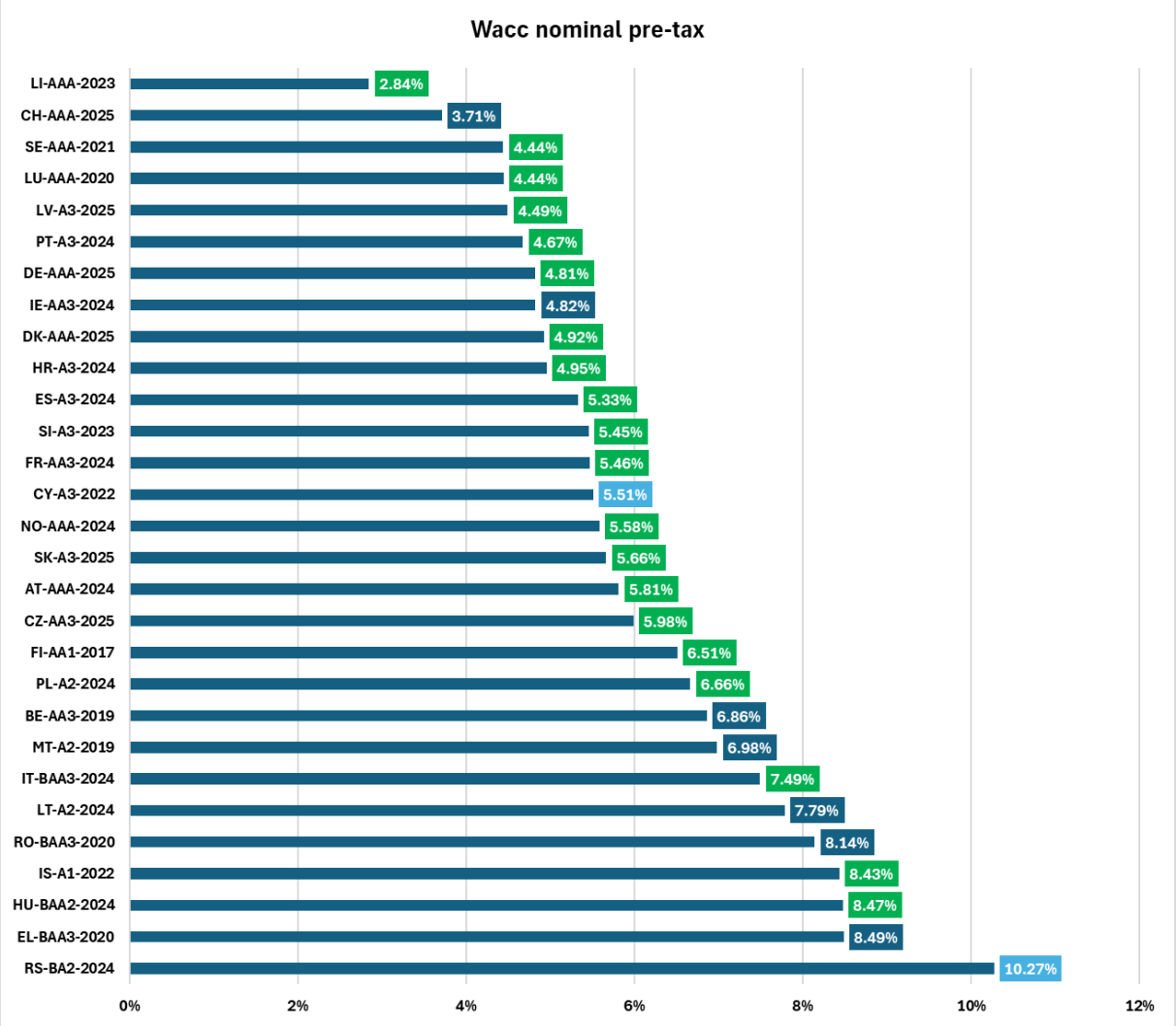
[22] In descriptive statistics a box plot is a method for graphically depicting groups of numerical data through their quartiles. It represents the median (bold black line) the 25th and 75th percentiles of the distribution (upper and lower part of the red square) and the dotted lines indicates variability outside the upper and lower quartiles. Values are plotted as individual points (yellow dots), showing outliers.

[23] Figures on country credit rating are updated to the latest available information at the time of writing the present report.

[24] EUROPEAN COMMISSION, 18.12.2020 C(2020) 8703 final COMMISSION DELEGATED REGULATION (EU) ./... of 18.12.2020 supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council by setting a single maximum Union-wide mobile voice termination rate and a single maximum Union-wide fixed voice termination rate

the scope of the fixed market); EL has updated the WACC only for leased lines fully in line with the Commission Notice and BEREC report BoR (23) 90 including an adjustment for RFR to better take into account current macroeconomic conditions. No NRA evaluates a different WACC for civil infrastructure access (while in some cases applying a specific NGA premium to legacy WACC).

Figure 3 - Nominal pre-tax WACC



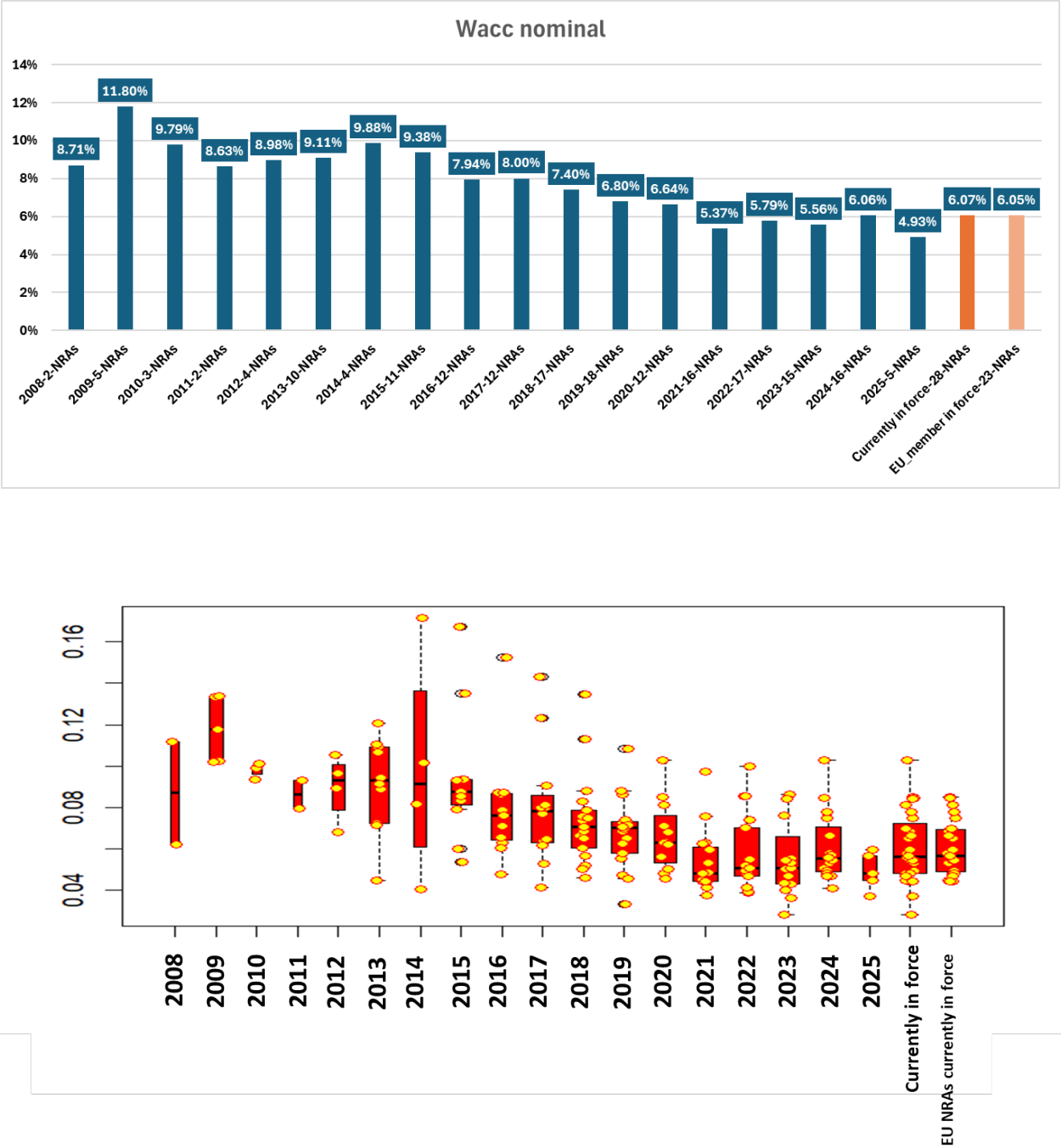
Source: BEREC RA database 2025

Figure 4 shows the average year-by-year values (NRAs that have calculated WACC in the corresponding year) and the resultant box plot of the nominal pre-tax WACC. The box plot in this figure only provides information about the dispersion between values while the average value is reported in figure 2. The objective is to provide information on the dispersion around the average value. A coherent application of the Notice along the last years provided more stable results in terms of average values in the estimation; this holds true even in a relatively unstable macro-economic environment within the last three years.

The average value currently in force is derived by averaging values that are in use at the cut-off date of the current report independent of the year of the decision.[25]

The average WACC has been decreasing since 2017.

Figure 4 - Nominal pre-tax WACC (fixed market 2008-2025)



Source: BEREC RA database 2025

[25] DE: the real pre-tax fixed WACC in force equals 2.81% considering an inflation rate of 2%.

In order to explore the WACC parameters' weight with respect to the final WACC value, the regression presented in the Regulatory Accounting Report 2017 (BoR (17) 169) and following Regulatory accounting reports was updated (see Appendix II). The regression can provide a quantitative approach useful for understanding the level of harmonisation of the parameters in light of the WACC Notice published by the Commission, taking into account that the harmonisation process relates to both the methodology and the values of some parameters. Data shows – in line with the previous exercise – that the differences of the final WACC values over time can be mainly explained by parameters in the WACC calculation that are more "country related" such as the RFR, ERP and Tax rate, with a less relevant role for sector specific parameters such as beta, gearing and debt premium. This is consistent with survey results on "methodologies applied" that confirm that beta, gearing and debt premium were estimated mainly on a "notional" basis (see also Appendix II) even prior to the WACC Notice.

In line with last year's report, this year 14 NRAs have provided new WACC values, i. e. about 50 % of NRAs participating in the survey.

By taking into account only the most recent estimations along the time line (i. e. the three most recent values for each NRA) in the pooled regression analysis, the results show that the ERP (the second most relevant parameter after RFR in explaining WACC differences) including all observations from the beginning (2008), is becoming year by year less relevant than "tax" parameters as a specific country parameter in explaining the differences in final WACC values.[26] This is due to the fact that the methodology applied by BEREC in line with the Notice based on long time series historical data provides very stable results for the ERP calculation, also in comparison with other parameters.

This result is in line with the fact that the ERP estimation through a notional approach (following the BEREC calculation) by most NRAs (due to the application of the WACC Notice) leads to a reduction in its spread and differences. If we apply the same regression focusing only on recent time series panel data (2018/2019 onwards) we observe that the most relevant country specific parameters in explaining differences are RFR and Tax. Notional parameters Beta, gearing, ERP and debt premium, in the proposed order of relevance, provide a less important contribution to explaining differences in final WACC values which shows that the application of the WACC Notice starts to have a visible effect in converging notional values. This is also consistent with the WACC Notice approach that provides some flexibility for NRAs to choose the peer group for the beta estimation and gearing estimation to better reflect national circumstances. The beta factor is becoming more relevant for explaining the differences between EU NRAs and this can be related to different aspects: the estimation of this parameter is adjusted in some cases to address the own country situation, as allowed by the Notice and it has been less stable in recent years than in the past due to a change in the risk profile of telecom operators (this can be indirectly seen in the different frequencies of WACC updates).

In each parameter section a specific analysis on how the WACC Notice has been addressed and applied by the NRAs, is provided in light of the flexibility given by the WACC Notice.

Considering the following figure of the 19 NRAs (including DK), that have applied the WACC Notice, following the 2024 report, the impact in comparison to previous estimations is considered, including the whole impact in comparison to the values in charge before the Notice was adopted.

In 2021, the first year in which the RA report started to monitor the adoption of the WACC Notice, 6 NRAs applied the WACC Notice (DE, ES, FR, LV, PL, PT); some adaptations and judgment has

[26] This result should be read in the applied framework that show consistent and efficient estimation of the model parameters including the suppression of outlier values from the pool of observations (see Annex II for details).

been applied by DE on the RFR for stability and consistency reason when ES adjusted RFR for Quantitative Easing reason. In a 2022 monitoring exercise another seven NRAs started to apply the WACC Notice (AT, CZ, HU, LU, SE, SI, SK) and three NRAs out of the first group updated their WACC using new data available from the BEREC WACC report (DE, ES, LV, PL). In 2023, a further four NRAs applied the WACC Notice (HR, IT, IS, LI) and nine NRAs of the fourteen NRAs that previously applied the WACC Notice updated their WACC by using the parameters of the new BEREC WACC report (AT, CZ, DE, ES, HU, LV, PT, SK, NO). In the 2024 RA report 14 NRAs out of 18 that had already adopted the Notice have updated the WACC (AT, CZ, DE, ES, FR, HU, IT, LV, PL, PT, SI, SK, IS, NO).[27] In the 2025 report 10 of 18 of NRAs that had already applied the Notice provided an update (AT, CZ, DE, ES, HR, HU, LV, PT, SK, NO).

In the following table relevant BEREC WACC parameters Reports used by NRAs for estimation are reported considering the NRAs that have applied the Notice since 2020; the year of adoption of the corresponding WACC value in parentheses is reported in line with the year of adoption reported in figure 1 and the number of WACC updates since the WACC Notice adoption.[28] No NRAs went back from the Notice approach to another methodology, not considering temporary adjustments, as already reported; one NRA (SK) increases the deviation in estimating some sector specific parameters in comparison with the standard approach (deviating from the corresponding averages calculated by BEREC in relevant reports).

[27] The final decision for PL is 2024, but the same WACC value was already in the RA report 2023.
[28] Blue refers to the 2021 RA report; green to the 2022 RA report update, red to the RA report 2023, in orange the update of the report 2024, light blue refers to the 2025 RA report.

Figure 5 – WACC Notice adoption 2021-2025 in fixed/access market

	Countries that applied the Notice since 2021 RA report	Countries that applied the Notice in 2022 RA report	Countries that applied the Notice in 2023 RA report	Countries that applied the Notice in 2024 RA report	Countries that applied the Notice in 2025 RA report	Number of update
AT		Bor(21)86 (2021)	Bor(22)70 (2022)	Bor(23)90(2023)	Bor(25)64(2024)	4
BE						
CY						
CZ		Bor(21)86 (2022)	Bor(22)70 (2023)	Bor(23)90(2024)	Bor(24)102 (2025)	4
DE	Bor(20)116 (2021)	Bor(21)86 (2022)	Bor(22)70 (2023)	Bor(23)90(2024)	Bor(24)102 (2025)	5
DK					Bor(25)64(2024)	1
EL						
ES	Bor(20)116 (2020)	Bor(21)86 (2021)	Bor(22)70 (2022)	Bor(23)90(2023)	Bor(24)102 (2024)	5
FI						
FR	Bor(20)116 (2021)	Bor(20)116	Bor(20)116	Bor(23)90(2024)	Bor(23)90	2
HR			Bor(22)70 (2022)	Bor(22)70	Bor(24)102 (2024)	2
HU		Bor(21)86 (2021)	Bor(23)90 (2022)	Bor(24)102 (2023)	Bor(25)64(2024)	4
IE						
IT			Bor(22)70 (2022)	Bor(23)90(2024)	Bor(23)90	2
LT						
LU		Bor(20)116 (2021)	Bor(20)116	Bor(20)116	Bor(20)116	1
LV	Bor(20)116 (2021)	Bor(21)86 (2022)	Bor(22)70 (2023)	Bor(23)90(2024)	Bor(24)102 (2025)	5
MT						
PL	Bor(20)116 (2020)	Bor(22)70 (2022)	Bor(22)70	Bor(23)90 (2024)	Bor(23)90	3
PT	Bor(20)116 (2020)	Bor(21)86 (2021)	BoR (22) 70 (2022)	Bor(23)90(2023)	Bor(24)102 (2024)	5
RO						
SE		Bor(20)116 (2021)	Bor(20)116	Bor(20)116	Bor(20)116	1
SI		Bor(20)116 (2021)	Bor(20)116	Bor(23)90(2023)	Bor(23)90	2
SK		Bor(22)70 (2022)	Bor(23)90 (2023)	Bor(24)102 (2024)	Bor(25)64(2024)	4
IS			Bor(21)86 (2022)	Bor(24)102 (2023)	Bor(24)102	2
LI			Bor(23)90 (2023)	Bor(23)90	Bor(23)90	1
NO		Bor(21)86 (2021)	Bor(22)70 (2022)	Bor(23)90(2023)	Bor(24)102 (2024)	4
RS						
Number of countries that have been updatedthrough the notice	6	14	18	18	18+1	

Source: BEREC RA database 2025

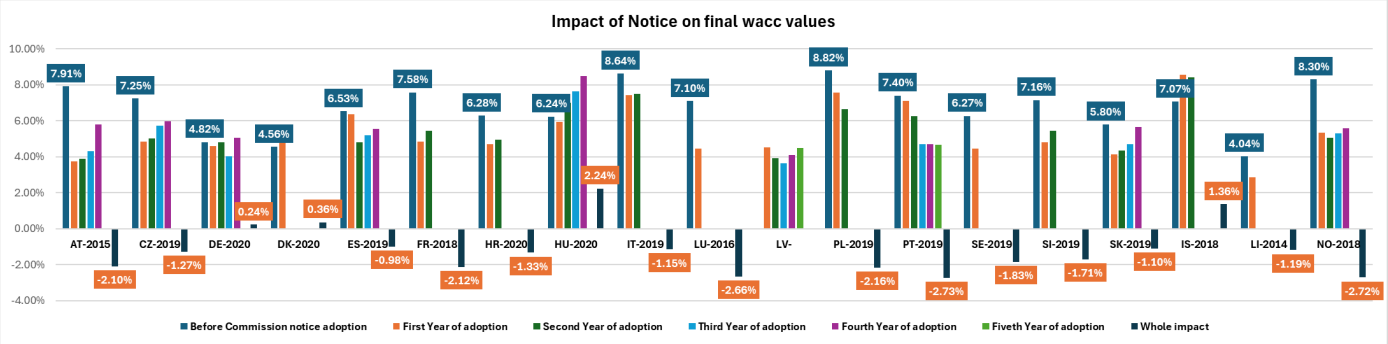
On the basis of the previous table, the following situation in terms of WACC variations can be detected from the last estimation before the WACC Notice had been adopted by each NRA. The last value in charge before the WACC Notice was adopted is reported in blue; values updated after the adoption of the WACC Notice follow. For each country the year of estimation before the adoption of the WACC Notice approach is given. The final WACC value is generally decreasing; since 2021 the variation on average is - 1.25 %[29] (-1.43% in 2024 report and - 1.71 % in 2023). In three cases, (HU, IS, DE) the application of the WACC Notice resulted in a small increase of the final WACC value in comparison to the last WACC value adopted before the WACC Notice was applied. It should be noted that the application of the Notice resulted in a significant stability of the final value in the annual updates of WACC (on average less than 0.1 %-0.2 % of difference in absolute terms)[30] than before the Notice was adopted (on average the difference was about 0.9 %). This indicates the role of methodology alignment with the consequence of more stable results when reviewing the WACC at the national level.

[29] DK is not considered in the statistics, but shown in the pictures.

[30] Average estimated on all WACC estimations for NRAs that notified WACC at least two times in application of the Notice.

This trend is a sum of effects related mainly to the market situation that changed over the years: i) reduction of the "systematic risk" of the telecoms sector (affecting beta); ii) low interest rate for a long time prior to the year 2022 (affecting RFR); iii) very stable equity premium evaluated on the basis of a long-term historical basis (affecting ERP).[31]

Figure 6 – WACC values and WACC Notice adoption 2021-2025



Source: BEREC RA database 2025

5.2.1 Risk Free Rate

see BoR (17) 169[32], BoR (18) 167[33], BoR (19) 240[34], BoR (20) 116[35], BoR (21) 86[36], BoR (22) 70, BoR (23) 90[37], BoR (24) 102[38] for definition and general financial theory

Main output from the survey.

Based on the replies provided in the 2025 survey the following statistics have been derived for all responding NRAs and for EU NRAs separately (2024-2018 values in brackets).[39]

[31] The methodology proposed by the WACC Notice on the EU-ERP notional methodology based on historical data estimation reduced the possibility for NRAs to adapt the ERP methodology to maintain a more stable TMR (Total Market Return).
32 https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-regulatory-accounting-in-practice-2017.
[33] https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-regulatory-accounting-in-practice-2018.
[34] https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-regulatory-accounting-in-practice-2019-including-wacc-chapter
[35] https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-wacc-parameter-calculations-according-to-the-european-commissions-wacc-notice.
[36] https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-wacc-parameter-calculations-according-to-the-european-commissions-wacc-notice-of-6-november-2019
[37] https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-wacc-parameter-calculations-according-to-the-european-commissions-wacc-notice-of-6th-november-2019-wacc-parameters-report-2023
[38] https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-wacc-parameter-calculations-according-to-the-european-commissions-wacc-notice-of-6th-november-2019-wacc-parameters-report-2024
[39] Data includes adjustments that can be attributed to RFR, as declared by NRAs, consistent with the final WACC estimation.

Figure 7 – Nominal Risk Free Rate

2025	Average	Median	Standard Deviation	Relative Standard Deviation	Maximum	Minimum
Nominal RFR-fixed market; Pre-tax 28 NRA;						
(2024-27)	**2.15%**	**1.94%**	**1.29%**	**60.21%**	**5.61%**	**0.29%**
(2023-28)	**(2.02%)**	**(1.89%)**	**(1.29%)**	**(64.06%)**	**(4.74%)**	**(0.29%)**
(2022-27)	**(1.80%)**	**(1.51%)**	**(1.43%)**	**(79.49%)**	**(5.78%)**	**(0.20%)**
(2021-29)	**(1.55%)**	**(1.39%)**	**(1.06%)**	**(68.27%)**	**(3.84%)**	**(0.25%)**
(2020-31)	**(1.96%)**	**(2.16%)**	**(1.07%)**	**(54.71%)**	**(4.62%)**	**(0.17%)**
(2019-32)	**(2.52%)**	**(2.30%)**	**(1.95%)**	**(77.28%)**	**(10.04%)**	**(0%)**
(2018-32)	**(2.70%)**	**(2.50%)**	**(1.90%)**	**(70.18%)**	**(10.04%)**	**(0.31%)**
	(3.00%)	**(2.59%)**	**(2.11%)**	**(70.54%)**	**(10.04%)**	**(-0.17%)**
Nominal RFR-fixed market EU: Pre-tax 23 EU NRAs						
(2024-23)	**2.02%**	**1.93%**	**1.09%**	**54.01%**	**5.61%**	**0.29%**
(23-2023)	**(1.87%)**	**(1.89%)**	**(1.13%)**	**(60.10%)**	**(4.74%)**	**(0.29%)**
(23-2022)	**(1.48%)**	**(1.43%)**	**(1.02%)**	**(68.78%)**	**(3.97%)**	**(0.20%)**
(25-2021)	**(1.38%)**	**(1.01%)**	**(0.94%)**	**(68.05%)**	**(2.93%)**	**(0.25%)**
(24-2020)	**(1.76%)**	**(2.05%)**	**(0.89%)**	**(50.74%)**	**(3.01%)**	**(0.17%)**
(2019-26)	**(2.24%)**	**(2.27%)**	**(1.26%)**	**(56.34%)**	**(6.39%)**	**(0.27%)**
(2018-26)	**(2.34%)**	**(2.34%)**	**(1.32%)**	**(56.18%)**	**(6.39%)**	**(0.31%)**
	(2.70%)	**(2.59%)**	**(1.71%)**	**(63.30%)**	**(7.21%)**	**(-0.17%)**

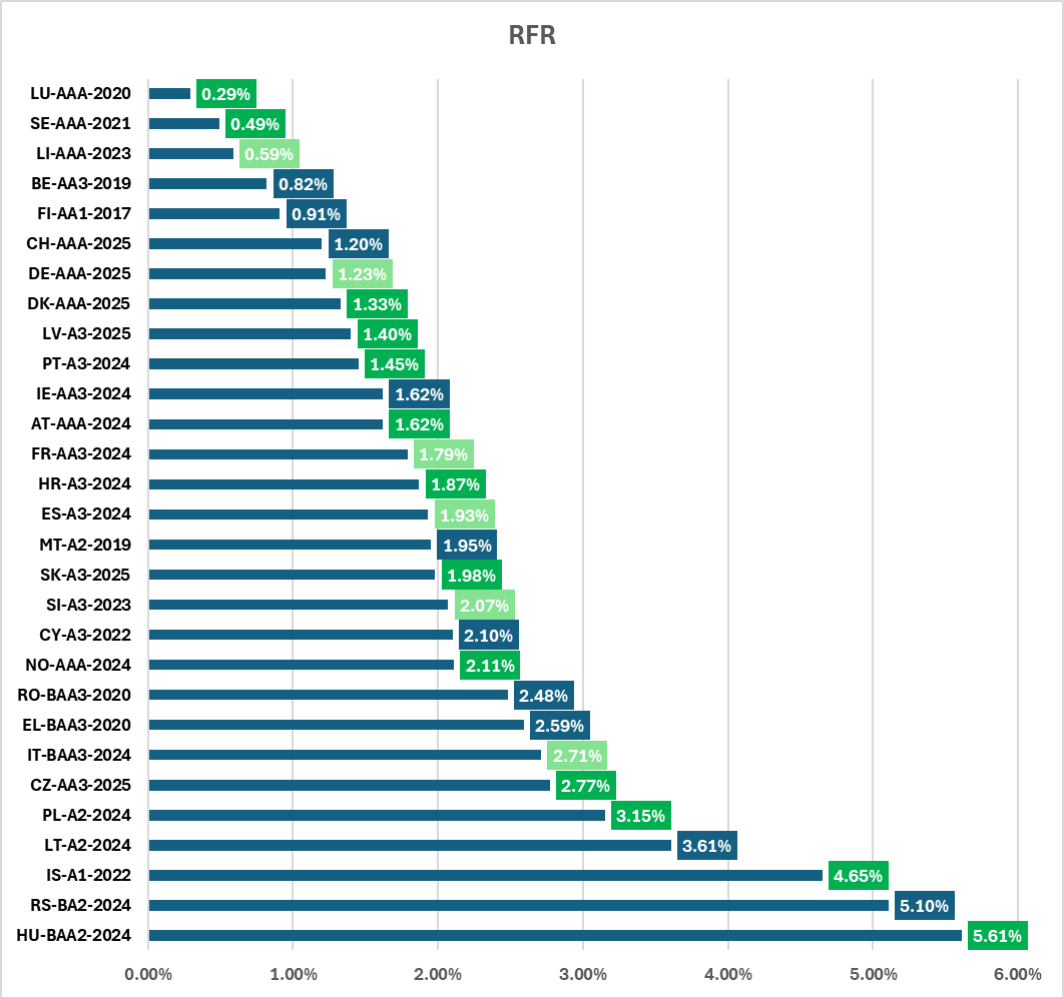
Source: BEREC RA database 2025

From 2023 RFR is increasing after a period of reduction - even if the differences among countries remain relatively stable.

Considering the 18+1 NRAs that have applied the WACC Notice and the corresponding BEREC estimations, 6 NRAs (DE, ES, FR, IT, SI, LI[40]) have adapted the values provided in the relevant BEREC WACC parameters Report and/or the methodology defined by the Commission. The other 12+1 NRAs have used the values estimated in the corresponding BEREC WACC parameters Report.

[40] No values have been published for LI for RFR in BoR (23) 90.

Figure 8 - Nominal Risk Free Rate



Source: BEREC RA database 2025

The six NRAs that have adapted the WACC Notice methodology due to macroeconomic conditions are NRAs that have estimated the WACC at the end of 2022, in the second half of 2023, or at the beginning of 2024, when inflation rates reflected major changes in financial outcomes (light green in figure 8).

In the cases of DE, FR, ES and SI RFR has been estimated considering a weighted average between two time windows: i) DE a 2/3 weighting between the RFR estimated in the relevant BEREC report and the average of a three months period (April-June 2024) (DE/2024/2530); ii) FR as the arithmetic average of: - average yield of long-term French government bonds over 5 years (from 1st April 2018 to 31st March 2023) as estimated in the relevant BEREC WACC parameters Report and the average yield of the same bonds over 5 months (from 1st April 2023 to 31st August 2023) (FR/2023/2455);[41] iii) ES used a weighted average for the estimation of the RFR considering 3/4 the relevant BEREC estimation

[41] A new adopted decision has been taken the 28 October 2025 with the decision to remove the adjustment for the next regulatory period since 2026.

and 1/4 the average yield for five months from April 2024 to September 2024 (ES/2024/2544)[42]; iv) in case of SI the RFR has been estimated considering the arithmetic average of the national bond yield between the relevant BEREC average of 5-years (April 2018 – March 2023) and a 6-month average (April 2023 – September 2023) (SI/2024/2488).

In IT, the RFR has been adjusted to take into account the estimation of the implicit inflation rate included in the nominal risk-free rate. An estimation of the real RFR over the same time window (five years) used by BEREC has been considered and the new nominal RFR has been derived using a more efficient, in line with a forward-looking value, long-run inflation rate - in order to better reflect national specificities[43].

AT, HU, SK preferred to use the last BEREC WACC parameters Report 2025 (BoR (25) 64) for 2024-2025 as a basis for their WACC estimation even though the Report had been published later than the 1st April, since it reports more recent data on the RFR.

In Figure 9, for the 18+1 NRAs that have applied the WACC Notice, the evolution of RFR values is reported in relation to the last value in charge before the adoption (the year of estimation is reported in **Error! Reference source not found.**).[44] The dark-green highlight identifies NRAs that have fully adopted the WACC Notice, while the light-green highlight reflects NRAs that have adjusted the BEREC values/methodology for this parameter. A rapid decrease of the nominal RFR for the NRAs that apply the WACC Notice occurs specifically in countries with a higher country credit rating. This is in line with the fact that countries with a higher country credit rating were more likely to adjust the averaging time window to more than five years in periods of low interest. This approach was less evident for countries with a lower country credit rating. Adaptation of the WACC Notice, in general, reduces the differences with respect to pre-WACC-Notice estimation (DE, ES[45], IT, LI, SI).

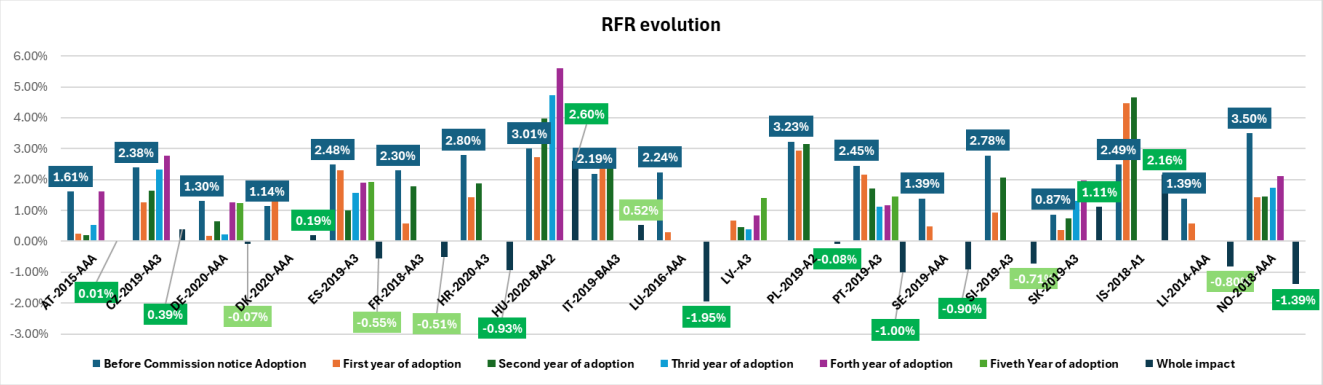
[42] On 15 October 2025, the CNMC adopted a draft measure for Telefónica's 2025 WACC in which it proposed removing the adjustment. After receiving a no-comment letter from the European Commission (case ES/2025/2618), a final decision is expected in the coming weeks.

[43] *Cf. point 63 of Commission notice "The Commission considers it appropriate to use a Eurozone-wide inflation estimate for Eurozone Member States; for non-Eurozone Member States national inflation estimates may be justified. In both cases, forward-looking estimates are more appropriate and ideally cover a period equal to the 10-year maturity of government bonds used to estimate the RFR. In practice 10-year inflation forecasts are rarely available, thus shorter -term forecasts may be used (e.g. inflation forecast 5 year ahead by ECB)*.

[44] In Figure 9 missing data for the specific year means that the value is not available in the RA database as it is shown in Figure1 (notwithstanding to the value applied by NRAs for that year).

[45] In 2020 – at the time of the first application of the WACC Notice - ES applied a Quantitative Easing adjustment (also considering the transition period) which was not included in the 2021 estimation.

Figure 9 – WACC Notice adoption 2021-2025 (RFR)



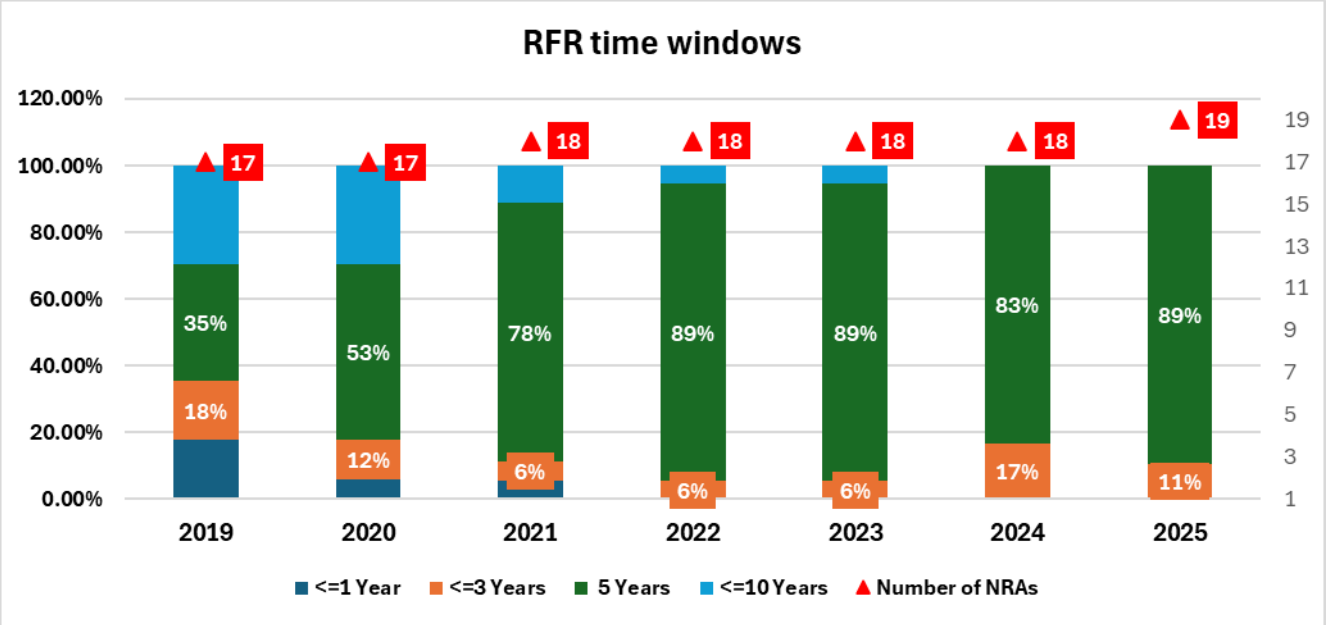
Source: BEREC RA database 2025

The following figures compare the main methodologies/approaches used by NRAs to estimate RFR. The answers, in line with past reports, have been based on a set of pre-defined alternatives as reported in the figure below.

The following analysis is no different from the one reported for the last years, but it is replicated just to provide information on the ongoing implementation. The distribution of the "time windows" used by the 18+1 NRAs (i) before the adoption of the WACC Notice, (ii) adopting the WACC Notice since 2020, and (iii) updating WACC along the years up to the last value in charge a relevant change in NRAs choices appears. Before the adoption of Commission WACC Notice 35 % of NRAs have applied a 5 year time windows, while in 2024 - even considering the adaptation applied by ES, DE, SI, LI - about 89 % of NRAs have used a 5 year time windows for the estimation of the RFR consistent with the WACC Notice.[46] With respect to the other main elements of the methodology (e. g. geographical scope, bond length) the 18+1 NRAs that had adopted the WACC Notice, had already considered their own country bond with ten years maturity (only AT used a different geographical scope before applying the WACC Notice) even before the WACC Notice came into force. Thus, methodological differences before and after the WACC Notice adoption, are mainly related to the averaging time windows applied. Such methodological differences are relevant when trying to explain different values before the WACC Notice came into force. It can be concluded that countries with lower credit rating were addressing the impact of higher interest rates, while countries with higher credit rating acted in an opposite direction to address the impact of lower interest rates.

[46] LI, SI have been classified as "<=3 Years", due to the fact that an arithmetic average between two time windows has been done considering a 5 year average and a less than one year average. ES and DE have been included in <=5 years as a weighted average was done between a time windows less than one year (weight ¼, and 1/3) and five years (weight ¾ and 2/3) giving more weight on a five year average time windows. For 2019 and 2020 (before the application of the WACC Notice) information on the averaging time windows applied was not available for LV and NO; for this reason, 16 NRAs have been considered instead of 18. DK was included in 2019 and 2020 in the category <10 Years, as a 6-year average was in use at that time.

Figure 10 - Distribution of time windows RFR (fixed market)



Source: BEREC RA database 2025

Figure 11 - Main methodology to estimate RFR

Main methodology	
Domestic bond	**Refers to the use of own country bond**
Country-specific bond	**Refers to the use of a specific bond from a different country**
Other	**A mix of methodologies and judgement is used to derive an estimate taking into account a mix of domestic and other country bond**
Benchmarking	**the RFR is estimated by referenced to RFR values used by other NRAs**

Source: BEREC RA database 2025

Figure 12 shows the summary of methodologies currently applied by NRAs for estimating the RFR. Marked in red are the most frequent approaches (in green the 18+1 NRAs that apply the WACC Notice). Most NRAs have taken into account the main elements of the methodology outlined in the WACC Notice.[47]

[47] RS: due to the low liquidity of their own country bonds and low values compared to previous estimations, has decided to use the ECB European bond estimation based on AAA countries, adjusted for country risk premium. Both CY and IE removed adjustments of the RFR evaluation since 2020 year's report.

Figure 12 - Methodology used to estimate RFR (fixed market)

	Do you evaluate the Real Risk Free Rate in order to compute the Nominal Risk free Rate?		Methodology/Country bond		Bond length		Sampling period used		Averaging window		Average methodology		Quantitative Easing	
Nominal Risk Free Rate	Yes	4+2	domestic bond	7+19	1 year	0	Daily	3+1	Spot rate	0	Arithmetic average	7+19	Yes	1
			country specific bond	2	3 years	0	Weekly	3	3 months	0	Geometric Average	0		
			other	1	5 years	0	Montly	2+18	6 months	0	Moving Average	0		
			benchmarking	0	10 years	7+19	Other	0	1 Year	5	Median	1		
					20 years	0			2 Years	0	Other	1		
					Other	2			3 Years	3				
									5 Years	2+15				
									10 Years	0				
									Others	4				

Source: BEREC RA database 2025

Like in the 2024 report, almost all NRAs have used a nominal estimation of the RFR without first evaluating a real RFR; in IT the real estimation has been chosen to address the issue of the inflation rate in the nominal estimation without modifying the BEREC time windows and the types of averages[48]. A real RFR has been estimated for the fixed market by 4 NRAs (BE, CY, IE, MT).

A more consistent approach among NRAs in terms of the main methodologies used for estimating the RFR is evident, primarily for the use of the averaging window. In comparison to the previous year, the number of NRAs that use a 5 year averaging windows has slightly decreased. RFR estimation can be significantly influenced by country specific issues such as exchange rates and expected inflation.

Combining the approaches in terms of general methodology (geographical scope: domestic or country-specific) and time windows (still the more differentiated parameters to estimate the RFR, even if tending towards homogeneity), the following statistics emerge (Figure 13).[49]

[48] This has taken into account that a liquid market of inflation linked bonds with bond of 10 Years maturity and inflation swap with 10 years maturity are available in the IT capital market and structural modifications on the level of forward -looking inflation rate in the nominal bonds have been present since the second half of 2021. In previous years, the level of the implicit inflation rate in the nominal bond rate was generally lower.

[49] NRAs that have a different approach in comparison to previous year's report are shown in red.

Figure 13 - Main methodologies and time windows (frequency, number of NRAs) [50]

RFR		Geographical scope			
		Domestic bond	Country specific	Others	Total
Time windows	≤1	CY,EL,FI,LT,MT (5)			5
	≤3	CH,SI,LI (1+2)	BE,RO (2)		5
	≥5	AT,CZ,DE, DK, ES,FR,HU, HR,IE,IT,IS,LU,LV, NO,PL,PT, SE,SK, (1+17)		RS (1)	19
	Total	26	2	1	29

Source: BEREC RA database 2025

19 NRAs have used domestic bonds and time windows that are greater than or equal to 5 years. 17 NRAs which are included in this category apply the WACC Notice. SI and LI that also apply the WACC Notice, have been included in the category "<= 3 years" as explained at the beginning of the paragraph. ES and DE have been included in the section ">=5 years" since different time windows are applied, but a higher weight has been given to the five year time window.

Note that when "country specific" or "Other" is selected as the main category for RFR, that means to use an AAA graded bond risk profile, a "country risk premium" is included in the cost of equity (RO, RS) and time windows are less relevant in this case. CH has so far taken into account a risk-free interest rate greater than or equal to zero. The SMP provider is currently proposing to take the inflation rate into account as the lower limit. This proposal is the subject of ongoing proceedings in front of the national regulatory authority.

Three NRAs have applied ex-post adjustments to the estimation of the RFR as reported in the following figure, where the year of update is provided. It should be pointed out that the number of NRAs that apply ex-post adjustment has been decreasing year by year, converging to a more consistent application of the overall methodology.

[50] In the matrix the first figure indicates the frequency of the methodological mix, the second mentions NRAs. In green the NRAs that have adopted the WACC Notice.

Figure 14 - Adjustments applied to RFR (fixed market)

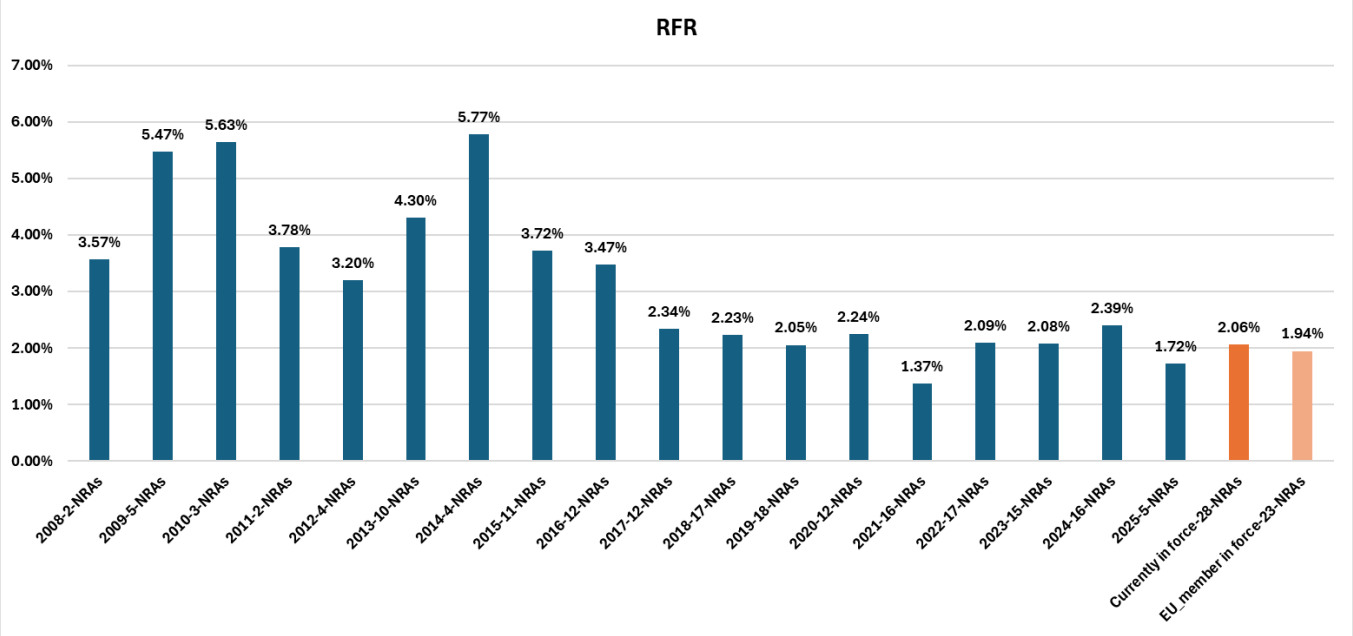
	Nominal RFR	Nominal risk free rate without adjustment	Country risk premium (%)	Size premium value (%)	Consistency with ERP estimation (hystorical data on ERP on different bond length)	Other adjustment: Size of adjustment (%)	Description of adjustment and how the adjustment was made
RO-2020	2.48% (6.39%)	0.31% (3.19%)	2.17% (3.20%)				Damodaran
RS-2024	5.10% (4.49%) (4.21%) (3.84%)	1.09% (0.58%) (0.17%) (0.01%)	4.01% (3.92%) (4.04%) (3.83%)				Damoradan
CH-2025	1.2%	0.54%	5.16%				Proposition of the SMP provider: Nominal risk free >= equal to the inflation rate.

Source: BEREC RA database 2025

In Figure 15 the adopted average year-by-year nominal RFR includes only NRAs that have indicated an update for the WACC value in the corresponding year. The average value currently in force is derived by averaging all current values in line with the information provided in Figure 1.

In terms of value, RFR is quite stable while the average value for NRAs that have adopted the WACC since 2023-24 starts to increase in line with the market development (higher returns for domestic bonds).

Figure 15 - RFR evolution over time (fixed market)



Source: BEREC RA database 2025

Summing up, the situation that has developed over the last three years, namely a very quick and substantial increase of interest rates, has posed some questions about a too strict and narrow application of the WACC Notice. Efficiency reasons, specifically in case the WACC is estimated for more than one year in line with market reviews, can require a more careful approach due to the fact that the year-by-year update can reflect an easier way to consider current economic conditions[51]. Stability and consistency reasons should also be taken into account: in EU countries there are already four relevant cases where a broader way of following the WACC Notice compared to a strict ("mechanical") application of the Notice has been considered and accepted by the EU Commission when justified by national circumstances, e. g. for estimating country-specific parameters such as RFR.
This is in line with the fact that the WACC Notice has already provided NRAs with the flexibility to partially mitigate their provisions, when strictly justified by national circumstances.

The current trend in interest rates reduced the need to apply adjustments to better reflect current macro- economic condition (as already mentioned, adjustments applied are decreasing). [52]

5.2.2 Equity Risk Premium (ERP)

see BoR (17) 169, BoR (18) 167, BoR (19) 240, BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102 for definition and general financial theory

[51] Cf. point 70 of the WACC Notice: "*The Commission considers that updating the national WACC value at least once per year is appropriate to take account of recent economic conditions*"
[52] In FR the new estimation that will be in charge from 2026 does not contain RFR adjustments with respect to the estimation done by BEREC in the relevant WACC parameters Report BoR (25) 64.

Main output from the survey.

Using the replies to the 2024 survey the following statistics have been derived for all responding NRAs and for EU NRAs separately (2023-2018 values in brackets).

Figure 16 - ERP values

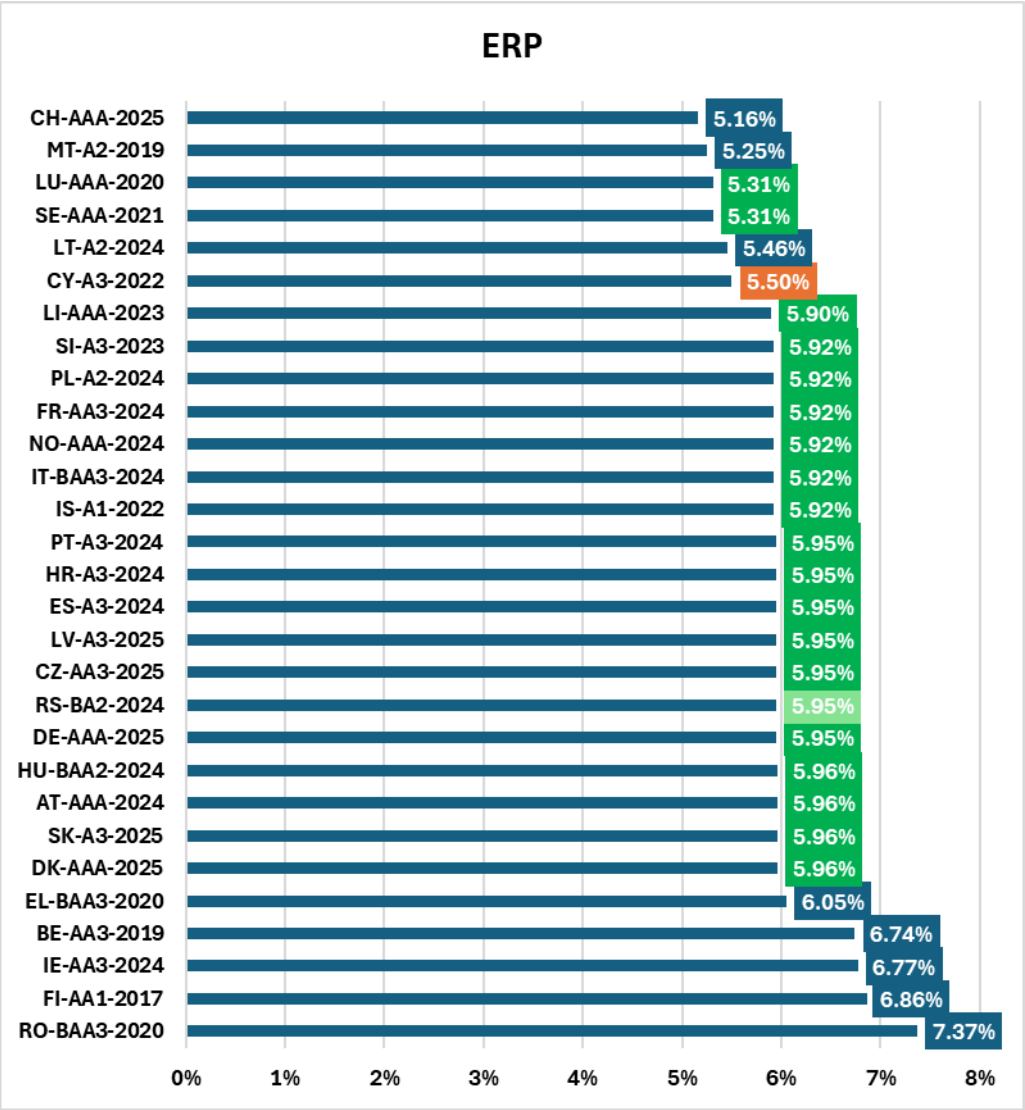
2025	Average	Median	Standard Deviation	Relative Standard Deviation	Maximum	Minimum
Equity Risk Premium (fixed); 28-NRAs	**5.95%**	**5.95%**	**0.48%**	**8.11%**	**7.37%**	**5.16%**
(2024-27)	**(5.95%)**	**(5.92%)**	**(0.44%)**	**(7-43%)**	**(7.37%)**	**(5.25%)**
(2023-28)	**(5.92%)**	**(5.70%)**	**(0.77%)**	**(13.00%)**	**(8.97%)**	**(5.25%)**
(2022-27)	**(5.65%)**	**(5.50%)**	**(0.58%)**	**(10.33%)**	**(7.37%)**	**(4.55%)**
(2021-29)	**(5.80%)**	**(5.71%)**	**(0.72%)**	**(12.43%)**	**(7.37%**	**(4.55%)**
(2020-31)	**(5.76%)**	**(5.75%)**	**(0.77%)**	**(13.29%)**	**(7.25%)**	**(4.55%)**
(2019-32)	**(5.93%)**	**(5.63%)**	**(1.52%)**	**(25.57%)**	**(13.14%)**	**(4.55%)**
(2018-32)	**(5.90%)**	**(5.45%)**	**(1.90%)**	**(32.14%)**	**(14.46%)**	**(3.10%)**
Equity Risk Premium EU 23-NRAs:	**5.99%**	**5.95%**	**0.50**	**8.43%**	**7.37%**	**5.25%**
(2024-23)	**(5.96%)**	**(5.92%)**	**(0.48%)**	**(8.07%)**	**(7.37%)**	**(5.25%)**
(2023-23)	**(5.82%)**	**(5.70%)**	**(0.53%)**	**(9.09%)**	**(7.37%)**	**(5.25%)**
(2022-23)	**(5.70%)**	**(5.50%)**	**(0.61%)**	**(10.77%)**	**(7.37%)**	**(4.55%)**
(2021-25)	**(5.81%)**	**(5.75%)**	**(0.72%)**	**(12.30%)**	**(7.37%)**	**(4.55%)**
(2020-24)	**(5.77%)**	**(5.85%)**	**(0.76%)**	**(13.18%)**	**(7.14%)**	**(4.55%)**
(2019-26)	**(6.05%)**	**(5.79%)**	**(1.65%)**	**(27.27%)**	**(13.14%)**	**(4.55%)**
(2018-26)	**(6.03%)**	**(5.60%)**	**(2.07%)**	**(34.42%)**	**(14.46%)**	**(3.10%)**

Source: BEREC RA database 2025

The average 2025 value for ERP is almost stable in comparison with the previous year. For this parameter the first group of 18+1 NRAs that have applied the WACC Notice are using the single EU/EEA ERP value estimated in the relevant BEREC Report, depending on the year of update. Of the first group of 18+1 NRAs, BEREC's calculation of the EU-ERP has also been used by RS that has declared to partially apply the WACC Notice. In one case (CY), the values estimated are country-specific but are approximately in line with the ERP estimated in the WACC parameters Report 2021 (BoR (21) 86) (despite the fact that the NRA had not formerly applied the WACC Notice).

The green highlights mark the 18+1 NRAs that apply the WACC Notice, in orange RS which de facto applies the WACC Notice, at least for this parameter.

Figure 17- ERP ranking for the NRAs

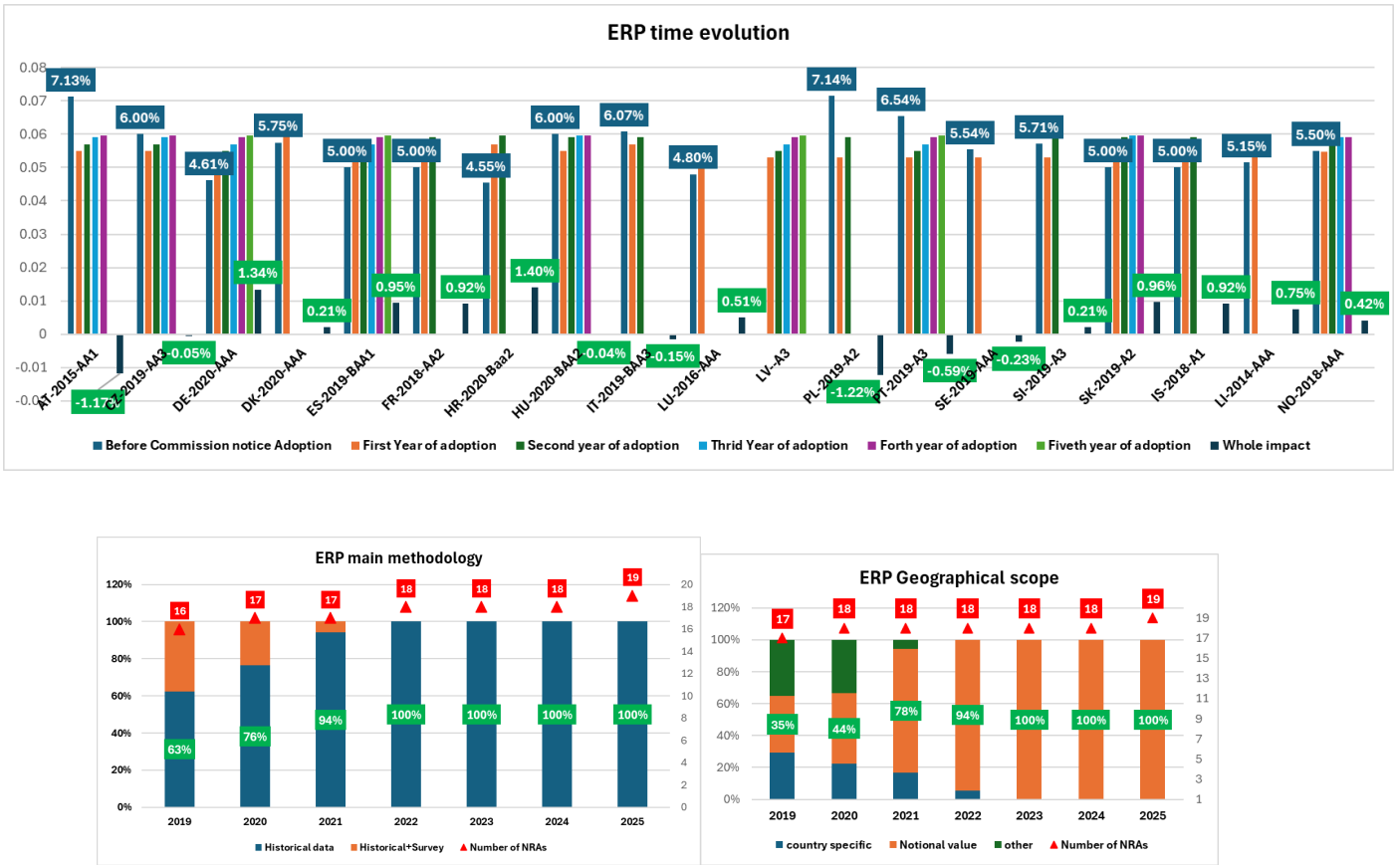


Source: BEREC RA database 2025

In figure 18 the impact on the 18+1 NRAs that apply the WACC Notice is reported in line with the analysis already reported for RFR and WACC final values. The impact of ERP is, on average, less relevant for NRAs for the final average values in comparison to RFR, where a clearly decreasing trend was already apparent for almost all NRAs that have adopted the WACC Notice.

For the ERP the inconsistency between methodologies before the Notice was applied was more relevant: half of NRAs experienced an increased value of the ERP, the other half a reduction. This situation is consistent with the evolution of the methodologies adopted by NRAs before the adoption of the WACC Notice by 18+1 NRAs: the geographical scope for calculating the ERP was about 1/3 own country specific, 1/3 notional, and 1/3 a mix of the approaches. Looking at the methodologies in use before the adoption of the WACC Notice, more than 60 % of NRAs had already based the estimation on “historical data” and the remaining on “historical data + survey”. After the adoption of the WACC Notice, the methodologies applied by all compliant NRAs is “notional”, based on “historical data”.

Figure 18 – WACC Notice adoption 2021-2025 (ERP)



Source: BEREC RA database 2025

Figure 19 reports the main approaches used by NRAs to estimate ERP, based on the questionnaire on a set of pre-defined alternatives. The 18+1 NRAs that apply the WACC Notice and the value BEREC estimates for this parameter are reported in green; RS that, for this parameter, refers to the WACC Notice is highlighted in orange.

Figure 19 – Methodologies for estimating ERP (fixed market)

	Methodology (General)		Specific Methodology		-If historical data Average methodology	
Equity risk premium	Notional value	1+1+19	Historical data	1+1+1+19	Arithmetic average	1+1+19
	country specific	4	Dividend grow model		Geometric Average	
	other	2	Historical+DGM		Moving Average	
	benchmarking	1	Historical+DGM+Suvey	1	Median	
			Survey	2	Other	1
			Historical+Survey		Arithmetic and Geometric	1

Source: BEREC RA database 2025

In terms of the geographical scope of the methodology, the adoption of the WACC Notice determines a clear preference for a notional EU ERP – evolving from the surveys reported in past BEREC RA reports – with 75 % of NRAs adopting a notional approach (roughly one third in 2020 and 66 % in 2022). Corresponding with last year, one NRA used a benchmarking approach based on values from other NRAs (MT). A "Country specific" methodology has been chosen by FI, IE, RO, CH. A mix of approaches ("Other") has been chosen by two NRAs (BE and EL). Considering the methodology applied, "historical data" is the most frequently used methodology (this was prevalent even before the adoption of the WACC Notice).

In Figure 20 the main indicators of the "geographical scope" (notional vs. country specific) and the type of information used in terms of weight given to the past are compared.[53] The situation is largely unchanged in comparison to last year, only one NRA has changed methodology.

NRAs that have used historical data generally have taken into account long-time series.[54] When a mixed approach has been chosen for the geographical scope ("other"), the estimation generally has taken into account many sources, also from different European countries.

[53] Note that not all NRAs have provided specific information on each methodological category.
[54] More than 100 years, source is the DMS time series, Duff & Phelps, Picket, as well as national bank sources. In some cases, more than one source is used.

Figure 20 - Methodologies used to determine ERP[55]

	Historical data	Historical data + (DGM/Survey)	Survey	Total
Notional	AT,CZ, DE, DK,ES,FR,HU,IS, IT,HR,LU,LI,LV, NO,PL,PT, SE,SI,SK + RS (1+19)			20
Country specific	IE, CH (2)		FI,RO (2)	4
Other		BE (1)		1
Total	22	1	2	25

Source: BEREC RA database 2025

The clear preference for a combination of notional with historical data can be seen (promoted by the WACC Notice) and was also frequent before the WACC Notice was adopted.

The main motivations behind NRAs current methodological choices in defining ERP is based on the Notice approach[56], where predictability and transparency objectives are the main motivations behind a stronger emphasis on historical data. According to some NRAs, a notional approach is generally preferred in case of unreliable/missing own country-specific data. When a notional approach has been used in combination with historical data and other methodologies (DGM/Survey)[57] this is generally motivated by the willingness to combine predictability with a forward-looking perspective in the ERP estimation. The use of a pure forward-looking approach to estimate ERP is generally motivated by trying to include more country specificity (e. g. macroeconomic conditions).

Figure 21 compares the updated choice of methodologies for parameters that contribute to the cost of equity (ERP and RFR).

[55] In green the 18+1 NRAs that have fully applied the WACC Notice.

[56] Main motivations behind NRAs methodological choices in defining ERP set in the questionnaire were: i) Regulatory predictability; ii) Consistency with RFR estimation and overall Total Market Return (TMR); iii) Reflect country specific conditions; iv) Consistency with market index used to estimate beta; v) Availability of evidence; vi) Other regulatory decisions.

[57] Annual study on ERP by Aswath Damodaran https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4398884 is mentioned as a relevant source. However, this approach is characterised by a subjective estimation (instead of the objective approach based on long historic time series, such as DMS).

Figure 21- Methodologies used to determine ERP and RFR[58]

		ERP			
		Notional value	country specific	other	benchmarking
RFR	domestic bond	AT,CZ, DK DE,ES,FR,HU,IS, IT,HR,LU,LI, LV, NO,PL,PT, SE,SI,SK LT (1+19)	FI,IE, CH (3)	EL (1)	MT (1)
	country specific bond		RO (1)	BE (1)	
	other	RS (1)			

Source: BEREC RA database 2025

Three NRAs use their own country specific ERP while estimating RFR with domestic bonds, providing the same geographical scope for the equity component RFR and ERP, while 20 NRAs have used domestic bonds and a notional approach for estimating ERP.

Another relevant aspect is the relation between the "averaging windows" considered for estimating the RFR and the "data source" (historical vs forward-looking approach) for ERP estimation (Figure 22). This may be relevant in order to understand the consistency in the application of the WACC Notice based on historical data for ERP with longer time windows for RFR; nevertheless, there are also a few NRAs that still maintain a preference for a more forward-looking approach for RFR and ERP: shorter averaging windows for the RFR (to a limit spot rate) and a survey approach for the ERP.

[58] In green the 18+1 NRAs that have applied the WACC Notice for the two parameters.

Figure 22 - Time windows used for ERP/RFR

		ERP		
		Historical data	Historical data + other	Survey
RFR	≤ 1 year			FI (1)
	≤ 3 year	CH, LI,SI (1+2)	BE (1)	RO (1)
	≥ 5 years	AT,CZ, DE, DK FR,HU,IS, IT, ES,HR,LU, LV, NO,PL,PT, SE,SK RS, IE (2+17)		

Source: BEREC RA database 2025

5.2.3 Beta

see BoR (17) 169, BoR (18) 167, BoR(19) 240, BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102 for definition and general financial theory

Main results of the survey

Using the replies provided in the 2025 survey the following statistics have been derived for all responding NRAs and for EU NRAs separately (2023-2018 values in brackets).[59]

[59] Asset betas/Equity betas are calculated with reference to different market indexes; thus, comparison should be considered in the light of this fact.

Figure 23 - Equity and Asset Beta values (fixed market)

2025 Data		Average	Median	Standard Deviation	Relative Standard Deviation	Maximum	Minimum
Fixed Market	Equity beta 28- NRAs (2024-27) (2023-28) (2022-27) (2021-29) (2020-31) (2019-32) (2018-32)	0.67 (0.69) (0.71) (0.77) (0.79) (0.83) (0.84) (0.83)	0.63 (0.64) (0.67) (0.77) (0.79) (0.83) (0.85) (0.82)	0.14 (0.14) (0.13) (0.12) (0.14) (0.13) (0.13) (0.14)	21.51% (20.10%) (18.96%) (15.37%) (17.13%) (15.36%) (15.51%) (15.53%)	1.09 (1.09) (1.09) (1.09) (1.09) (1.11) (1.11) (1.11)	0.41 (0.41) (0.41) (0.49) (0.45) (0.5) (0.5) (0.5)
	Asset beta – 20-NRAs (2024-17) (2023-15) (2022-17) (2021-16) (2020-18) (2019-18) (2018-18)	0.42 (0.43) (0.46) (0.51) (0.53) (0.55) (0.54) (0.53)	0.38 (0.38) (0.43) (0.48) (0.53) (0.54) (0.55) (0.54)	0.09 (0.1) (0.10) (0.07) (0.08) (0.06) (0.04) (0.06)	21.80% (23.31%) (22.32%) (14%) (14.73%) (11.18%) (7.55%) (12.06%)	0.63 (0.71) (0.71) (0.71) (0.71) (0.71) (0.62) (0.64)	0.28 (0.36) (0.31) (0.40) (0.43) (0.46) (0.43) (0.43)
	Beta debt – 17-NRAs (2024-15) (2023-13) (2022-8) (2021-5) (2020-4) (2019-3) (2018-3)	0.11 (0.10) (0.10) (0.11) (0.11) (0.11) (0.14) (0.14)	0.10 (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1)	0.01 (0.01) (0.01) (0.01) (0.02) (0.02) (0.07) (0.07)	13.87% (10.39%) (10.76%) (13.47%) (15.31%) (18.18%) (49.49%) (49.49%)	0.15 (0.14) (0.14) (0.14) (0.14) (0.14) (0.22) (0.22)	0.1 (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1)
Fixed Market EU NRAs	Equity beta 23 –NRAs (2024-23) (2023-23) (2022-23) (2021-25) (2020-24) (2019-26) (2018-26)	0.69 (0.71) (0.74) (0.78) (0.81) (0.85) (0.85) (0.84)	0.64 (0.65) (0.72) (0.78) (0.79) (0.85) (0.86) (0.84)	0.14 (0.14) (0.13) (0.11) (0.13) (0.14) (0.14) (0.13)	20.78% (19.33%) (17.52%) (14.40%) (16.16%) (16.18%) (16.04%) (16.02%)	1.09 (1.09) (1.09) (1.09) (1.09) (1.11) (1.11) (1.11)	0.47 (0.49) (0.49) (0.49) (0.45) (0.50) (0.50) (0.50)
	Asset beta 17-NRAs (2024-12) (2023-12) (2022-14) (2021-12) (2020-12) (2019-14) (2018-14)	0.42 (0.44) (0.48) (0.51) (0.54) (0.56) (0.55) (0.54)	0.38 (0.38) (0.43) (0.50) (0.53) (0.55) (0.55) (0.55)	0.10 (0.11) (0.10) (0.08) (0.08) (0.07) (0.06) (0.07)	23.63% (24.13%) (21.11%) (14.78%) (14.73%) (12.78%) (10.28%) (13.40%)	0.63 (0.71) (0.71) (0.71) (0.71) (0.71) (0.64) (0.64)	0.28 (0.36) (0.38) (0.40) (0.43) (0.46) (0.45) (0.43)
	Beta debt – 14 NRAs (2024-12) (2023-10) (2022-7) (2021-4) (2020-1) (2019-2) (2018-2)	0.1 (0.1) (0.10) (0.11) (0.11) (0.14) (0.16) (0.16)	0.1 (0.1) (0.1) (0.1) (0.10) (0.14) (0.16) (0.16)	0.01 (0.01) (0.01) (0.02) (0.02) (0) (0.08) (0.08)	10.36% (11.17%) (12.16%) (14.30%) (18.18%) (0) (53.03%) (53.03%)	0.14 (0.14) (0.14) (0.14) (0.14) (0.14) (0.22) (0.22)	0.10 (0.1) (0.1) (0.1) (0.1) (0.14) (0.1) (0.1)

Source: BEREC RA database 2025

Average values for 2025 are lower compared to the previous years, showing a general progressive reduction of the perceived systematic risk in the Telecom sector.

The WACC Notice asks for calculating the relevant equity beta for evaluating the corresponding cost of equity basing the estimation on a peer group of values or at least verifying that the own country SMP operator parameters are in an efficiency close range of the BEREC estimation. Nevertheless, the WACC Notice does not prescribe a specific approach for estimating the beta from the peer group and

allows the direct use of the national SMP operator's parameter if within an efficient range of the BEREC estimation. However, the WACC Notice states (point 48-50) that the asset beta (operating beta) of a peer group provides the best estimation of the corresponding systematic risk of a hypothetically efficient operator in the industry (being represented by the peers). Considering the equity beta of a peer group can slightly polarise the estimation of the systematic risk due to the fact that the levered beta of each company also includes the risk related to the level of gearing of the specific company, which is not related to the risk of the operating business.

The equity beta can thus be derived from the notional asset beta estimation with the following formula including a figure of beta debt of 0.1 as a general reasonable value for the beta debt estimation used by BEREC to derive the asset beta of each peer and the corresponding gearing.

$$\beta_E = (\beta_A - \beta_D * g) * \frac{1}{1-g}$$

The WACC Notice allows to exclude some peers if they clearly do not fit national conditions[60]. The annual BEREC report provides guidance on this aspect in chapter three.

Looking at the 18+1 NRAs that fully applied the WACC Notice 4 main groups emerge that differentiate the approach in the WACC Notice application: i) type of beta (SMP vs Notional); ii) if notional, applying the AM (Arithmetic Mean) of the equity betas of BEREC peers; iii) if notional, the AM (Arithmetic Mean) of the asset beta peers is first evaluated and the Miller formula is applied to estimate the relevant equity beta choosing a relevant gearing value; iv) if notional the WA (weighted average over market cap) of the asset beta peers is first evaluated and the Miller formula is applied to estimate the relevant equity beta choosing a relevant gearing value.

The following four main approaches are applied:

- One NRA (AT) uses the equity beta of the national SMP operator, which means no need to lever and re-lever the beta as no notional asset beta is derived.
- Some NRAs do not estimate the notional asset beta, even if a peer group is considered for the relevant notional equity beta estimation; in such cases the arithmetic mean of the equity beta of the peers is directly used (DK, IS, NO) without any modification of the peer group considered by BEREC. One NRA (SK) excludes four peers (Elisa, Telekom Austria, NOS and Digi) from the arithmetic mean of the equity beta of the peers due to the fact that no debt premium could

[60] Cf. p. 20 BoR (23) 90: "*According to para. 67 and in order to avoid "arbitrary" choices BEREC considers it justified to remove peer group members from the list primarily for the following reasons:*
(a) Certain companies in the peer group may not reflect the size of the SMP operator in the particular member state. For example, it may be inappropriate to include a very large company in the peer group if its scale is significantly greater than the SMP operator or the member state itself has a relatively small population;
(b) Competition conditions within the electronic communications sector, and in particular infrastructure-based competition, may vary between member states increasing risk for both SMP and OAO operators (access seekers and wholesalers). For example, the presence of a significant cable operator could present particular competitive conditions in one member state that may be absent from another;
(c) The share of regulated vs non-regulated revenues of peer group members may vary. Indeed, as mentioned by the Brattle report46, regulated telecommunication activities could be seen to be less sensitive to changes in the economy than those of an average firm with non-regulated activities;
(d) The scope of segments of activity (i.e. mainly mobile, mainly fixed, mainly TV, combined, etc.) of certain companies in the peer group may differ significantly from the SMP's types of business to an extent of not being representative."

be derived for these four peers in the last BEREC WACC parameters Report (BoR (25) 64), including an adjustment for the final value of the parameter, reaching a value equal to 0.73.

- Ten NRAs (CZ, ES, FR, HR, HU, LU, LV, PL, PT, SI) use the arithmetic mean (AM) of the asset beta of the full group of peers for the notional asset beta estimation as evaluated by BEREC and the Miller formula is applied to derive the corresponding equity beta using the arithmetic mean (AM) of the gearing of the full group of peers as derived by BEREC in combination with a beta debt of 0.1. One NRA (SE) used the gearing of the national SMP operator instead of the notional gearing to derive the equity beta through the Miller formula in combination with the AM of the full peer group asset beta and a beta debt of 0.1. One NRA (IT) derived the equity beta through the Miller formula using the arithmetic mean of the notional asset beta and notional gearing with the same peer group selected, excluding three peers from the full BEREC peer group (Telenor, Telnet and Digi) [61] and including a beta debt of 0.1.
- One NRAs (DE) used the weighted average (WA) of the asset beta of the full group of peers for the notional asset beta as evaluated by BEREC in the relevant WACC BEREC report. The Miller formula is applied to derive the corresponding equity beta using the Weighted Average (WA) of the gearing of the full group of peers as derived by BEREC in combination with a beta debt of 0.1. In LI the weighted average of the notional asset beta is derived using only SMP operators in the BEREC peer group (DT, Elisa, KPN, Orange, Proximus, TI, Telefonica, TA, Telenor, Telia) excluding OAO operators; the Miller formula is applied to derive the corresponding equity beta using the gearing of the national SMP operator including a beta debt of 0.1.

In the following table a synthesis of different situations in WACC Notice adoptions is reported (18+1 NRAs). The relevant values for equity beta are given and, where relevant, also the corresponding asset beta, gearing and beta debt in use. The NRAs that estimate the notional asset beta using the arithmetic mean of the peers' relevant parameters[62] are reported in green. The NRAs that estimate a notional asset beta using the weighted average of the BEREC peer group are reported in red. The NRAs that directly derive the equity beta without the need of the corresponding asset beta are reported in blue. PL and SI have modified the approach since last year as in this case the estimation of the equity beta is done via the asset beta, while other NRAs that have updated the WACC since last year report did not modify the approach and apply the methodology of the WACC Notice for the beta parameter, differently from their approach to the RFR (e. g. ES, DE, SI).

[61] Main reasons: i) Digi is a very small MVNO in Italy with its business focused on countries where competition is at a more advanced stage (RO) and where SMP regulatory pressure is lower in comparison to the Italian market; ii) Telenor is an EEA operator and in the BEREC peer group the specificities of Northern European countries are already represented by three EU operators (Telia, Tele2, and Elisa) that experience a similar structural market situation in terms of demand and end-user income that can affect the corresponding systematic risk in a comparable way (no need to "polarise" the estimation); iii) Telenet is a cable operator that has a different level of risk in comparison to "no cable" operators (in relation to the investment needed to deliver a VHCN), whereas in Italy no cable is present.

[62] Not bold in case some differences have been applied with respect to the most common approach of each group.

Figure 24 – WACC Notice adoption beta

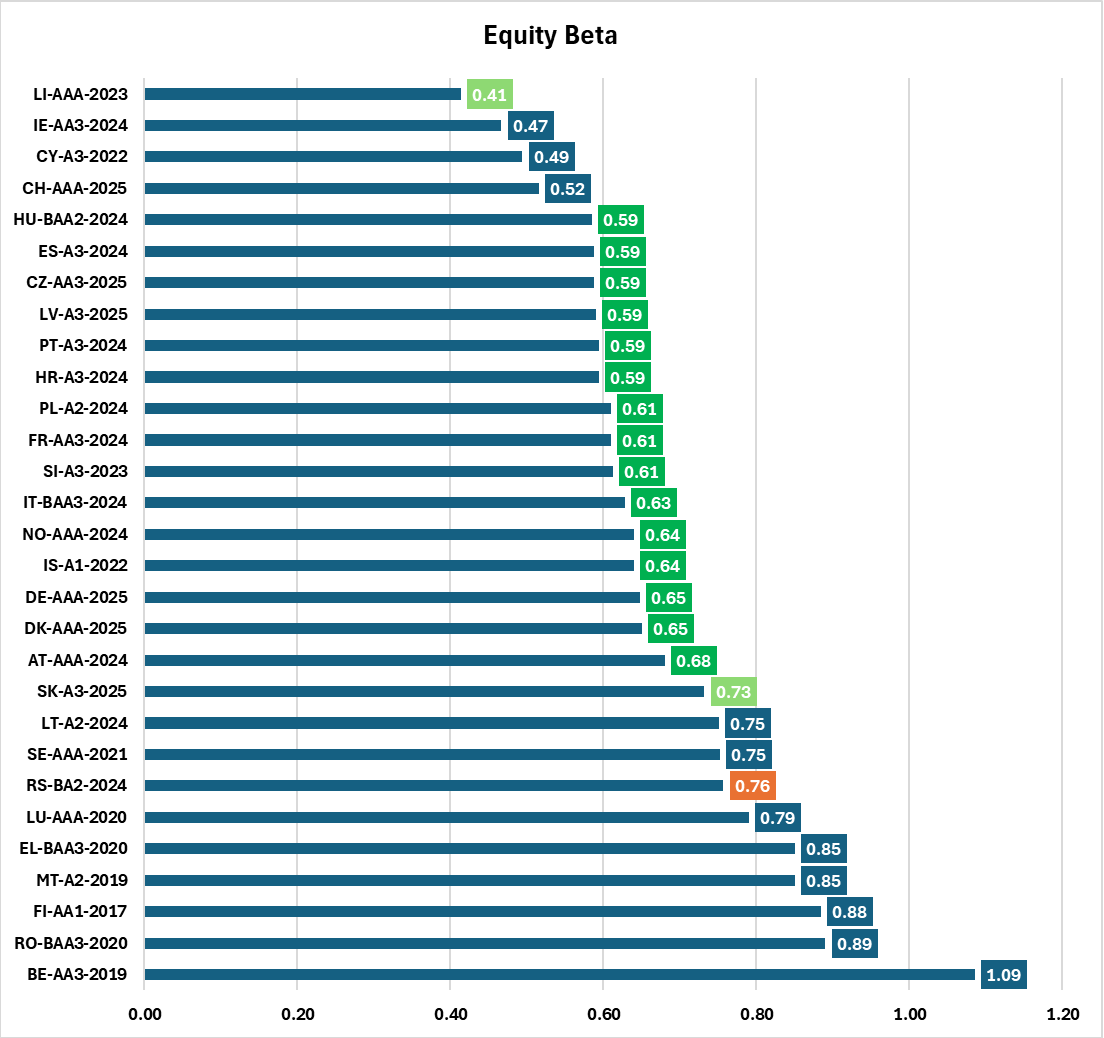
Country	Relevant report	Methodology	Asset beta	Beta equity	Gearing to relever the beta
AT	Bor(25)64	Own country SMP operator beta		0.68	
CZ	Bor(24)102	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.36	0.59	46.66%
DE	Bor(24)102	WA of asset beta of the full peer group and WA of the gearing peer group to relever the beta	0.36	0.65	52.56%
DK	Bor(25)64	AM of Equity beta of some of the companies in the peer group for reasons of consitency		0.65	
ES	Bor(24)102	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.36	0.59	46.67%
FR	Bor(23)90	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.38	0.61	45.36%
HR	Bor(24)102	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.36	0.59	46.66%
HU	Bor(25)64	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.355	0.59	47.35%
IS	Bor(21)86	AM of Equity beta of the full reported in the relevant Berec report		0.64	
IT	Bor(23)90	AM of asset beta of the peer group selected companies not including (Telnor, DIGI, Telnet) and AM of the gearing of the same peer group to relever the beta	0.4	0.63	43.20%
LI	Bor(23)90	WA of asset beta of the SMP operators in the peer group and gearing of the own SMP operator to relever the beta	0.37	0.41	13.47%
LU	Bor(20)116	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.53	0.79	37.00%
LV	Bor(24)102	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.36	0.59	46.66%
NO	Bor(24)102	AM of Equity beta of the full reported in the relevant Berec report		0.64	
PL	Bor(23)90	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.38	0.61	45.36%
PT	Bor(24)102	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.36	0.59	46.66%
SE	Bor(21)86	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.53	0.75	34.10%
SI	Bor(23)90	AM of asset beta of the full peer group and AM of the gearing peer group to relever the beta	0.38	0.61	45.36%
SK	Bor(25)64	AM of Equity beta of companies in the peer group without (TA, Elisa, Digi, NOS)		0.73	

Source: BEREC RA database 2025

Figure 25 reports Equity Beta values estimated by each NRA ranging from lower to higher values. The values for NRAs that apply the WACC Notice are reported in green; RS is in orange, since for this parameter the estimation is in line with the WACC Notice using the BEREC report BoR (23) 90, adapted to national circumstances.[63]

[63] RS selected a group from the 14 peers defined by BEREC taking into account comparable industry, relatively similar products/services and geographical location of the own country situation.

Figure 25 – Equity Beta values



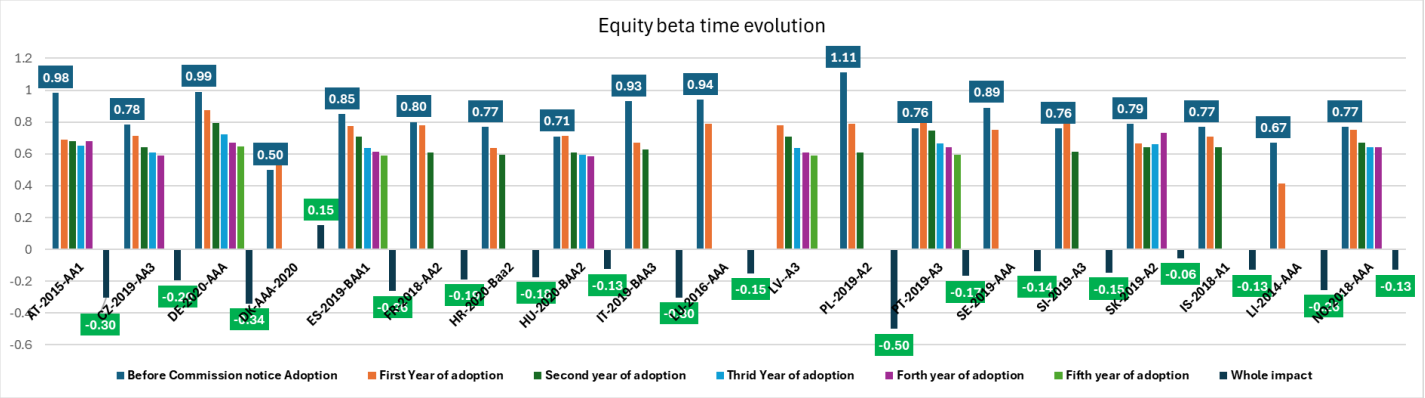
Source: BEREC RA database 2025

In the following picture, in line with the analysis carried out for the other parameters, the impact of the application of the WACC Notice over time in term of values and methodologies is reported. For almost all NRAs the application of the WACC Notice resulted in a reduction of the equity beta in line with past year's results (between -0.06 and -0.50). This trend is mainly driven by market conditions, i. e. a perceived risk in the Telecom sector (changes in methodologies may play a less relevant role).

In figure 26 the evolution of the main elements of the methodologies are monitored: (i) which kind of beta is estimated (notional if a peer group is in use; an SMP beta; Other); (ii) the time windows used (5 years; 3 years; 12 months; or other); (iii) if an adjustment is applied (Blume, Bayesian). According to information provided, even before the WACC Notice came into force, among the 18 NRAs that currently adopt the WACC Notice, about 80 % had already used a notional approach for the beta estimation,[64] 60 % have used a time window of five years and more that 40 % do not apply any adjustment (keeping in mind that only 12 out of 18 NRAs had provided information on the adjustment at that time).

[64] AT, using the national SMP operator's equity beta as estimated by BEREC, the methodology after the adoption of the WACC Notice has been classified as "Notional approach", due to the fact that the SMP value is well inside the efficient range

Figure 26 – Before and after WACC Notice adoption 2021-2024 (beta)



Source: BEREC RA database 2025

Figure 27 – WACC Notice adoption 2021-2024 (beta) (methodologies evolution)

Source: BEREC RA database 2025

The following figures summarises the different approaches used by NRAs to estimate the beta; in green the 18+1 NRAs that fully apply the WACC Notice.

and not far from the AM mean estimated by BEREC. Therefore, the approach cannot be considered a deviation from the main "WACC Notice approach": "notional approach", 5 years average for the time windows estimation; "No adjustment" to the equity beta estimated.

Figure 28 – Methodologies for estimating Beta

	Methodology		-if notional/others (if applicable) please indicate the average used (average to get the asset/equity beta from the comparable)		Sampling period		Time window		Adjustment Used		Market reference index used		Do you unlever your beta?		- if yes which formula do you apply?		-if benchmarking is indicated in the methodology section please indicate the average used from other countries	
Beta (equity)	notional (generic operator)	7+18	Arithmetic average	15	daily	1	1 week	-	Dimson	1	Own Country	0	yes	4+14	Modigliani-Miller	3+14	Arithmetic average	1
	SMP Operator	1+1	Weighted Average	2	weekly	5+19	1 month	-	Bayesian	0	European	6+19	no	1+5	Miles & Ezzell	0	Geometric Average	0
	Other	0	Median	-	montly	1	3 month	-	Blume	1	Word	0			Hamada	1	Moving Average	0
	benchmarking	2	Other	-	other	-	6 months	-	Vasicek	0					Other	1	Median	0
							12 months	-	others	1							Other	1
							2 years	1	No Adjustment	4+19								
							3 years	2										
							5 years	3+19										
							10 years	0										
							others	0										

Source: BEREC RA database 2025

The most frequent methodology used by NRAs to estimate a notional beta is based on a peer group of telecom operators (25 NRAs, increased since last year).

In line with previous year's reports, the number of peers is given for the NRAs that apply a notional approach for beta estimation and that have provided information, but do not fully apply the WACC Notice. The number of comparable operators varies between 9 and 17[65] mainly European.

The way the average beta is estimated from the peer group may differ according to the different kinds of averaging methods chosen.

[65] CH uses a national market index for each of the 17 European operators in the peer-group that is provided by the SMP operator.

Figure 29 - NRAs not applying the WACC Notice: Beta notional methodology[66]

Countries	Methodology	Number of peers	Average used
BE	notional (generic operator)	SMP + 8 EU peers	Other
CH	notional (generic operator)	17 European operator	Median
FI	notional (generic operator)	15 telecom companies	Median
IE	notional (generic operator)	12, European operator	Other
RS	notional (generic operator)	14 Europen SMP operators as the one reported in the Berec report Bor(24)102	Other

Source: BEREC RA database 2025

Concerning the sampling period, daily and weekly sampling are the most frequent approaches used by NRAs that had not yet applied the WACC Notice. The choice of the sampling period does not seem to be correlated with the time window used, as reported in Figure 30.

Figure 30 – NRAs not applying the WACC Notice: Beta methodology for sampling period and time windows[67]

Fixed					
		Time windows			
		≤2 Years	≤3 Years	≥5 Years	Total
Sampling period	daily	1	0	0	1
	weekly		2	2+19	21
	montly			1	1
	Others				
	Total	1	1	21	23

	Fixed market		
	Methodology	Sampling period	Time windows
BE	notional (generic operator)	daily	2 years
CH	notional (generic operator)	weekly	3 years
FI	notional (generic operator)	weekly	3 years
IE	notional (generic operator)	weekly	5 years
LT	SMP Operator	montly	5 years
RS	notional (generic operator)	weekly	5 years

Source: BEREC RA database 2025

The motivation behind the choice of time windows and sampling period are related (i) to the importance given to a theoretical approach for providing a reliable estimation of the beta, (ii) to the need to be consistent with the estimation of other parameters such as the RFR, (iii) to the availability of data from referenced sources such as Bloomberg and (iv) a shorter time period is more relevant for the purpose of calculating a forward-looking beta.

[66] NRAs that have provided information on all elements are shown. All NRAs that fully apply the WACC Notice are not reported separately due to the fact that the approach has been already described.
[67] NRAs that have provided information on all elements are shown. The 18+1 NRAs that fully apply the WACC Notice are not reported separately.

The averaging windows used for estimating RFR and Beta are unchanged in most cases over time (Figure 31).

Figure 31 - Beta/RFR time windows[68]

		Beta (Time windows)			
		≤2 Years	≤3 Years	≥5 Years	Total
RFR (time windows)	≤1 Year		FI (1)	LT (1)	2
	≤3 Years	BE (1)	CH (1)	SI,LI (2)	4
	≥ 5 Years			AT,CZ,DE, DK, ES, FR,HU,IS, IT,HR,LU, LV, NO,PL,PT, SE, SK IE,RS (17+2)	19
	Total	1	2	22	25

Source: BEREC RA database 2025

Since the adoption of the WACC Notice there has been a clear convergence in the choice of the averaging time window.

Concerning the adjustment used for estimating the equity beta of SMP operators or comparable companies (Figure 32), there is a clear tendency, since the adoption of the WACC Notice, not to use adjustments. Only a few NRAs still apply adjustments to the standard OLS estimation for the Equity beta due to the fact that the estimation has been done before the WACC Notice was applicable[69]. The WACC Notice has thus increased the methodological consistency of NRAs concerning the application of an adjustment.

[68] NRAs that have provided information on all parameters are shown. The NRAs that apply the WACC Notice are highlighted in green.

[69] The application of an adjustment is made where a shorter time window for beta estimation is used; this is consistent with the idea that with less data available, the estimation of the equity beta may be less reliable.

Figure 32 - Time window adjustments to Equity Beta[70]

	Time Windows		
	<=2 Years	<=3 Years	>=5 Years
No Adjustment		1	2+19
Blume		1	
Vasiecek			
Bayesian			
Dimson	1		
Others			

Source: BEREC RA database 2025

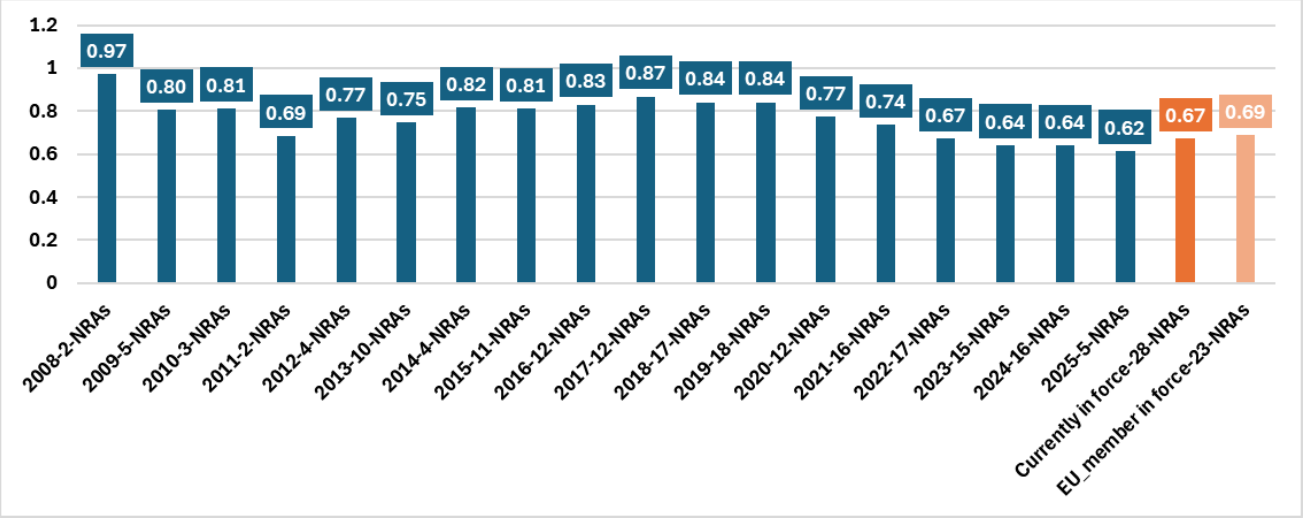
Most NRAs apply an unlevered beta before estimating the final equity beta (18 NRAs), increasing since last year and including NRAs that apply the WACC Notice. Concerning the unlevering formula, the most widely used is the Modigliani-Miller formula (Miller being the same formula without tax[71]).

Concerning the market index, all NRAs use a European index (STOXX Europe TMI Telecommunications; STOXX Europe TMI, MSCI Europe Index) which is a trend that has increased year by year.

Sensitivity analysis on the time windows, adjustments and the choice of market index show a relevant variability of the estimation (see annex 1 of BoR (17) 169). A notional approach can reduce a certain level of variability.

Overall, in the period 2008-2025, the estimated beta values show a first increase between 2014-2019 followed by a significant reduction in the last years.

Figure 33 - Equity Beta evolution over time



Source: BEREC RA database 2025

[70] NRAs that have provided information on all parameters are shown. The NRAs that apply the WACC Notice are not reported separately.

[71] Sometimes the same formula is referred to as "Hamada formula". In CH the following formula is in use: (Weight Equity*Raw Beta +Weight Debt*(1-tax rate)*debt beta)/(Weight Equity+(1-tax rate)*weight debt).

5.2.4 The cost of debt

see BoR (17) 169, BoR (18) 167, BoR (19) 240, BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102 for definition and general financial theory

Main output from the survey.

Using the replies provided in the 2025 survey the following statistics have been derived for all responding NRAs and for EU NRAs separately (2024-2018 values in brackets).

Figure 34 – Cost of debt values

2025	Average	Median	Standard Deviation	Relative Standard Deviation	Maximum	Minimum
Cost of debt fixed market 28-NRAs	3.35%	3.21%	1.58%	47.14%	7.79%	0%
(2024-27)	(3.29%)	(3.21%)	(1.64%)	(49.68%)	(8.12%)	(0%)
(2023-28)	(3.02%)	(2.67%)	(1.86%)	(61.47%)	(8.71%)	(0.00%)
(2022-27)	(2.71%)	(2.40%)	(1.55%)	(57.08%)	(7.69%)	(0.00%)
(2021-29)	(3.22%)	(3.44%)	(1.56%)	(48.44%)	(7.67%)	(0.00%)
(2020-31)	(3.81%)	(3.90%)	(2.03%)	(53.33%)	(8.58%)	(0.00%)
(2019-32)	(4.00%)	(3.98%)	(2.03%)	(50.89%)	(8.58%)	(0.00%)
(2018-32)	(4.30%)	(4.43%)	(2.08%)	(48.31%)	(8.77%)	(0.00%)
Cost of debt fixed market 23-EU NRAs	3.14%	3.14%	1.27%	39.70%	6.78%	0%
(2024-23)	(3.04%)	(3.12%)	(1.27%)	(41.76%)	(5.95%)	(0%)
(2023-23)	(2.58%)	(2.43%)	(1.28%)	(49.53%)	(5.45%)	(0.00%)
(2022-23)	(2.49%)	(2.25%)	(1.19%)	(47.69%)	(4.23%)	(0.00%)
(2021- 25)	(3.00%)	(3.29%)	(1.26%)	(42.05%)	(5.83%)	(0.00%)
(2020-24)	(3.55%)	(3.59%)	(1.67%)	(47.11%)	(7.84%)	(0.00%)
(2019-26)	(3.79%)	(3.81%)	(1.74%)	(45.92%)	(7.84%)	(0.00%)
(2018-26)	(4.12%)	(4.39%)	(1.74%)	(42.14%)	(7.84%)	(0.00%)

Source: BEREC RA database 2025

For 2018-2022 a continuous decrease in the level of the averages is seen mainly due to the decrease of the RFR that is included in the cost of debt. For 2023-2025 an increasing trend can be detected, due to the evolution of the capital market in the Telecom sector where higher interest rates can affect the level of operators' debt.

Considering the 18+1 NRAs that apply the WACC Notice, with reference to the parameter in this section:

- 14 NRAs (CZ, ES, FR, HR, HU, IT, LU, LV, PL, PT, SI, IS, NO, SK) apply the relevant arithmetic mean estimated by BEREC in the relevant WACC Report;
- 2 NRAs (AT, SE) use the debt premium of the SMP operator estimated by BEREC in the relevant WACC Report, more specifically for AT the incumbent debt premium was not available since 2023 as no traded bond were available at the time of the BEREC report BoR (23) 90, so for this reason the NRA used the 2022 BEREC report for the estimation of the corresponding own SMP debt premium;
- two NRAs use the weighted average (DE, LI): DE applies the WA of debt premium evaluated in the relevant BEREC report; LI evaluates the WA of debt premium considering only SMP operators (DT, Elisa, KPN, Orange, Proximus, TI, Telefonica, TA, Telenor, Telia) in the peer group using as weight the data included in the BEREC WACC Report BoR (23) 90 for market capitalisation;

- one NRA has omitted some of the companies in the peer group for reasons of consistency (DK).

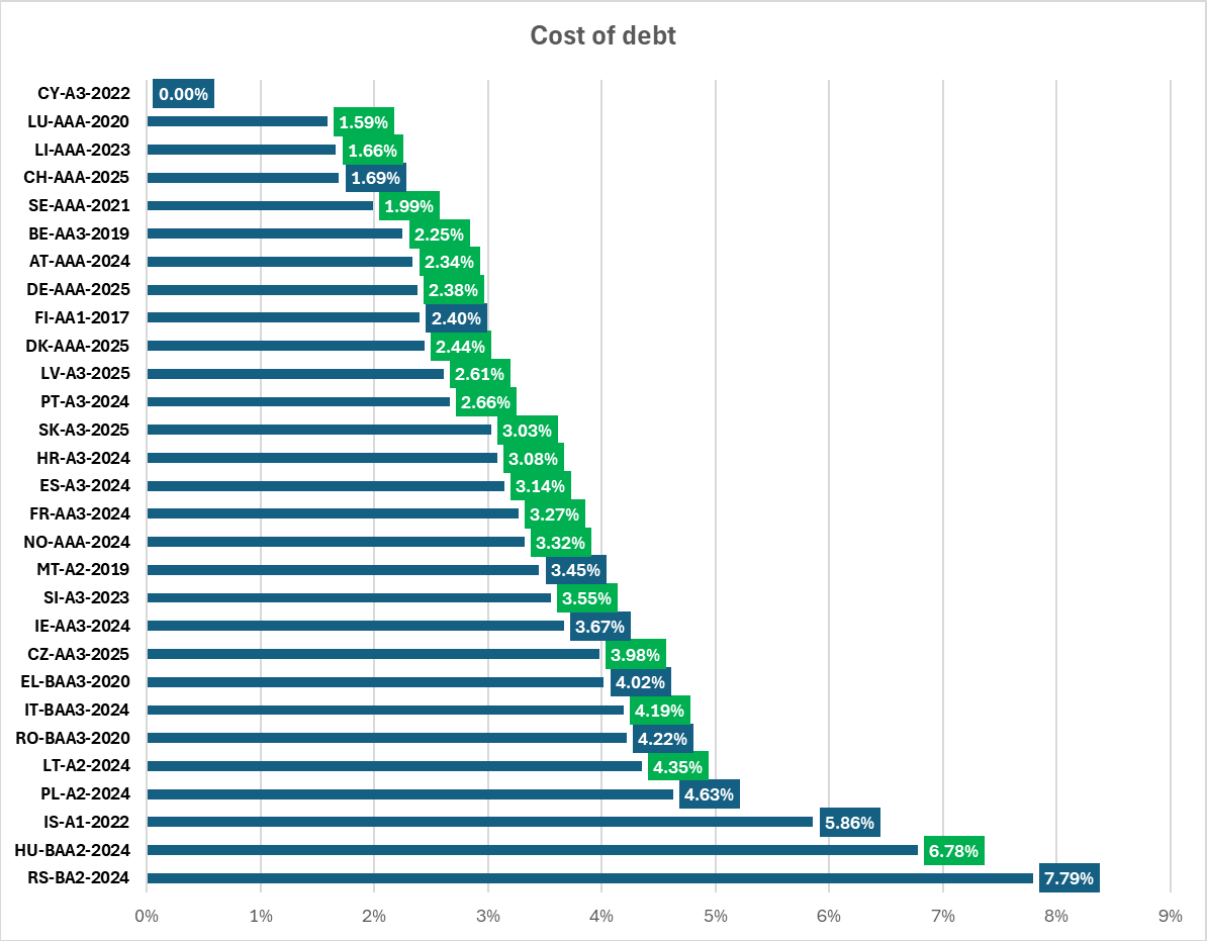
Figure 35 – NRAs that adopt the WACC Notice approach (debt premium)

Country	Relevant report	Methodology	Debt premium
AT	Bor(25)64	Own country SMP debt premium	0.72%
CZ	Bor(24)102	AM full Berec group debt premium	1.21%
DE	Bor(24)102	WA debt premium	1.15%
DK	Bor(25)64	Omitted some of the companies in the peer group for consitency reason	1.11%
ES	Bor(24)102	AM full Berec group debt premium	1.21%
FR	Bor(23)90	AM full Berec group debt premium	1.48%
HR	Bor(24)102	AM full Berec group debt premium	1.21%
HU	Bor(25)64	AM full Berec group debt premium	1.17%
IS	Bor(21)86	AM full Berec group debt premium	1.21%
IT	Bor(23)90	AM full Berec group debt premium	1.48%
LI	Bor(23)90	WA debt premium(using only SMP operators)	1.08%
LU	Bor(20)116	AM full Berec group debt premium	1.30%
LV	Bor(24)102	AM full Berec group debt premium	1.21%
NO	Bor(24)102	AM full Berec group debt premium	1.21%
PL	Bor(23)90	AM full Berec group debt premium	1.48%
PT	Bor(24)102	AM full Berec group debt premium	1.21%
SE	Bor(21)86	Own country SMP debt premium	1.50%
SI	Bor(23)90	AM full Berec group debt premium	1.48%
SK	Bor(25)64	AM full Berec group debt premium	1.17%

Source: BEREC RA database 2025

In Figure 36 the currently estimated cost of debt is shown. The respective Credit Rating and its year of estimation is also reported.

Figure 36 - Cost of debt value



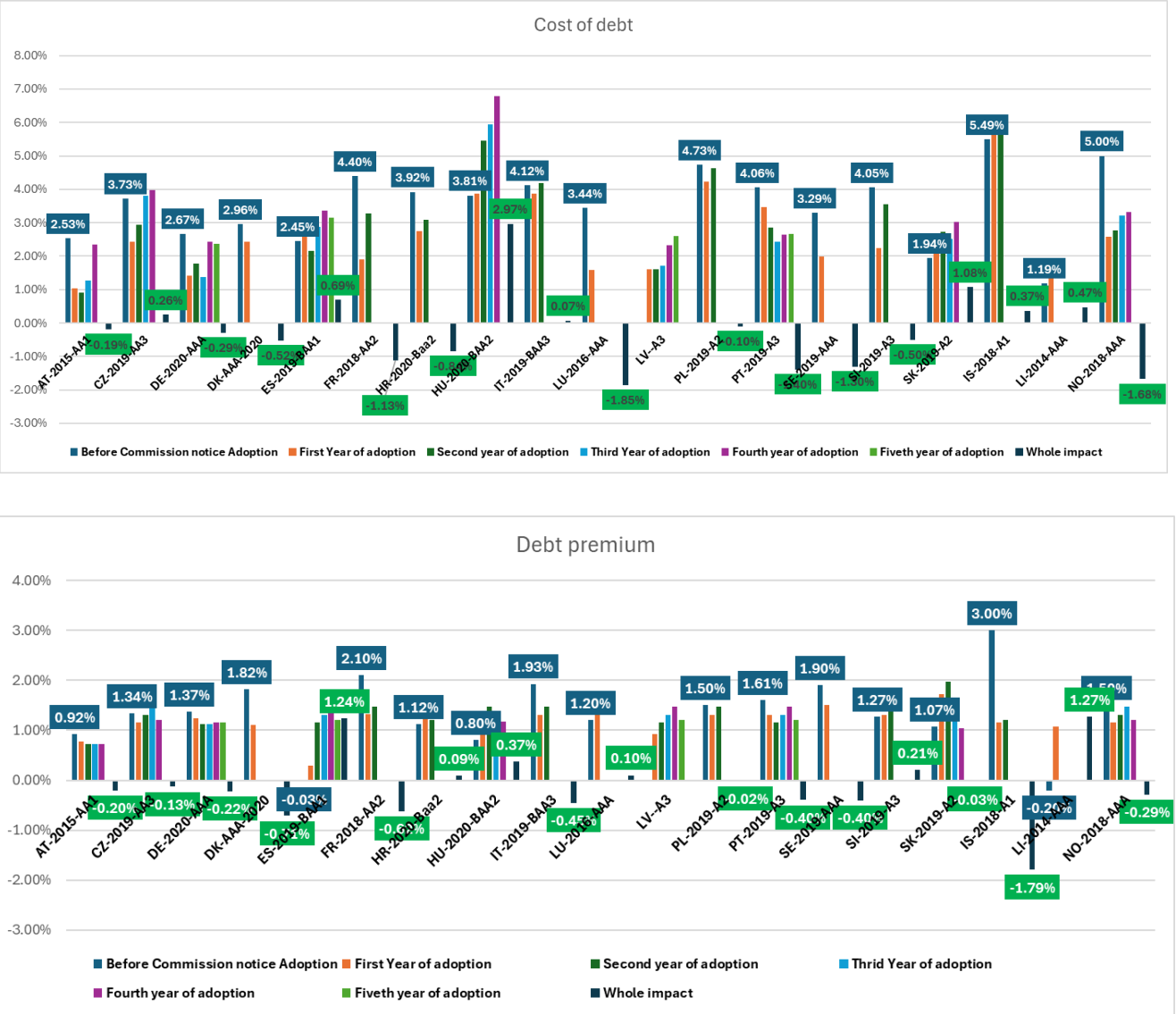
Source: BEREC RA database 2025

The following Figure reports the evolution of cost of debt and debt premium[72] for the 18+1 NRAs that applied the WACC Notice. The last value before the adoption of the WACC Notice serves as reference (the year of last estimation before the WACC Notice is reported in the label of each country). The whole impact is estimated as the difference between the last value estimated before the adoption of the WACC Notice and the last value adopted following the WACC Notice. A decrease of the parameter value after the application of the WACC Notice is observed, mainly due to the RFR component included. With reference to the debt premium, the overall decrease is less evident - some countries experience an increase of the debt premium (the reduction is generally limited and in most of the cases lower than -0.11%).

Looking at the evolution of the methodologies, the geographical scope of the estimation (SMP vs notional) as well as the "time windows" used for estimating the debt premium/cost of debt changed over the years causing a different impact. Therefore, for this parameter, the trend is not only influenced by the evolution of the capital market in the Telecom sector, but also by methodological changes.

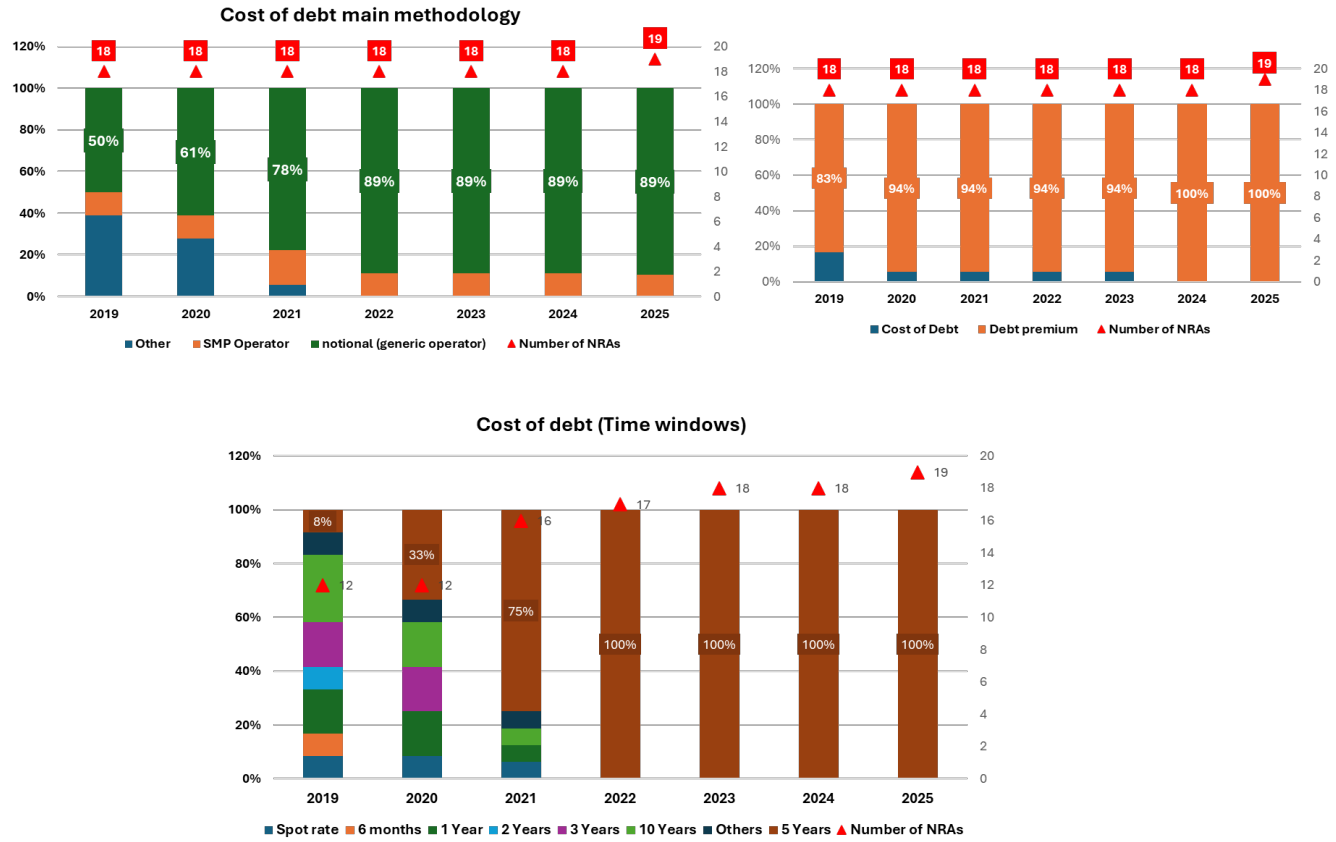
[72] The debt premium has been estimated as the difference between cost of debt and RFR.

Figure 37 - Before and after WACC Notice adoption 2021-2024 (Debt premium/Cost of debt)



Source: BEREC RA database 2025

Figure 38 – Methodologies evolution of cost of debt over time (2019-2024) for the NRAs that applied the WACC Notice



Source: BEREC RA database 2025

The following table summarises the different approaches used by NRAs to estimate the cost of debt for fixed markets. The approach outlined in the WACC Notice is the most frequent one; the effort by BEREC in publishing an evaluation of the debt premium from the secondary traded market data (not freely available) played a role in favouring the convergence towards the most frequent approach by NRAs.

Figure 39 - Methodology used for estimating cost of debt

	Methodology		Cost of debt/debt-premium		Market/book value		-if "Market value"/"Other" (if applicable) Source data		-if "Market value"/"Other" (if applicable) bond window		-if "Market value"/"Other" (if applicable) Average window		-if "Market value"/"Other" (if applicable) Average methodology (with respect to the hystorical series included in the Average window)		If notional approach is used for the peer group please indicate the average used	
Cost of debt (RFR+ Debt premium)	notional (generic operator)	5+17	Debt premium	5+19	Book value	1	Secondary traded market	18	1 year	0	Spot rate	1	Arithmetic average	3+19	Arithmetic	15
	SMP Operator	1+2	Cost of Debt	3	Market Value (Company bond)	4+18	Nominal bond yield	3	3 years	0	3 months	0	Geometric Average	0	Median	0
	Other	2			Other	1	Other	1	5 years	0	6 months	0	Moving Average	0	Weighted Average	2
	benchmarking	1							10 years	3+19	1 Year	0	Median	0	Other	0
									20 years	0	2 Years	0	Other	1		
									Hybrid	1	3 Years	2				
									Other	0	5 Years	1+19				
											10 Years	0				
											Others	2				

Source: BEREC RA database 2025

The most frequent approach used by NRAs is a notional one (22 NRAs, increasing in comparison to past years); the category "Other" which reflects a mix of approaches (SMP and notional, benchmarking) is now chosen by only 2 NRAs; the SMP cost of debt is considered by 3 NRAs. It should be highlighted that the WACC Notice allows the use of the SMP operator's value directly if this value is considered to be efficient and within the range of the values estimated for the BEREC peer group. Two NRAs adopted the national SMP operator's debt premium estimation. The majority of NRAs apply the arithmetic mean. The weighted average is used only by two countries (DE, LI) due to the specificity of the incumbent.

The application of the WACC Notice has considerably increased the consistency of the methodological approach applied by NRAs. Over time we observe a general consistency in the application of the Notice itself.

Almost all NRAs estimate a debt premium instead of estimating the cost of debt directly, mostly when using a notional approach (see Figure 40). in this case, NRAs use the same peer group used for estimating beta and gearing; in one case (IT) the BEREC Arithmetic Mean is used as it was very close to the debt premium of the national SMP operator (which sometimes is considered more relevant for estimating the cost of debt), in comparison to a pure notional approach considering national circumstances. One NRA (IE) uses a very detailed approach that considers many sources of evidence *inter alia*: i) the approach of the WACC Notice (five years average of the debt premium of a peer group of companies with credit rating at least BBB); ii) spot rate of the same debt premium estimation; iii) actual coupon bond emission of the national incumbent operator.[73]

[73] https://www.comreg.ie/media/2020/10/ComReg-2096.pdf, see paragraph (5.1). In the annual update an adjustment to the cost of debt estimated in 2020 equal to 2.6 % is applied: the adjustment takes into account the fact that the difference between the cost of debt estimated by ComReg with the proposed methodology and the one based on the Commission notice as

One NRA (CY) declared that the level of debt of the SMP operator is negligible, and, for this reason, it is considered equal to 0.

Most NRAs use averaging windows for bonds or time to maturity in line with those used for RFR (10-year average).

Figure 40 - Cost of debt calculated through debt premium[74]

	Cost of debt calculated through debt premium	Cost of Debt
Notional (generic operator)	AT,CZ,DE,DK,ES,FR, HR,HU,IS,IT,LI,LU,LV ,NO,PL,PT,SE,SI, SK BE,FI,IE,CH (19+4)	RS (1)
SMP operator		LT (1)
Other	MT (1)	
Benchmarking		RO (1)

Source: BEREC RA database 2025

With reference to the data source used, most NRAs use the market value of peer group companies. A book value approach is used typically in case of SMP cost of debt.

Concerning the bond lengths, the most common approach is to use corporate bonds with a 10-year residual maturity, in line with the bond length used to estimate RFR (21 NRAs).

estimated by ComReg was 116 point basis in 2020; this difference was expected to remain constant over time. Thus, the cost of debt is going to be updated annually considering an estimation of the cost of debt using the Commission Notice approach and adding to this the 116 point basis. In practice it is a correction of the value of the cost of debt estimated in 2020.
This year the annual update (https://www.comreg.ie/media/2025/06/EE-Update-2025-25-35a.pdf) has been done as follows: Since the NRA regards a credit rating range between BBB and A as being representative of European telecom operators, ComReg calculated the average (weekly) yield between two indices "Thomson Reuters Europe Non-financial 10-year index" with credit rating A and BBB. Second, they calculated the spread between the yield of the average evaluated along the five years' time windows and the yield of 10-year Irish government bonds; and then the average spread over a 5-year period. The adjustment is equal to 0.89 %.

[74] NRAs that have provided information on all elements are shown. The NRAs that apply the WACC Notice are not reported separately.

Figure 41 - Bond lengths used for estimating cost of debt/RFR

		Bond length						
		1 Year	3 Years	5 Years	10 Years	20 Years	Hybrid	Other
RFR	1 Year							
	3 Years							
	5 Years							
	10 Years				3+19 (RS, BE, IE)		(1) CH	(1) RO
	20 Years							
	Other							

Source: BEREC RA database 2025

NRAs generally choose averaging windows in accordance with averaging windows used for the RFR. The category "Other" is chosen only by 2 NRAs where the cost of debt is estimated based on the nominal coupon bond yield and not when the secondary traded market is used as data source.[75]

The results of the methodological survey are in line with the general principle expressed in the BEREC WACC Position Paper (BoR (18) 167). BEREC understands the need for consistency in the averaging windows used for cost of debt and RFR but also recognises the necessity for NRAs to be flexible due to the fact that it is not easy to find a match of the ten year company bond maturity with corresponding time to maturity of country bonds for the five year averaging windows (i. e. point 98 BoR (18) 167). This is in line with the approach adopted by BEREC in the debt premium estimation in the annual WACC parameters report: a specific criterion has been selected to trade off expected outcomes due to the methodological provisions of the WACC Notice and the availability of the data for the parameter estimation (WACC parameters Report 2024, section 4.3 BoR (24) 102).

Figure 42 - RFR/cost of debt time windows[76]

		Cost of debts		
		<=1 Year	<=3 years	>= 5 Years
RFR	<=1 Year			
	<=3 Years		BE, CH	SI,LI
	>= 5 Years	RS		IE, AT,CZ,DE,DK ES,FR,HR,HU,IS ,IT,LU,LV,NO,PL ,PT,SE,SI, SK

Source: BEREC RA database 2025

Two NRAs applied adjustments to the cost of debt.

[75] When "other" is chosen, NRAs generally consider in their calculation all bonds not yet expired that are emitted in a range of time that cannot strictly correspond to the time windows used for the RFR estimation.
[76] NRAs that have provided information on all parameters are shown. The NRAs that fully apply the WACC Notice are not reported separately.

Figure 43 - Adjustments to cost of debt

	Cost of debt	Cost of debt without adjustment	Adjustment (%)	Motivation
IE	3.67% (3.12%) (2.67%)	2.6% (2.6%) (2.6%)	0.89% (0.52%) (0.07%)	New estimation of the cost of debt by a modified «Commission Notice methodology» done by ComReg + 116 point basis , that over all determine the new cost of debt with respect to the value estimated in 2020.
RS	7.79% (8.12%) (8.71%) (7.69%) (7.67%) (7.86%) (7.61%) (8.77%)	6.43% (6.76%) (6.03%) (5.64%) (6.27%) (6.85%) (6.48%) (7.23%)	1.36% (1.36%) (2.68%) (2.05%) (1.65%) (1.02%) (1.13%) (1.54%)	Adjustment is made using the inflation rate for Serbia and Eurozone, since the initial value of cost of debt is in EUR. Inlfation adjustment was made using Fisher equation: Pretax Cost of debt*(1+ Projected Inflation Rate for RS)/(1+Projected Inflation Rate for Eurozone)

Source: BEREC RA database 2025

In the previous table the case where the pre-tax cost of debt is adjusted to take into account a specific fiscal obligation concerning potentially different interest rate deductibility on debt in comparison to the corporate tax rate is not considered. When this is the case, it has to be taken into account for a correct estimation of the pre-tax cost of debt. The Post tax cost of debt is the following[77]:

$$post_{tax} Cost\ of\ debt = R_D(1 - Tc)$$

In RS the cost of debt estimated at market value. If Tc of the previous formula is equivalent to the corporate tax rate, the pre-tax cost of debt is directly derived from the market data. In this case the cost of debt is fully deductible when the tax deduction rate for interest rate is not equal to the specific corporate tax (Tc). Such a condition is generally defined by national law, so the pre-tax cost of debt should be corrected as follows in the framework of the WACC formula:

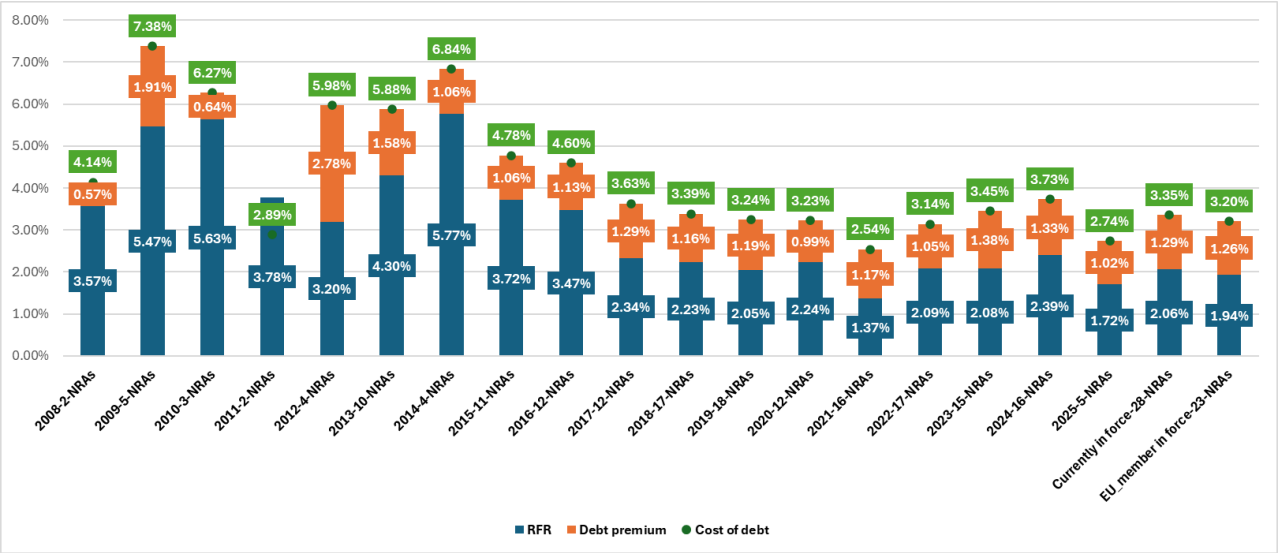
$$pre_{tax} Cost\ of\ debt = \frac{R_D(1 - T_{shield})}{(1 - Tc)}$$

Two NRAs indicated a different level of tax rate deduction for interest on debt with respect to the corresponding corporate tax rate (DE, IT) from which a tax shield equivalent has been derived: for IT24 % (a value established by national law) and for DE 29 %, where corporate tax has been defined as 32.9 % and 31.40 % respectively. The pre-tax cost of debt including the adjustment for taking into account the different tax-deductible rates are 4.75 % for IT and 2.47 % for DE.

The next figure shows the evolution over time of the cost of debt (as the sum of RFR and debt premium).

[77] SWD of the EU Commission Notice on WACC, p.13.

Figure 44 - Evolution of cost of debt over time



Source: BEREC RA database 2025

5.2.5 Gearing Ratio

see BoR (17) 169, BoR (18) 167, BoR (19) 240, BoR (20) 116, BoR (21) 86, BoR (22) 70, BoR (23) 90, BoR (24) 102 for definition and general financial theory

Main results of the survey.

The outcome of the 2025 survey is reported in the following figure for all responding NRAs and EU NRAs separately (2024-2018 values in brackets).

Figure 45 - Gearing ratio

	Average	Median	Standard Deviation	Relative Stand-ard Deviation	Maximum	Mini-mum
Gearing fixed market –-						
28-NRAs	**39.75%**	**45.36%**	**11.44%**	**28.78%**	**52.56%**	**0.00%**
(2024-27)	**(39.79%)**	**(45.36%)**	**(11.28%)**	**(28.35%)**	**(51.18%)**	**(0.00%)**
(2023-28)	**(39.59%)**	**(41.56%)**	**(11.87%)**	**(29.99%)**	**(64.30%)**	**(0.00%)**
(2022-27)	**(37.16%)**	**(39.22%)**	**(9.23%)**	**(24.83%)**	**(49.89%)**	**(0.00%)**
(2021-29)	**(36.51%)**	**(37.26%)**	**(9.39%)**	**(27.71%)**	**(53.04%)**	**(0.00%)**
(2020-31)	**(37.79%)**	**(39.54%)**	**(9.99%)**	**(26.44%)**	**(57.89%)**	**(0.00%)**
(2019-32)	**(37.70%)**	**(39.93%)**	**(9.71%)**	**(26.76%)**	**(54.79%)**	**(0.00%)**
(2018-32)	**(37.28%)**	**(39.85%)**	**(10.04%)**	**(26.93%)**	**(55.62%)**	**(0.00%)**
Gearing fixed market-EU						
23-NRAs	**40.57%**	**45.18%**	**10.76%**	**26.53%**	**52.56%**	**0.00%**
(2023-23)	**(39.90%)**	**(45.00%)**	**(10.46%)**	**(26.22%)**	**(50.26%)**	**(0.00%)**
(2023-23)	**(38.67%)**	**(40.73%)**	**(9.75%)**	**(25.20%)**	**(47.07%)**	**(0.00%)**
(2022-23)	**(37.24%)**	**(39.22%)**	**(9.08%)**	**(24.39%)**	**(46.46%)**	**(0.00%)**
(2021-25)	**(36.33%)**	**(37.26%)**	**(9.06%)**	**(24.93%)**	**(46.46%)**	**(0.00%)**
(2020-24)	**(37.84%)**	**(39.41%)**	**(10.65%)**	**(28.14%)**	**(57.89%)**	**(0.00%)**
(2019-26)	**(37.24%)**	**(40%)**	**(10.61%)**	**(28.48%)**	**(55.62%)**	**(0.00%)**
(2018-26)	**(37.27%)**	**(40%)**	**(10.65%)**	**(28.58%)**	**(55.62%)**	**(0.00%)**

Source: BEREC RA database 2025

The overall situation is quite stable over time with a small increase over the last years in line with the evolution of market data on the level of debt of telecom operators, as highlighted in BEREC's WACC parameters Report 2025 (BoR (25) 64).

Results for the 18+1 NRAs that fully apply the WACC Notice and the corresponding relevant BEREC reports can be summarised as follows:

- 13 NRAs (CZ, DK, ES, FR, HU, IT, LU, LV, HR, PL, PT, SI, SK, NO, IS) apply the arithmetic average derived from the relevant BEREC WACC Reports; of these 11 NRAs (CZ, ES, FR, HR, HU, LU, LV, PL, PT, SI, NO, IS) use the calculated BEREC AM average using the full peer group as last year; IT has deleted three operators from the peer group (Digi, Telenor and Telenet) for the same reasons as for the asset beta (the same gearing has been used to re-lever the asset betas as well as for estimating the weighted average of the cost of equity and cost of debt in the WACC formula); SK does not consider NOS, Elisa, Telekom Austria and DIGI in the peer group for the AM of the gearing due to the missing data on debt premium for those operators in the relevant BEREC WACC parameters Report 2025 (BoR (25) 64). DK calculated the AM eliminating some operators from the BEREC peer group.
- 2 NRAs (AT, SE) use the gearing of their national SMP operator;
- 1 NRA (DE) used the weighted average for Market capitalisation as indicated by BEREC in the relevant report;
- 1 NRA (LI) estimated gearing using both equity and debt components from the book values included in the financial statement of the national SMP operator (no traded debt) and national fiscal regime (deductions for equity, not debt);

The following table shows the 18+1 NRAs compliant with the WACC Notice and using the values in the relevant BEREC Report: NRAs that use AM from the BEREC peer group are in green, NRAs that apply the WA of the peer group are in red, NRAs that use the SMP operator values are in black.

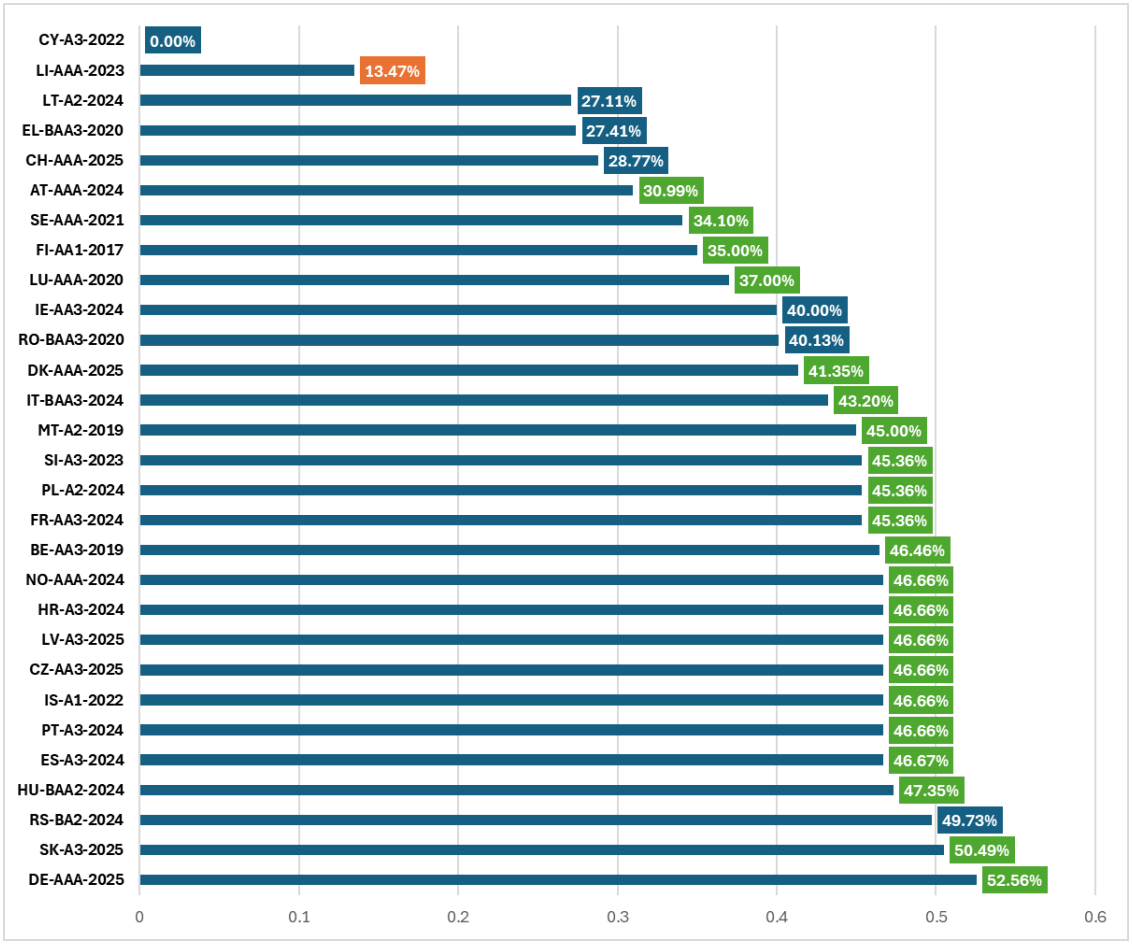
Figure 46 - NRAs that adopted the WACC Notice approach (gearing)

Countries	Relevant report	Methodology	Gearing
AT	Bor(25)64	Own SMP gearing	30.99%
CZ	Bor(24)102	AM of the gearing of the full Berec peer group	46.66%
DE	Bor(24)102	WA of the gearing of the full Berec peer group	52.56%
DK	Bor(25)64	AM of the gearing of the Berec peer group excluding some operators for consistency reason	41.35%
ES	Bor(24)102	AM of the gearing of the full Berec peer group	46.67%
FR	Bor(23)90	AM of the gearing of the full Berec peer group	45.36%
HR	Bor(24)102	AM of the gearing of the full Berec peer group	46.66%
HU	Bor(25)64	AM of the gearing of the full Berec peer group	47.35%
IS	Bor(21)86	AM of the gearing of the full Berec peer group	46.66%
IT	Bor(23)90	AM of the gearing of the Berec peer group excluding DIGI, Telenet, Telnor	43.20%
LI	Bor(23)90	Own SMP gearing due to the specific national condition no relevant the Berec peer group	13.47%
LU	Bor(20)116	AM of the gearing of the full Berec peer group	37.00%
LV	Bor(24)102	AM of the gearing of the full Berec peer group	46.66%
NO	Bor(24)102	AM of the gearing of the full Berec peer group	46.66%
PL	Bor(23)90	AM of the gearing of the full Berec peer group	45.36%
PT	Bor(24)102	AM of the gearing of the full Berec peer group	46.66%
SE	Bor(21)86	Own SMP gearing	34.10%
SI	Bor(23)90	AM of the gearing of the full Berec peer group	45.36%
SK	Bor(25)64	AM of the gearing of the Berec peer group not including Elisa, DIGI, TA, NOS as no debt premium is calculated for those operators	50.49%

Source: BEREC RA database 2025

In Figure 47 the estimated gearing is reported for each NRA, with the indication for the year of estimation and the relative Credit Rating.

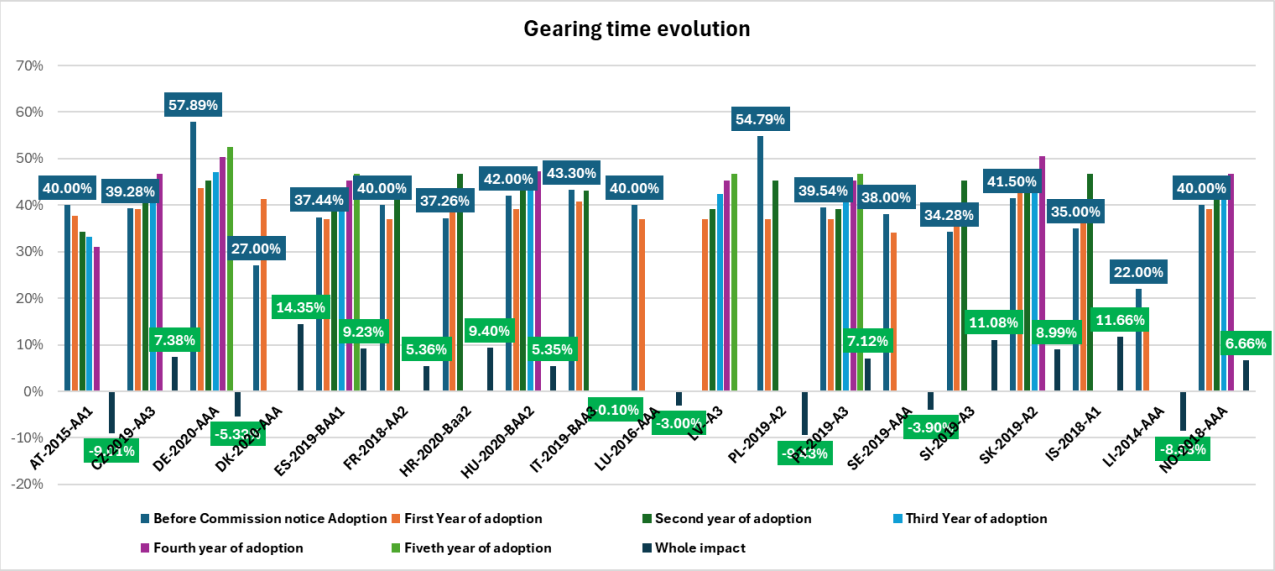
Figure 47 - Gearing values



Source: BEREC RA database 2025

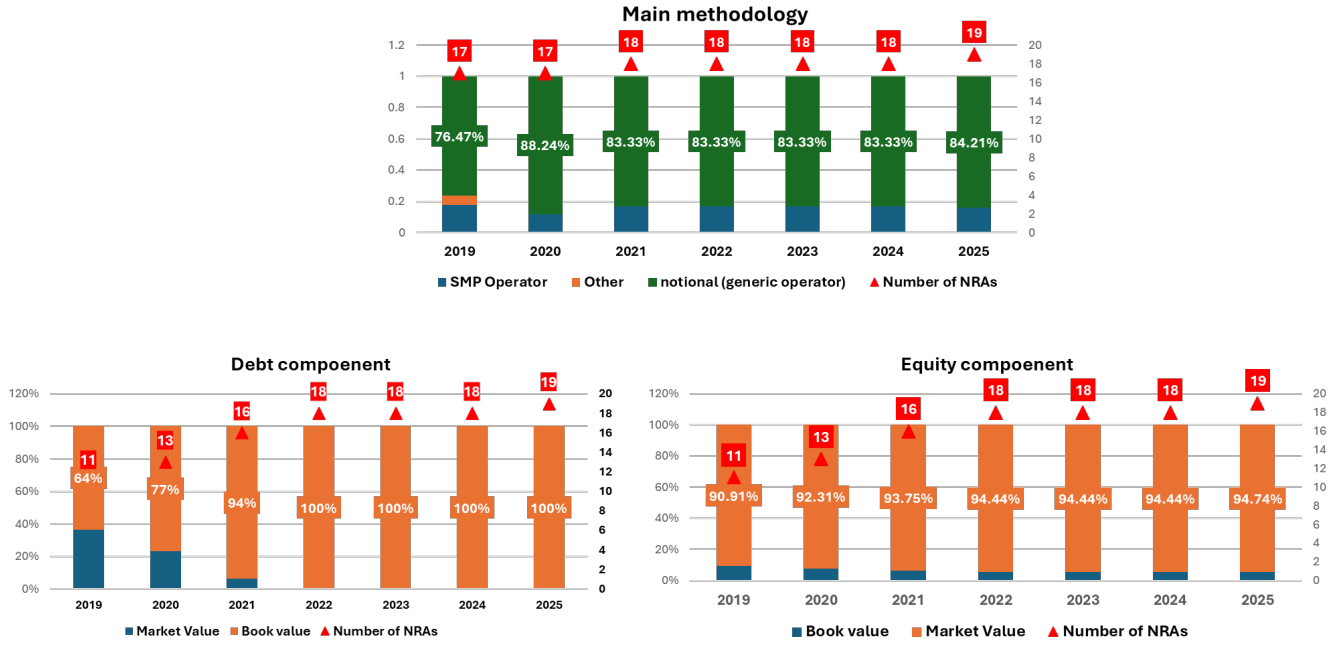
In the following Figure 48 the evolution of gearing is considered for the 18+1 NRAs that have applied the WACC Notice. The last value before the adoption of the WACC Notice is the starting point (the year of last estimation before the WACC Notice adoption is reported in the label of each country). The whole impact is estimated as the difference between the last value estimated before application of the WACC Notice and the most recent value adopted compliant with the WACC Notice. For the gearing the impact in absolute term is quite limited for most NRAs (max about 10 % difference in 5 years); this can be partially explained by the fact that the methodology used was already quite homogeneous. The geographical scope of the estimation was already focused on a notional approach; significant differences were only seen for NRAs that have adjusted the methodology according to national circumstances (e. g. DE, PL) when adopting the WACC Notice. The other main elements of the methodology (data source for the estimation, i. e. market value vs book value) were already substantially in line with the approach of the WACC Notice for most NRAs.

Figure 48 – WACC Notice adoption 2021-2024 (Gearing)



Source: BEREC RA database 2025

Figure 49 - Methodologies evolution of gearing over time (2019-2025) for the NRAs that adopted the WACC Notice



Source: BEREC RA database 2025

The following figure summarises the different approaches used by NRAs to estimate the gearing parameters. The adoption of the WACC Notice contributes to an increase of the most frequent approaches.

Figure 50 - Gearing methodology

	Methodology		Debt component (if applicable)		Equity component (if applicable)		-if notional value "Average methodology"		-if benchmarking is indicated in the methodology section please indicate the average used from other countries	
Gearing	notional (generic operator)	5+16	Book value	1+19	Book value	1	Arithmetic	3+15	Arithmetic average	1
	SMP Operator	1+3	Market Value	1	Market Value	2+18	Median	2		
	Other	2	Other	0	Other	0	Weighted Average	1		
	benchmarking	1					Other	2		

Source: BEREC RA database 2025

The vast majority of NRAs use a “notional” approach, and, in general, do not adjust the gearing according to national circumstances. When an unlevered beta is estimated, the gearing used to unlever the beta is the same as the one used for the weighted average of the cost of equity and debt in the WACC formula (there is only one case of different gearing estimation)[78]. The gearing is estimated using the same averaging window as the one used for beta estimation. In line with last year’s report, most NRAs use a notional approach consistent with their approach for estimating the beta, (exceptions from the notional approach are AT, SE, LI, where the national SMP gearing has been used).

[78] CH uses a different gearing ratio to relever the asset beta with respect to the gearing for estimating the weighted average of the cost of equity and debt in the WACC formula. The value over equity is obtained as the total book debt for peer group companies and Swiss Market Index (SMI) companies, excluding banks and insurance companies and the average of the averages of the two samples. In the present paragraph the gearing for the WACC calculation is used for the statistical figures.

Figure 51 - Gearing methodology[79]

	Debt Component			Equity component		
	Book value	Market value	Other	Book value	Market value	Other
notional (generic operator)	CZ,DE,DK, ES,FR,HR,HU,IS,IT, LU,LV,NO,PL,PT,SI, SK. CH	BE			CZ,DE, DK, ES,FR,HR,HU,IS,IT,LU,LV,NO,PL,PT, SI, SK, BE, CH	
SMP Operator	AT,SE,LI			LI	AT,SE	
Other						
benchmarking						

Source: BEREC RA database 2025

Figure 52 indicates that the gearing methodology is influenced mainly by the methodology used for the beta estimation, while gearing also influences the debt premium estimation.

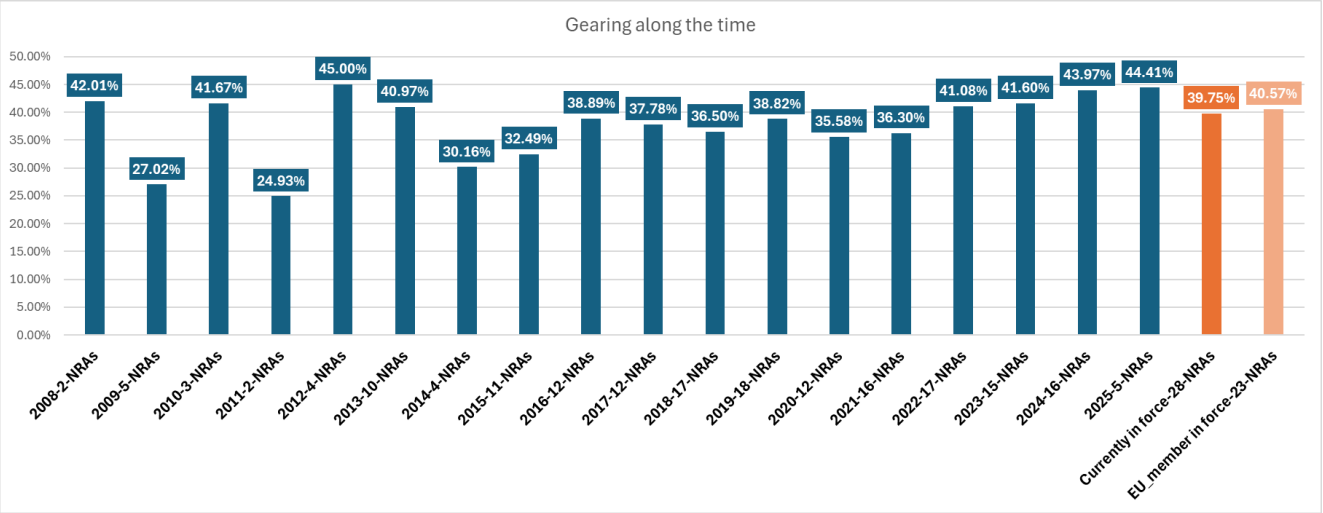
Considering the methodologies used by all NRAs for estimating the cost of debt, gearing and beta (company/industry specific parameters) it should be highlighted that the gearing estimate plays a significant role in the WACC formula since it affects several parameters: (i) it determines the weights for the cost of equity and cost of debt, (ii) it is used to unlever and re-lever the beta, (iii) it influences the amount of the cost of debt.

The adoption of the WACC Notice, as for the other parameters, is resulting in a reduction in the spread of the methodologies in accordance with a notional approach based on a peer group.

The evolution over time of the gearing estimation is reported in Figure 53, with a small increase year by year of the parameters in the last year.

[79] NRAs that have provided information on all parameters are shown. The NRAs that apply the WACC Notice are reported in green.

Figure 52 – Evolution of gearing over time



Source: BEREC RA database 2025

5.2.6 Tax rate

Concerning the corporate tax rate in use in 2024 the following statistics emerge (2018-2023 figures in brackets):

Figure 53 - Corporate tax rate[80]

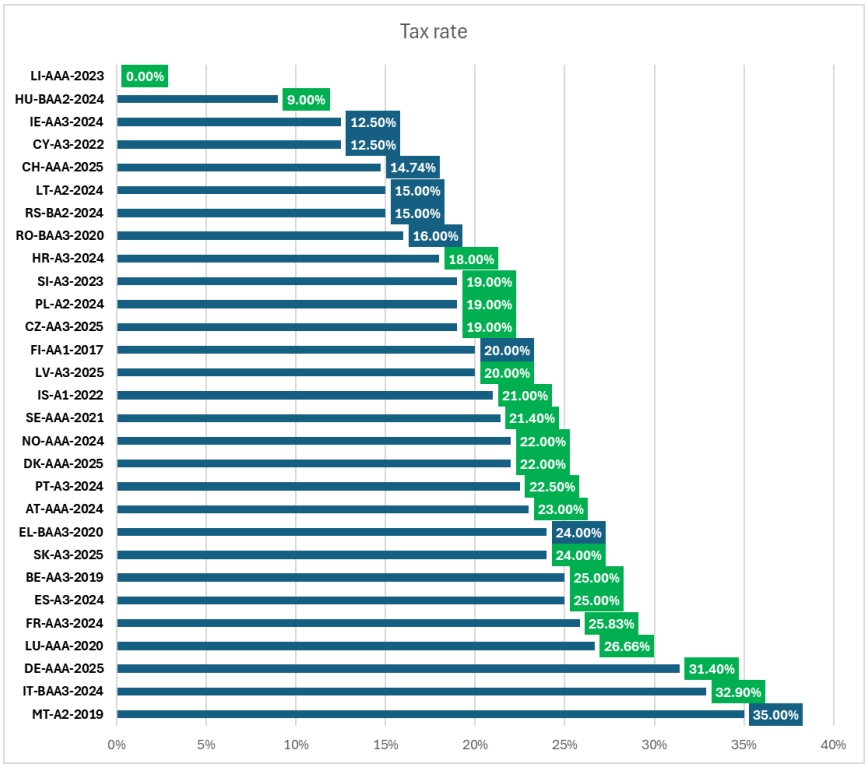
2025	Average	Median	Standard Deviation	Relative Standard Deviation	Maximum	Minimum
Tax rate fixed market 27-NRAs **(2024-27)** **(2023-28)** **(2022-27)** **(2021-29)** **(2020-31)** **(2019-32)** **(2018-32)**	**20.34%** **(20.51%)** **(20.15%)** **(20.48%)** **(20.31%)** **(20.02%)** **(21.07%)** **(21.09%)**	**20.50%** **(21.00%)** **(20.00%)** **(20.00%)** **(20.00%)** **(20.00%)** **(20.45%)** **(20.45%)**	**7.16%** **(7.35%)** **(7.62%)** **(8.04%)** **(8.09%)** **(7.75%)** **(8.34%)** **(8.48%)**	**35.20%** **(35.84%)** **(37.81%)** **(39.25%)** **(39.85%)** **(38.72%)** **(39.57%)** **(40.19%)**	**35.00%** **(35.00%)** **(35.00%)** **(35.00%)** **(35.00%)** **(35.00%)** **(35.00%)** **(36.00%)**	**0.00%** **(0.00%)** **(0.00%)** **(0.00%)** **(0.00%)** **(0.00%)** **(0.00%)** **(0.00%)**
Tax rate fixed market 23-EU NRAs **(2024-23)** **(2023-23)** **(2022-23)** **(2021-25)** **(2020-24)** **(2019-26)** **(2018-26)**	**21.61%** **(21.55%)** **(21.66%)** **(22.04%)** **(21.68%)** **(21.57%)** **(22.51%)** **(22.54%)**	**22.00%** **(21.00%)** **(21.00%)** **(21.00%)** **(21.00%)** **(21.50%)** **(21.50%)** **(22.00%)**	**6.31%** **(6.49%)** **(6.59%)** **(6.88%)** **(7.11%)** **(7.21%)** **(7.73%)** **(7.91%)**	**29.18%** **(30.10%)** **(30.40%)** **(31.20%)** **(32.77%)** **(33.43%)** **(34.33%)** **(35.08%)**	**35.00%** **(35.00%)** **(35.00%)** **(35.00%)** **(35.00%)** **(35.00%)** **(35.00%)** **(36.00%)**	**9.00%** **(9.00%)** **(9.00%)** **(9.00%)** **(9.00%)** **(9.00%)** **(9.00%)** **(9.00%)**

Source: BEREC RA database 2025

As already mentioned, taxation is an important parameter to explain WACC variations between NRAs - it represents a typical country-specific parameter. Needless to say, it is not a parameter that NRAs have an influence over.

[80] Zero tax rate is related to the fact that in LI specific deductions for equity apply.

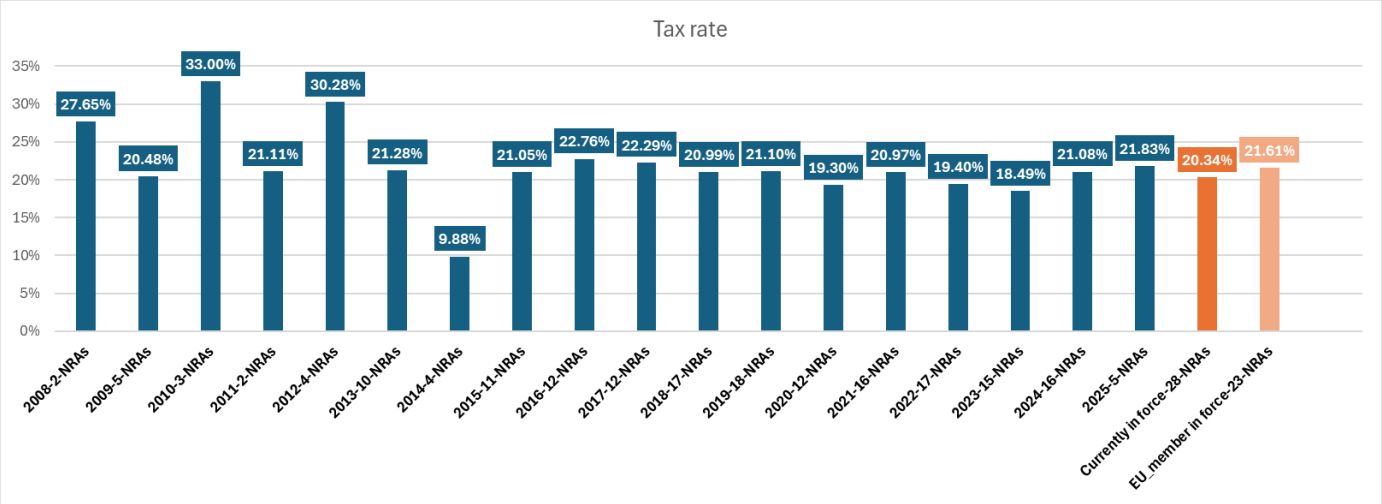
Figure 54 - Tax rate in use



Source: BEREC RA database 2025

The time series of the arithmetic average tax rate adopted is reported in Figure 56.

Figure 55 - Evolution of average tax rate over time (fixed market 2008-2025)



Source: BEREC RA database 2025

5.2.7 Other Adjustments

The practice by some NRAs to adjust the value of WACC parameters posed an issue in some cases of the Article 7/Art. 32 evaluation process by the European Commission.

Today, only two NRAs still apply an adjustment to the cost of equity in fixed markets (see Figure 20 - Adjustments to cost of debt, in bracket the adjustment applied in 2018-2023).

Technical adjustments to the cost of equity are evaluated as: Post-tax cost of equity (RFR+ Equity Beta*ERP) + “Adjustment”. The following adjustments do not include other adjustments reported in previous sections.[81]

In comparison to the previous years the practice of using adjustments is decreasing over time with some NRAs (CZ, DE, NO, SK) having removed the adjustments. This tendency has been also confirmed with the application of the WACC Notice. One NRA (IE) annually updates the cost of equity through a specific adjustment applied to the 2020 estimation.[82]

[81] The adjustment reported is derived in a comparable way by NRAs for the purpose of the present report, with the objective to derive the final WACC via the standard formula of the CAPM model, considering all the information provided on all the other parameters.

[82] In IE the methodology for the cost of equity calculation has been established in 2020, based on a mix of approaches. They take into account both the 2014 methodology and the methodology reported in the Commission Notice for the estimation of some parameters, providing an estimation called “Equilibrium approach”. The final cost of equity in 2020 has been found within a range of values from those two methodologies: i) 2014 methodology ii) modified Commission Notice approach. In the annual update only a “modified Commission Notice” approach has been applied to update the cost of equity parameters (risk free rate, equity beta, and equity risk premium). In calculating the parameters ComReg will also refer to the value proposed by BEREC to ensure consistency and, in case variances arise, to understand the reasons. Therefore, the range of values include BEREC estimations but are derived through a wider level of information supported by a consultant. Using the updated parameters ComReg calculates a new range of the cost of equity under the modified Commission Notice approach. 64 % of the difference between the lower bound and the upper bounds is considered and added to the lower bound already calculated,

Figure 56 - Adjustments to the cost of equity

	Adjustmet for cost of equity	Motivation
IE	-1.08% (-1.03%)	An annual calculation of the parameters that compose the cost of equity (RFR, Equity beta and ERP) is done in line with a modified Commission notice approach. From this calculation a range of values for the post-tax cost of equity are derived and the 64% of the differences between the uper bound and lower bound is considered, this value (64° percentile approach) is added to the lower bound of the estimation of the post tax cost of equity that is the new value that substitute the one derived in 2020 decision.
RS	1.20% (2.34%) (1.81%) (1.25%) (0.91%) (1.01%) (1.38%)	As for the cost of debt Adjustment is made using the inflation rate for Serbia and Eurozone, since the initial values of cost of equity are in EUR. Infation adjustment was made using Fisher equation.

Source: BEREC RA database 2025

The motivation for technical adjustments is to take into account national specificities with the main motivation being stability considerations.

producing the new updated post tax cost of equity. The 64 % is based on the evidence that in the 2020 estimation the mid-point of the post-tax cost of equity derived thorough the "Equilibrium approach" was in the 64th percentile of the "Modified Commission Notice approach" derived at that time. Thus, the new annual calculation, based only on the "Modified Commission Notice Approach" that produces a range of values of the cost of equity, is considered, and the 64th percentile of the range is taken as new final cost of equity.

5.3 NGA Risk premium

In this section an overview of NGA/VHCN WACC estimation is provided (no cross-relationship with the price control applied to the NGA wholesale regulated product for which the information is available in the RA section of the report). The Gigabit Recommendation addresses the issue in the section "Adequately rewarding the investment risk on new VHCN projects" rec. 63-75[83].

The following emerges from the survey: 7 NRAs estimate a risk premium for FTTH networks currently in force, 1 NRA still applies a risk premium to the FTTC services without differentiating it from the one applied to FTTH (SI). In the last year 4 NRAs have updated their risk premium (CZ, SI, IT, DE).

It is not possible to obtain a clear view of the corresponding systematic or non-systematic risk taken into account in the NGA risk premium estimation. Uncertainty of demand is the main source of risk.[84] The risk is generally applied to all the kinds of infrastructure, both active and passive.

[83] At rec. 67 "*When setting access prices to VHCNs, NRAs should consider applying, in addition to the applicable WACC, a risk premium to reflect any additional and quantifiable risk of the new investment network project, including of newly built civil engineering infrastructures, incurred by the SMP operator. NRAs should be transparent about the application of the risk premium in addition to the applicable WACC*." Rec. 68 more over states: "*NRAs should assess investment risk by taking into account one or several of the following factors of uncertainty: (a) uncertainty relating to retail and wholesale demand; (b) uncertainty relating to the costs of deployment, civil-engineering works and managerial execution; (c) uncertainty relating to technological progress; (d) uncertainty relating to market dynamics and the changing competitive situation, such as the degree of infrastructure-based competition; (e) macroeconomic uncertainty.*"

[84] The general concerns reported in the NGA recommendation are: i) uncertainty relating to the costs of deployment; ii) uncertainty relating to technological progress; iii) uncertainty relating to market dynamics and the evolving competitive situation, such as the degree of infrastructure-based and/or cable competition; iv) macroeconomic uncertainty can have an influence about the level of risk included in the market.

Figure 57 - Risk premium

	Do you apply an NGA premium?	Do you apply a premium to FTTC?	If yes, please provide the nominal %	Do you apply a premium to FTTB?	If yes, please provide the nominal %	Do you apply a premium to FTTH?	If yes, please provide the nominal %	What kind of risks do you take into account?	Which infrastructure do you apply the premium to?	How do you estimate the premium (please explain briefly)	How do you apply the premium (please explain briefly i.e. if you also include a premium for duct access products etc.)	Other comments
BE	Yes	No	0	Yes	1.59%	Yes	1.59%	other	Passive and Active	Increased beta and cost of debt and a worse credit rating; based on qualitative arguments	Different WACCs for different networks (legacy, cable, FTTH, mobile)	
CZ	Yes	No	-	Yes	2.41% (2.98%) (0.97%)	Yes	2.41% (2.98%) (0.97%)	.		The NGA risk premium represents a risk difference between the NGA and legacy networks, assessed separately for all relevant criteria. For this exercise a special model of complex box method for cost of equity estimation published by Prof. Mařík was used. This method segments the total risk into partial risks which are then assessed separately. Individual risks associated with NGA networks are not estimated in their absolute values but relatively to the risks of legacy networks, i. e. whether the risk is the same, higher or lower than for the legacy networks. Consistent risk factor is a value of 100 %, higher risk factor is more than 100 % and lower risk factor is lower than 100 %. Finally, the weighted average was calculated from the percentage values of risks. This average value represents the risk ratio of NGA networks and other technologies. Due to a series of exceptional events in the world economy (covid-19, war in Ukraine, energy shock, high inflation), a growing gap can be observed between the risk-free interest rate reflected in the WACC calculation according to the WACC Notice (i. e. average monthly yields of 10-year Czech bonds for the period of 5 years) and the current values. Therefore, the market risk coefficient was added in the WACC for NGA/VHCN.		The NGA risk premium was calculated as the difference between the WACC for legacy network and WACC for NGA network.
DE	Yes (new civil infrastructures including poles)	No			2.48%			Investment risk of fibre deployment	Civil infrastructures including poles	The premium was based on a benchmark (equity and debt yields of fibre deploying companies) (survey from operators)		
HR	Yes	No		Yes	1.59% (1.55%) (1.97%)	Yes	1.59% (1.55%) (1.97%)	The additional risk premium should reflect the risks related to the demand, like the risks related to the use of broadband access services NGA speeds (speeds higher than 30 Mbit/s).	Passive and Active	Benchmark methodology based on currently available data on EU member states	NGA risk premium is applied to civil engineering assets required to provide FTTH/FTTB infrastructure New and old infrastructure that can be adapted for deploying optical fibre.	

IT	Yes	No				Yes	1.36% (1.92%) (3.20%)	Mainly systematic risk (as it is estimated not for a specific project or geographical area).	Passive and Active	Agcom evaluated the risk premium through an option pricing model (mainly based on a DCF approach) in a way to include two main risk factors: a) the “wait and see” option to postpone the investment when new information about demand/cost will be available; b) the risk to openthe network to third parties without having any first mover advantage. The evaluation of the risk premium in 2015 was based on the quantification of the wait and see option using a Montecarlo method for estimating the variance of the investment in FTTH, considering uncertainty on: demand (take up), Arpu, and capex cost, including the flexibility option given by third party that can have access to the infrastructure without sustaining any sunk cost. Applying the theory provided in the paper J.C Cox S.A.Ross, M. Rubestain, Option pricing: A simplified approach, (1979), the corresponding risk premium on the top of legacy WACC have been determined from the variance of the IRR FTTH business case considered. The two sources of risk have been justified until 2022, due to the specific conditions experienced in the market review 2015-2018 and 2019-2021, that showed: i) a national coverage with FTTC solution, achieved between 2015-2018 by the incumbent operator, in combination with a low coverage of FTTH with no incremental investments; ii) the investments in FTTH have been taken until 2021 at national level only by an alternative operator with a wholesale only model. The investment in FTTH solution in this context was not an independent choice by the SMP operator, but a reply to the competitive context. This means that the fast deployment of FTTH is a source of increased systematic risk not only for the incumbent, but also for a generic operator, due to the fact that every operator deploying VHCN networks face demand uncertainty at retail and wholesale level in combination with the need to find new sources for substantial capital (capital leverage) for asset investments. Since 2022 investment’ plans for FTTH materialized, in term of commercial availability of the network, also by the incumbent operator, the "wait and see” option is going to decrease along the years. Agcom, for 2024-2028 (decision 114/24/CONS), has reduced the risk premium considering a specific glide path following the fact that all the investment in FTTH will be concluded between 2026 and 2028 so the risk premium has been defined at 0% in 2028.	The premium is applied to all VHCN wholesale services with respect to the nominal legacy WACC.	In line with the objective of the NGA Recommendation the risk premium evaluated by AGCOM has been seen as an instrument to promote efficient investment by providing the right make or buy signal to the market taking into account the risks incurred by all investing undertakings. The level of the risk addressed is generally systematic and is related to speed up the investment in FTTH network in a context where there is uncertainty about demand for new services and no first mover advantage.
PL	Yes	No		No		Yes	1.51% (2.05%)		Only passive	The premium is determined on the basis of the arithmetic mean of the NGA risk premium of countries that apply such a premium (currently, 5 other EU countries).	The NGA risk premium is only included for fibre when it comes to cabling or copper infrastructure is out of service	
SI	Yes	Yes	1.59% (1.50%)	Yes	1.59% (1.50%)	Yes	1.59% (1.50%)	Demand risk/network utilization	Passive and Active	Benchmarking	For all NGN network components	

Source: BEREC RA database 2025

Appendix I - WACC parameter quantitative analysis

Carried out since the BEREC Regulatory Accounting Report 2017 (BoR (17) 169), as new observations on the WACC estimation become available (17 new observations since last year are available), the time series on WACC estimation for causal inference analysis have been updated in order to identify parameters that may better explain WACC variations on a historical basis. Over time this exercise provides insight into the results of the evolution of the methodologies applied for each parameter. In this case, the independent variables (parameters for estimating WACC) are considered as causes of the dependent variable (WACC values). Causality exploration aims to determine whether a particular independent variable influences the dependent variable and to estimate the magnitude of the effect, if any.

We use the following regression model, which links the WACC values to six main parameters (data updated in 2025):[85]

WACC_*i*_*k*= Constant+ β_1 RFR_*i*_*k* + β_2 Equity Beta_*i*_*k* + β_3 ERP_*i*_*k* + β_4 gearing_*i*_*k* +β_5 Debt premium_*i*_*k*+ β_6 Tax_*i*_*k* (where *i* is the year of the data and *k* identifies countries involved).

Regression analysis can provide a deep understanding and numerical information on the causality between the dependent variable and each independent variable, taking into account information provided by other independent variables.

This cannot be addressed by a simple correlation analysis between each independent and the dependent variable as this only considers a measure of the extent the two variables move together, independently with respect to the information on variation provided by all other independent variables (thus not being able to prove real causality).

Several checks are needed to validate the use of a linearized model in order to infer or predict[86]. In case of a panel data analysis using a linear regression model, it is necessary, *inter alia*, to address the following main elements: i) linearity of the relationship between dependent and independent variables; ii) multicollinearity between independent variables; iii) homoscedasticity (constant variance) of the errors; iv) normality of the error distribution.

In the following, “sanity checks” of the proposed linear model have been addressed analysing the residual output of the model before addressing the relevance of variables that better explain observed WACC values.

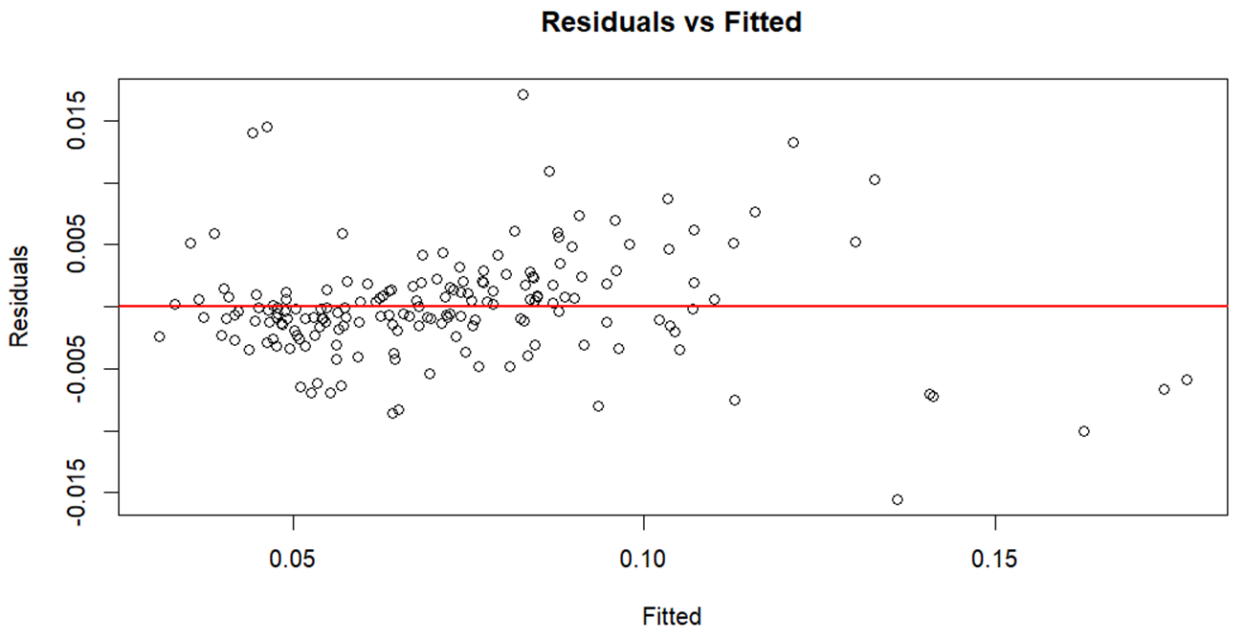
Linearity

A first verification of the validity of the linear approximation is to detect if some path can be identified in the residual plot (y-axis) with respect to the expected values (x-axis). Points should be distributed symmetrically around a horizontal line in relation to an intercept equal to zero. Different trends indicate at first point the presence of some non-linearity in

[85] The parameters have been analysed not including adjustment not attributed to single parameters.
[86] “Statistics for business and economics” Heinz Kohler 1994.

the model (Figure 59)[87]. The assumption that the average error E(ε) is zero everywhere implies that the regression surface accurately reflects the dependency of Y on the X's.

Figure 58 - Linear approximation

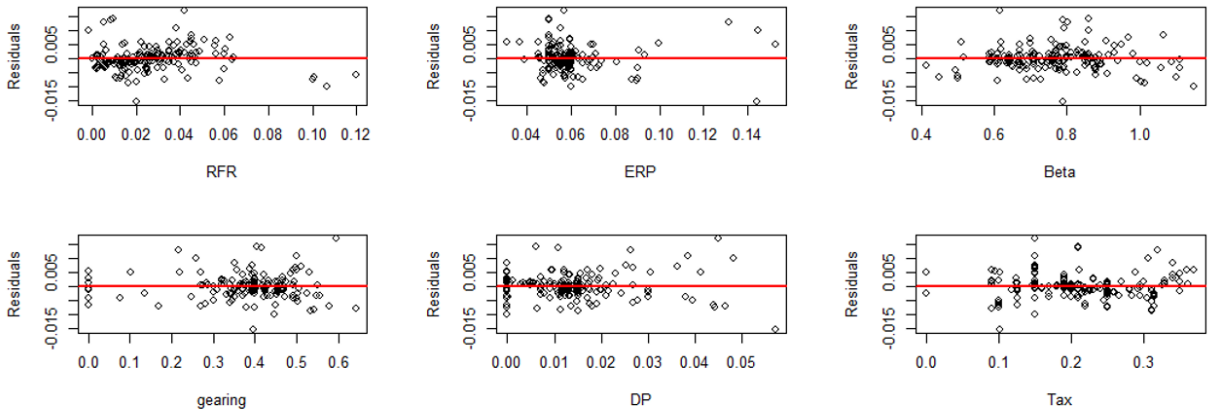


Source: BEREC RA database 2025

Moreover, a deeper analysis on each regressor should be considered plotting the residual previously represented with each independent variable. Also, in this case non-linear effects could be detected when paths deviate from the "random" shape (visible in the residual plots).

[87] The residual of an observed value is the difference between the observed value and the estimated value of the quantity of interest.

Figure 59 - Non-linear effects



Source: BEREC RA database 2025

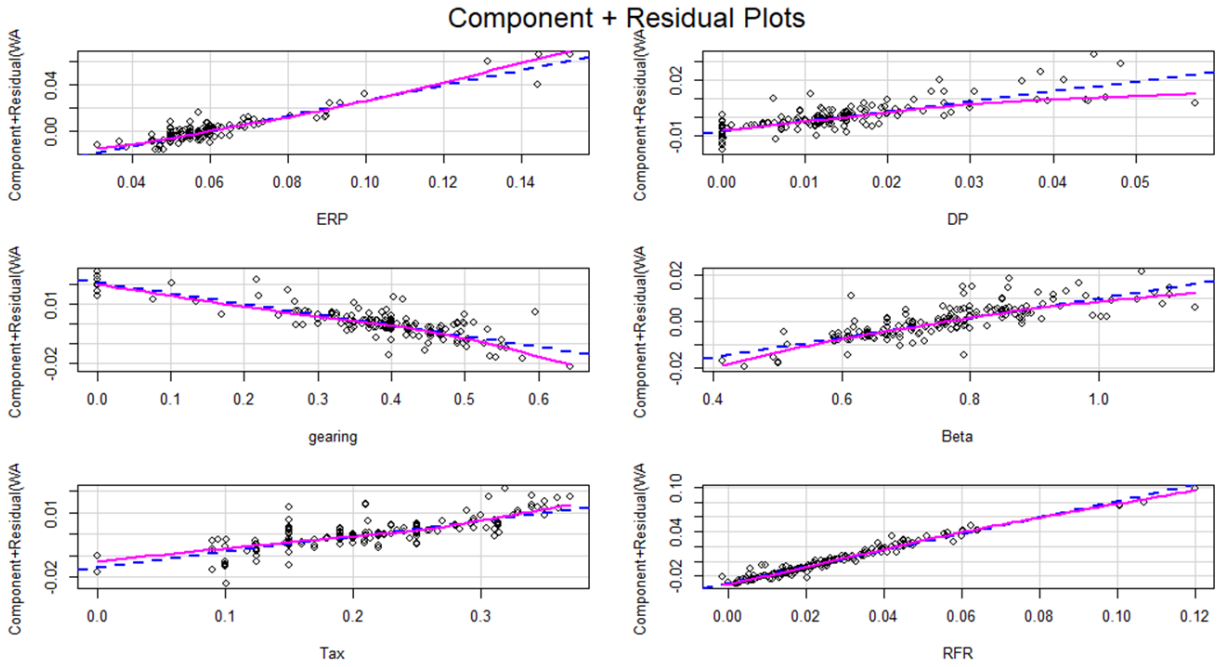
Another relevant measure to detect non-linearity in the model is provided through the use of the partial residual plot[88] (Figure 61), which, in case of multiple regression, shows the relationship between a given independent variable and the response variable, given that other independent variables are also in the model. Since in our case the dependent variable depends on six main parameters, the use of a partial residual plot is therefore more correct than simple single-variables scatter plots[89] (correlation measure).

In Figure 59 a nonparametric fitting (pink line) helps to assess whether the linear trend adequately captures the partial relationship between Y and X. The partial residual plot (blue line) highlights that linear approximation is good for each parameter.

[88] Partial residual plot includes E_ij=(residual_i + beta_j*x_ij) vs x_ij. This simply adds the linear component of the partial regression between Y and x_i (which may be characterised by a nonlinear component) to the least squares residuals. The "partial residuals" E(j) are plotted versus Xj, meaning that beta_j is the slope of the simple regression of E(j) on X_j. Through this plot both monotone and non-monotone non linearity can be detected.

[89] Regressing each independent variable with the dependent variable like a bi-variate model.

Figure 60 - Nonparametric fitting



Source: BEREC RA database 2025

Normality, multicollinearity, homoscedasticity

In Figure 62 summarised statistics are provided showing that all regressors are statistically significant with an adjusted R squared of 0.97. Moreover, the standard variance inflation factor (VIF) shows no multicollinearity among variables, thus further validating the model. We show hence (i) the residual graph against theoretical values, which looks completely casual, thus not revealing the existence of a residual systemic dependence among variables (already shown in Figure 59); (ii) the normal Q-Q plot of the standardised residues, which graphically verifies the assumption of normality of the erratic component of the linear model; (iii) the chart of square roots of standardised residues against theoretical values, and (iv) the graph of Cook distances, which let us identify three observations as possible outliers.

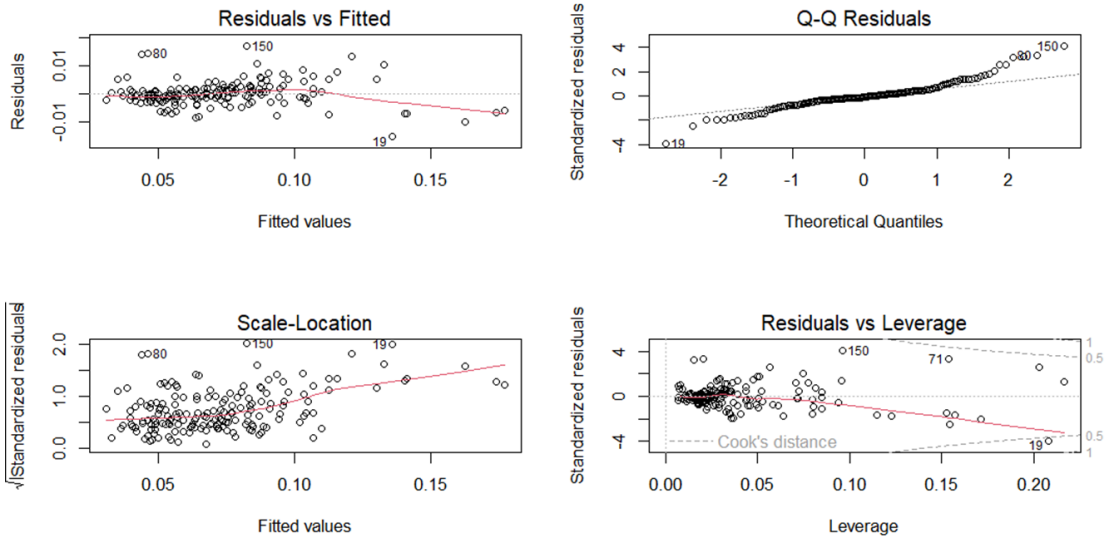
Figure 61 - Nominal panel data statistics

MODEL INFO:
Observations: 178
Dependent Variable: WACC
Type: OLS linear regression

MODEL FIT:
$F(6,171) = 1035.21$, $p = 0.00$
$R^2 = 0.97$
Adj. $R^2 = 0.97$

Standard errors:OLS

	Est.	S.E.	t val.	p	VIF
(Intercept)	-0.03	0.00	-11.32	0.00	
ERP	0.65	0.02	26.27	0.00	1.46
DP	0.54	0.04	14.43	0.00	1.38
gearing	-0.05	0.00	-16.25	0.00	1.42
Beta	0.04	0.00	16.19	0.00	1.17
Tax	0.07	0.00	14.80	0.00	1.26
RFR	1.11	0.02	60.40	0.00	1.19



Source: BEREC RA database 2025

We hence show the same model without 10 possible outlier observations, by still finding similar results, as shown in Figure 63, where the quality of fitting and the correlation between variable are reduced.[90]

[90] Global test and Breush-Pagan test have been carried out with a result to discard the null Hypothesis of Non linearity, Skewness, Kurtosis, Kind of Model (categorical/continuous), Heteroscedasticity.

Figure 62 - Nominal statistics without outliers

MODEL INFO:
Observations: 168
Dependent Variable: WACC
Type: OLS linear regression

MODEL FIT:
$F(6,161) = 1610.95$, $p = 0.00$
$R^2 = 0.98$
Adj. $R^2 = 0.98$

Standard errors:OLS

	Est.	S.E.	t val.	p	VIF
(Intercept)	-0.03	0.00	-11.80	0.00	
ERP	0.61	0.03	23.59	0.00	1.18
DP	0.45	0.03	15.01	0.00	1.21
gearing	-0.05	0.00	-22.56	0.00	1.39
Beta	0.04	0.00	22.00	0.00	1.17
Tax	0.07	0.00	19.53	0.00	1.30
RFR	1.16	0.01	79.00	0.00	1.18

Source: BEREC RA database 2025

Figure 64 shows the contribution to the increase in R-squared that each parameter produces when it is added to a model that already contains all of the other variables. Specifically, we include all N-1 variables in the model and we evaluate how well they fit in the model, like in a Backward elimination selection rule in a stepwise regression, and comparing the results with the Model specified with the N independent variable.

Since the change in R-squared analysis considers each variable as the last one entered into the model, the change represents the percentage of the variance one single variable explains that the other variables in the model cannot explain. In other words, this change in adjusted R-squared represents the amount of *unique* variance that each variable explains above and beyond the other variables in the model. We further estimate the Akaike Information Criterion,[91] comparing the value obtained with a model with N independent variables and the values obtained with models composed by N-1 variables. This analysis confirms what the R-square analysis already highlighted, in terms of relevance of the parameters and provides that no model overfitting problem comes out. In figure 64 we report statistics from the three analyses done, when all the observations are taken into account (n=178),[92] when possible 10 “outliers” have been deleted (n=168), when only EU members are included (n=136).

[91] The Akaike information criterion (AIC) is a measure of the relative quality of statistical models for a given set of data. Given a collection of models for the data, AIC estimates the quality of each model, relative to each of the other models. Hence, AIC provides a means for model selection. Given a set of candidate models for the data, the preferred model is the one with the minimum AIC value. AIC rewards goodness of fit (as assessed by the likelihood function), but it also includes a penalty that is an increasing function of the number of estimated parameters. The penalty discourages overfitting, because increasing the number of parameters in the model almost always improves the goodness of the fit.

[92] The RA database benefit of 182 observations (Table 1). The last value for 2022 and 2023 -2024 of IE has not been included as it is not derived by a formula, but from an adjustment to the cost of equity and debt on the one in 2020 estimation that has been already included. DK as for the previous numerical statistics has not being included as it is a value only for internal use.

Figure 63 - WACC Nominal pre-tax R^2 adjusted variations / AIC variations (full time series analysis)

Number of observation : 178	Total	RFR	ERP	Tax	gearing	beta	CD
R^2Adj	97.23%	58.80%	11.11%	3.52%	4.25%	4.21%	3.35%
AIC	-1926.01	-550.87	-285.73	-144.77	-164.24	-163.46	-139.83
Number of observation : 168	Total	RFR	ERP	Tax	gearing	beta	CD
R^2Adj	98.30%	65.46%	5.83%	3.99%	5.33%	5.06%	2.35%
AIC	-1933.66	-616.73	-249.06	-202.06	-237.5	-231.12	-145.01
Number of observation EU NRAs: 136	Total	RFR	ERP	Tax	gearing	beta	CD
R^2Adj	98.33%	72.45%	8.74%	5.90%	6.81%	7.36%	2.20%
AIC	-1611.64	-514.9	-248	-204.64	-220.06	-228.67	-113.24

Source: BEREC RA database 2025

The main conclusion prevails that most of the variability is explained by the RFR estimation and, to a lesser extent, by the ERP estimation. Looking at only EU member state countries, ERP is more relevant to understand the causality variation of the final WACC value even though it has a lower weight over the years. The relevance of other parameters has grown in comparison to the weight of ERP that has remained more stable, due to the fact that by applying the Notice the NRAs ERPs are no longer differentiated. All other parameters provide a much lower statistically significant explanation, beta continues to becoming more relevant with the new introduced observation; this can be seen by the fact that contrary to the past the new updated values are going to be different from the past, due to increased differences in the level of risk in the telecom sector with respect to the other sectors as already discussed in previous chapter.

In the sample there are some NRAs that update the WACC every year and others updating it only every market analysis. The outlined differences in the frequency of WACC estimation may produce an unbalanced sample that over/under-represents some countries in a way that can bias the estimation (intrinsic selection bias[93]). In fact, even if we have considered that each WACC estimation is an independent observation, some parameters can be linked to country specificities, producing a selection bias problem. Such consideration is useful for taking into account the temporal dimension in a more effective way. We have repeated the previous analysis limiting the number of estimations for each NRA to the three more recent observations. From this sample we

[93] The Selection bias is the bias introduced by the selection of individuals, groups or data for analysis in such a way that proper randomization is not achieved, thereby ensuring that the sample obtained is not representative of the population intended to be analysed. It is sometimes referred to as the selection effect. Selection bias may lead to the distortion of a statistical analysis, resulting from the method of collecting samples. If the selection bias is not taken into account, then some conclusions of the study may be false.

observe that beta is slightly more explanatory with respect to gearing when also considering older estimations, but it is relevant to observe that ERP has become less relevant for explaining differences between WACC values applied by NRAs. Tax, which is a country parameter, not under NRAs control, has become more relevant in explaining differences with respect to ERP over time. These results confirm the fact that by taking into account more recent data ERP is already less relevant in explaining differences between NRAs WACC in line with a notional approach to estimation. At the same time beta is becoming more relevant for explaining the difference in WACC values between NRAs due to asynchronous update of the parameter and due to the fact that contrary to the past the variation of this parameter is more pronounced than in past years.

Figure 64 - WACC Nominal pre-tax R^2 adjusted variations / AIC variations (reduced time series analysis)

Number of observation : 90 observations	Total	RFR	ERP	Tax	gearing	beta	CD
R^2Adj	98.21%	68.78%	2.76%	5.23%	5.62%	9.71%	4.25%
AIC	-1074.18	-329.6	-82.86	-121.94	-126.74	-166.31	-108.39
Number of observation : 71	Total	RFR	ERP	Tax	gearing	beta	CD
R^2Adj	98.97%	71.20%	3.06%	7.53%	6.61%	13.05%	2.61%
AIC	-898	-300.56	-96.75	-149.12	-141.1	-184.44	-88.42

Source: BEREC RA database 2025