NERA
ECONOMIC CONSULTING

Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period

A report for daa plc

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CONFIDENTIALITY

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Executive Summary

NERA Economic Consulting (NERA) were commissioned by daa to review the Commission for Aviation Regulation (CAR's) Draft Decision on the cost of capital for Dublin Airport. This interim price control is expected to set charges for the period 2023-26. In this report, we set out our response to CAR's proposed approach and an updated cost of capital estimate for Dublin Airport, drawing on our earlier April 2022 report for daa.

We estimate a higher pre-tax cost of capital principally because CAR's beta fails to reflect Dublin Airport's risk

A key issue for the interim review is how to reflect the consequences of pandemic risk on Dublin Airport's beta. In line with our earlier April 2022 report, we have set out two possible approaches. Table 1 shows our pre-tax real cost of capital estimate for Dublin Airport of **5.9 to 6.7 per cent**, drawing on current market evidence for beta risk. Alternatively, we estimate a lower cost of capital of **5.3 to 6.2 per cent** where we draw on our estimate of Dublin Airport's pre-COVID beta of 0.6 and make an explicit upward adjustment for pandemic event risk of 0.02 to 0.11, based on UK CAA's approach for London Heathrow at its recent price control.

Our estimated cost of capital is higher than CAR's 2022 Draft Determination of 4.22 per cent, mainly because CAR's asset beta estimate fails to reflect Dublin Airport risk, including COVID risk.

Table 1: 1) Based on Current Betas, We Estimate Cost of Capital of 5.9 to 6.7 per cent; 2) Based on Pre-COVID beta of 0.6+ uplift, Estimated Range is 5.3 to 6.2 per cent

Parameter	CAR 2022	Approach 1: Current beta estimates		Approach 2: Pre-COVID beta 0.6+ uplift (0.02-0.11)	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
Gearing	50%	50%	50%	50%	50%
Risk Free Rate	-1.07%	-0.07%	0.30%	-0.07%	0.30%
Total Market Return	6.25%	6.75%	7.00%	6.75%	7.00%
Equity Risk Premium	7.32%	6.82%	6.70%	6.82%	6.70%
Asset Beta	0.56	0.70	0.78	0.62	0.71
Equity Beta	1.05	1.40	1.56	1.24	1.42
Cost of equity (after tax)	6.60%	9.48%	10.75%	8.39%	9.81%
Cost of debt (pre - tax)	-0.10%	-0.08%	0.14%	-0.08%	0.14%
Pre-tax WACC (before aiming up)	**3.72%**	**5.38%**	**6.21%**	**4.76%**	**5.68%**
Aiming up	0.50%	0.50%	0.50%	0.50%	0.50%
Pre-tax WACC (post aiming up)	**4.22%**	**5.88%**	**6.71%**	**5.26%**	**6.18%**

Note: Approaches to beta: 1) Use most recent estimates of asset betas, with no adjustment or weight given to solely pre-COVID estimates. We rely on a 12.5 per cent tax rate. 2) Based on the CAA's estimate of pandemic beta uplift (0.02 to 0.11), and our estimate of Dublin Airport's pre-pandemic asset beta of at least 0.6
Source: NERA analysis; CAR (22 July 2022), Draft Decision on an Interim Review of the 2019 Determination in relation to 2023-2026, Table 10.2.

Beta risk: SE approach relies on ill-suited comparators and ignores Covid risk

As per its 2019 price review, to estimate Dublin Airport's asset beta SE relies on empirical evidence for 9 listed airports and regulatory decisions for unlisted airports, and applies some weight to all of these observations. A key change from its 2019 review is that SE removes 2020 data to avoid capturing any effects of the COVID-19 pandemic.

Overall, SE derives an asset beta range of 0.52 (pre-pandemic average) to 0.59 (post pandemic average), and proposes a point estimate of 0.56.

SE's weighting approach to beta risk is not in line with economic theory

SE's approach of weighting the beta datapoints for various airports based on numerous risk factors (e.g. "business structure" and "demand structure") is not in line with either economic principles or regulatory practice. As discussed in our April 2022 report, the comparative risk assessment should be based principally on whether the regulatory regime is a multi-annual incentive-based regime, i.e. where the regulated entity faces demand and cost risks between regulatory resets, as per Dublin Airport. The key factor in determining the demand risk is the length of the regulatory period and the form of regulation. Other risk factors – such as the composition of demand – are secondary. For example, if the airport does not face demand/cost risk, then the composition of demand is also irrelevant. In contrast to SE's

approach, we identify AdP, Auckland, AENA and Zurich as operating under multi-annual incentive based controls, and therefore the principal comparators.[1]

CAR/SE's reasons for not placing greater reliance on AENA and ADP are incorrect

SE objects to placing substantial weight on AENA and ADP because of their greater size compared to Dublin and their ownership of a portfolio of airports. SE also identifies differences in the regulatory regimes.

We disagree with SE's reasons for not focusing on AENA and ADP. To the extent that AENA or ADP's greater size is a beta risk factor, it is likely that their greater size means that they display lower beta risk than Dublin Airport and therefore understate Dublin's beta. In terms of these two comparators owning a portfolio of airports, we calculate that around 80 per cent and 90 per cent of revenues for ADP and AENA respectively are generated from their principal domestic hubs, so their smaller airports have minimal weighting in the composite group betas. Also, the smaller airports may provide some diversification benefits that place downward pressure on the group betas, meaning the overall impact of the additional airport holdings is unclear. Finally, whilst there are differences in AENA and ADP regulatory regimes, these differences are minor relative to the substantive differences in the regulatory regimes for the wider set of comparators identified by SE.

We focus on three airports which operate under similar risk regimes consistent with regulatory practice

Our approach of focusing on airports that operate under a multi-year regulatory framework as the primary risk, and a set of three comparators instead of CAR's wider set, is consistent with CAA's Final Proposals for Heathrow Airport at H7. In its recent decision, CAA determined HAL's beta principally based on the beta for AENA, as the closest comparator in terms of regulatory regime.

SE claims that its large sample helps address the influence of outliers. However, SE approach of placing weight on all listed airports has the effect of including airports which are not comparable to Dublin, and understating Dublin's beta risk. SE provides no evidence that our estimates are affected by outlying observations. Indeed, there is broad consistency in our comparator beta estimates.

SE is wrong to exclude pandemic period from beta estimates – airport betas have increased during and since the pandemic

SE excludes the pandemic period from its data estimation as it considers events similar to COVID-19 are sufficiently rare to not be included in the estimation of beta, and that the impact of COVID-19 on Dublin Airport's asset beta to be low.

We show that SE is wrong to conclude that the impact of the pandemic on beta risk is negligible; as shown in Figure 1, there was an increase in beta from around 0.55 to 0.75 across the wider airport sector during the pandemic period, and the betas are yet to return to pre-pandemic levels. We also show that Dublin Airport has faced greater peak-to-trough

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[1]   As we note above in this section, however, we do not include Auckland in our beta estimate for Dublin due to concerns regarding its stock return data. NERA (1 July 2019), Cost of Capital for Dublin Airport for 2019 Determination, Section 2.

reduction in passenger during the COVID-19 pandemic than its comparators, suggesting that it has greater exposure to pandemic type risks than other airports.

Figure 1: Beta increased during the pandemic, and remain higher than pre-pandemic levels
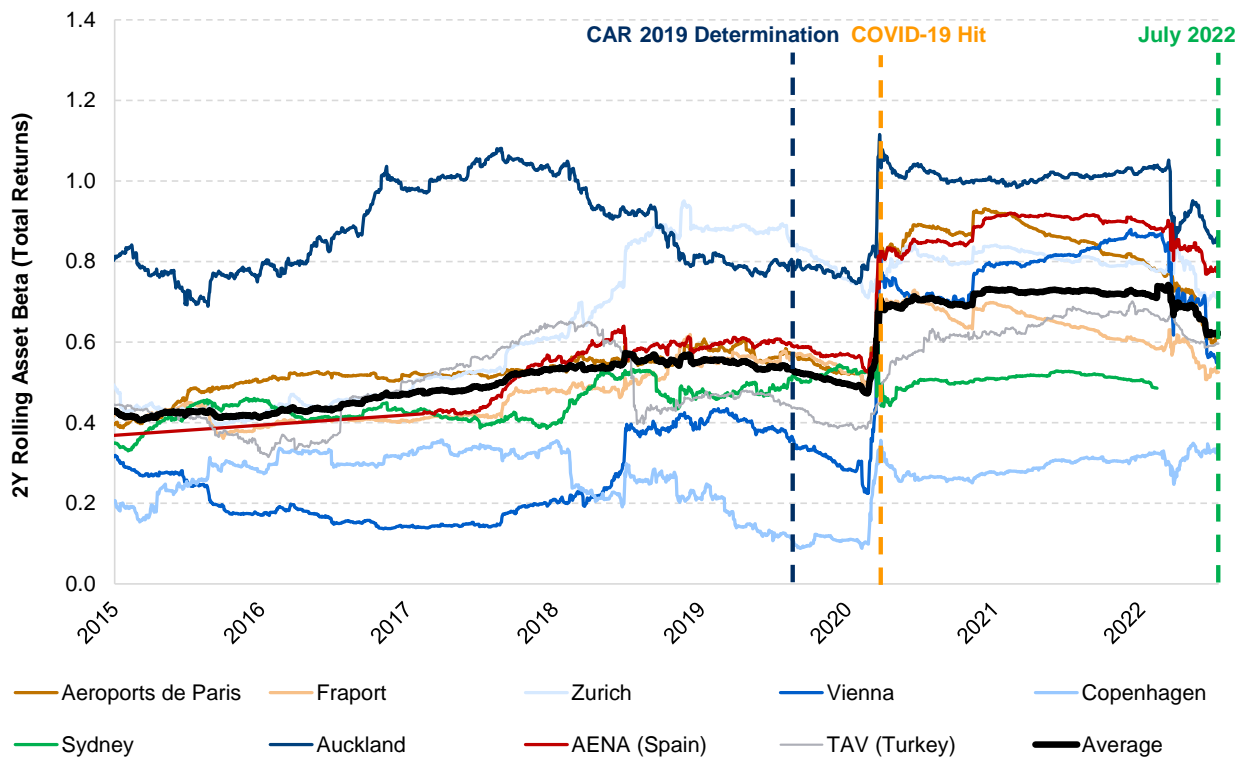
Source: NERA Analysis

Figure 2: Dublin suffered a greater reduction in PAX during pandemic than other airports
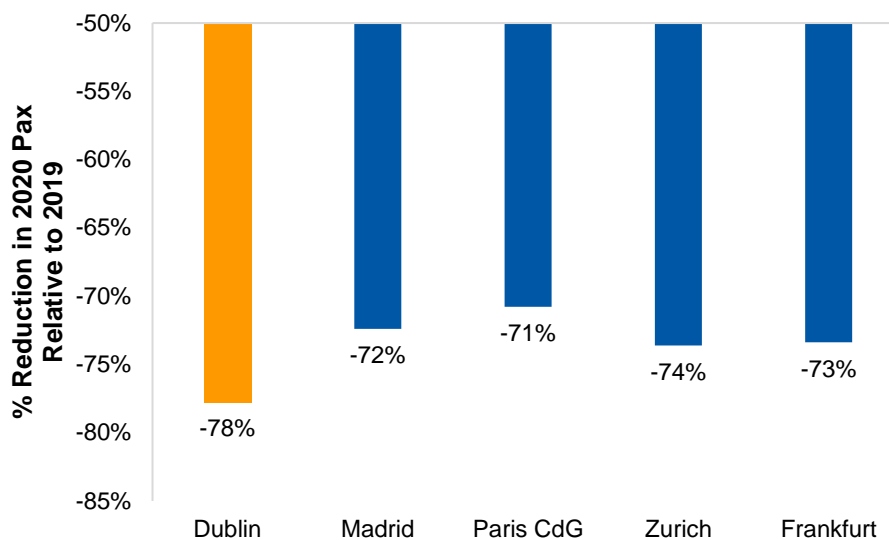
Source: NERA Analysis of Eurostat data.

Comparator Airports also received support during the pandemic, hence their empirical betas are relevant to Dublin

SE also argues that betas that are affected by the pandemic are not relevant to Dublin Airport, given the government and regulatory support provided to Dublin. However, our principal comparators – AENA, ADP and Zurich – also received substantive government support and regulatory resets through the pandemic. This means that the empirical beta estimates of comparators already take into account the risk mitigating effects of government and regulatory support and are relevant to Dublin Airport.

We estimate asset beta drawing on two potential approaches – using current market evidence under approach 1

Under one approach, we draw on current market evidence to estimate beta risk for Dublin Airport. Current market evidence captures a substantive element of the COVID-19 period and therefore pandemic risk. The rationale for using current market estimates is that there is still uncertainty around COVID-19 risks, and investors' perception of risk has changed. Also, Dublin Airport was not compensated for pandemic related risks at previous price controls – relying on pre-pandemic betas would mean these risks were ignored to date and would be ignored in the future as well.

Following this approach, we conclude on an asset beta range of 0.70 to 0.78, based on the average 2-year and 5-year empirical asset beta estimates of close comparators (AENA, AdP and Zurich).

Alternatively, we estimate beta based on pre-COVID beta + CAA pandemic uplift

As an alternative approach, we draw on the CAA's estimate of the enduring impact of the pandemic on beta risk (0.02-0.11), and our estimate of Dublin Airport's pre-pandemic asset beta of at least 0.6, as set out in previous NERA reports. Under this approach, we conclude on an asset beta range of 0.62 to 0.71. Such an approach potentially provides a more enduring approach to estimating Dublin Airport's beta, by drawing on its beta in "normal times" and explicitly accounting for pandemic risk events.

Under both approaches, the increase relative to CAR's beta estimate of 0.56 reflects our use of a focussed comparator set and our inclusion of beta evidence from the pandemic period, which SE wrongly excludes.

TMR: We estimate a (real) TMR range of 6.8 per cent to 7 per cent based on historical long-run evidence.

To estimate TMR, as per our April 2022 report, we rely on historical realised returns and Blume averaging techniques, holding periods of 1 to 5 years (consistent with equity market evidence) and Irish and World markets (given European market sensitivity to outliers). Our updated analysis provides a range of 6.8 to 7 per cent.

Our higher estimate relative to CAR's TMR of 6.25 per cent reflects our preference to rely exclusively on historical realised returns, as opposed to CAR which also relied on dividend growth models (DGM) which involve subjective assumptions, as well as differences in holding periods and our reliance on the wider sample in the world TMR estimates.

RfR: We draw on short-term market data averaged over 1 to 5 years to estimate RFR, as per CAR's approach in 2022

We estimate a (real) RfR range of -0.07 to 0.30 per cent based on: i) 1, 2 and 5-year average of Irish 10-year nominal government bonds; ii) Irish forward rate adjustment based on 10-year yields over 2023-2026; and iii) long-run inflation assumption of 2.1 per cent.

Our range is higher than CAR's 2022 Draft Decision of -1.07 per cent, explained mainly by our use of Irish government bonds compared to SE's use of both Irish and other Eurozone bonds. We disagree with the use of other countries' bonds without an adjustment for Irish country risk.

Cost of debt and gearing: we estimate a weighted average cost of debt of -0.08 to 0.14 per cent

We estimate a (real) cost of debt of -0.08 to 0.14 per cent. Our approach is based on a weighted average of: i) cost of embedded debt of -0.56 per cent; ii) cost of new debt range of 0.92 to 1.36 per cent, based on 1, 2 and 5-year averages of iBoxx non-financials 10-year plus index and a forward rate adjustment as per RfR. Our cost of debt assumes a 2.1 per cent long-run inflation assumption, 26 per cent share of new debt and a 10 to 20bps transaction cost allowance based on UK regulatory precedent.

The main difference with SE relates to its failure to allow for transaction costs on embedded debt, and its use of European country forward rates instead of Irish forward rates for new debt costs.

We estimate a gearing of 50 per cent, consistent with CAR's 2022 Draft Decision.

Aiming up: **We estimate an aiming up of 50 bps, consistent with 2022 Draft Decision**

Overall, we show that there is no substantive change in regulators' approaches to aiming-up between CAR's 2019 Determination and its 2022 Draft Decision, based on recent Irish and UK precedent. While Dublin Airport now faces greater beta risk and consequently increased cash-flow risk from future pandemic events, there is a stronger case for an increase in aiming-up (i.e. above CAR's original determination of 50 bps in 2019) to provide support in downside scenarios and given uncertainty in beta risk. Despite the increased risk, we have retained CAR's estimate of 50 bps.

1. Introduction

NERA Economic Consulting (NERA) were commissioned by daa to estimate the cost of capital for Dublin Airport to inform daa's submission to the Commission for Aviation Regulation (CAR) at the 2022 third interim review of the 2019 price control determination, which will set charges for the period 2023-26.

In its July 2022 Draft Decision, CAR commissioned a report from Swiss Economics (SE) to estimate the cost of capital for Dublin Airport.[2] SE had originally prepared a report on the cost of capital for Dublin Airport in September 2019.[3]

In this report, we respond to CAR/SE's approach to the estimation of Dublin Airport's cost of capital as set out in the Draft Decision. In addition, we update out our estimates for Dublin Airport's WACC under our preferred approach, drawing on our previous reports for daa in 2019 and April 2022.

This report is structured as follows.

- Section 2 sets out our review of SE's approach to estimating Dublin Airport's cost of equity, and our approach and estimate;

- Section 3 sets out our review of SE's approach to estimating Dublin Airport's cost of debt and gearing, and our approach and estimate;

- Section 4 sets out our conclusion on the overall cost of capital for Dublin Airport, as well as our approach to aiming up.

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[2]   CAR (22 July 2022), Draft Decision on an Interim Review of the 2019 Determination in relation to 2023-2026, para 1.32.

[3]   CAR (22 July 2022), Draft Decision on an Interim Review of the 2019 Determination in relation to 2023-2026, para 10.2.

2. Cost of Equity

In the 2019 review SE followed the established approach of estimating the cost of equity using the Capital Asset Pricing Model (CAPM), and estimating the total market return (TMR) and risk-free rate (RFR) directly, deriving the equity risk premium (ERP) as the residual (i.e. ERP = TMR – RFR). The measure of beta risk is based on estimates of listed and unlisted comparators and a weighting scheme derived by SE. CAR/SE has retained this framework for its interim review of the 2019 Determination and we have also adopted the same framework.

In this section, we start by summarising CAR/SE's approach to estimating the cost of equity as per the 2022 Draft Decision. We summarise our concerns with this approach which we have outlined in past submissions to CAR. We then show how parameters have evolved since the 2019 review and provide an updated estimate of the cost of equity.

We describe our respective approaches to the estimation of each parameter in turn below.

2.1. Beta

2.1.1. Summary of 2022 CAR/SE Decision

CAR/SE's 2022 beta approach is broadly in line with their methodology in 2019, which we describe in our April 2022 report.[4] However, one key change is that SE removes 2020 data to avoid capturing the effects of the COVID-19 pandemic – in particular, SE calculates betas based on:[5]

▪ Pre-pandemic data (i.e. until the end of 2019); and

▪ Post-pandemic data (i.e. from the beginning of 2021).

Otherwise, as per its 2019 price review, to estimate Dublin Airport's asset beta, SE continues to rely on empirical evidence for 9 listed airports and regulatory decisions for unlisted airports. For listed airport betas, SE estimates 1-year daily, 2-year daily and 5-year weekly betas against a European index (except for Auckland, Sydney and Turkish airports which are estimated based on the respective local indices) and uses the Hamada formula based on the market value of debt to unlever the equity betas and re-lever them to derive Dublin Airport's asset beta.[6]

To take account of distortions caused by the COVID-19 pandemic, SE estimates a "Non-Pandemic" beta by excluding all observations from 2020 in its analysis, stating that co-movements between airports and stock indices had normalised by the end of 2020.[7] SE does not add an uplift to reflect the possibility of future events similar to COVID-19, as SE considers that:[8]

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[4]   NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, section 2.1.1.

[5]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, p.21.

[6]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, pp.21–23.

[7]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, p.21.

[8]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, pp.21-22.

- government and regulators' measures to remedy the impact of COVID reduces uncertainty in the financial markets regarding future catastrophic events.

- events similar to COVID-19 are sufficiently rare to not be included in the estimation of beta.

- the impact of COVID-19 on Dublin Airport's asset beta to be low (0-0.04).

In deciding which are the most relevant comparators, SE uses a weighting scheme that assigns scores to each comparator based on their comparability to Dublin Airport for three risk categories (regulatory environment, demand structure and business structure), in line with their 2019 approach.[9] SE then concludes on a weighted average asset beta range of 0.52 to 0.59 and proposes a point estimate of 0.56.

Figure 2.1: In forming beta range, SE excludes pandemic period and places some weight on all airports, irrespective of risk profile

Airport	1 year / daily data pre-pandemic	2 years / daily data pre-pandemic	5 years / weekly data pre-pandemic	1 year / daily data post-pandemic	Weight
Aena (Spain)	0.60	0.60	0.52	0.74	7.7%
Aéroports de Paris	0.57	0.56	0.61	0.49	5.8%
Aeroporti di Roma	0.57	0.57	0.57	0.57	9.6%
Auckland Airport	0.79	0.86	1.00	0.85	11.5%
Copenhagen Airport	0.12	0.11	0.44	0.44	5.8%
Fraport (Frankfurt)	0.58	0.56	0.55	0.47	5.8%
London Gatwick Airport	0.52	0.52	0.52	0.52	11.5%
London Heathrow Airport	0.47	0.47	0.47	0.59	11.5%
Sydney Airport	0.71	0.59	0.42	0.50	9.6%
TAV (Turkey)	0.41	0.44	0.50	0.54	7.7%
Vienna Airport	0.09	0.31	0.25	0.66	7.7%
Zurich Airport	0.61	0.77	0.53	0.64	5.8%
Weighted Asset Beta	**0.52**	**0.54**	**0.54**	**0.59**	

Source: SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, p.29

CAR adopts the 0.56 asset beta proposed by SE in its final determination, an increase of 0.06 from its 2019 determination of 0.5 in 2019[10] but a decrease of 0.04 from its 2014 determination of 0.6.[11] CAR argues that the methodology used by SE results in an equity beta above Thessaloniki forum recommendations and the economy-wide beta.[12]

2.1.2.   Criticisms of CAR/SE's 2022 Draft Decision

In this section we set out two main areas of criticism of the CAR/SE approach to estimating Dublin Airport's beta, namely that:

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[9]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, pp.27–29.

[10]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, pp.30.

[11]   CAR (22 July 2022) Draft Decision on an Interim Review of the 2019 Determination in relation to 2023 to 2026, para 10.19.

[12]   CAR (22 July 2022) Draft Decision on an Interim Review of the 2019 Determination in relation to 2023 to 2026, para 10.71.

- SE's comparator set incorporates lower risk airports, and as consequence understates Dublin Airport's beta; and

- CAR and SE incorrectly fail to provide an uplift to their "non-pandemic" beta estimate.

2.1.2.1. SE's comparator set includes lower risk airports

SE's weighting approach is not in line with economic theory

SE's approach of weighting the beta datapoints for various airports based on numerous risk factors (e.g. "business structure" and "demand structure") is not in line with either economic principles or regulatory practice. As discussed in our April 2022 report, the comparative risk assessment should be based principally on whether the regulatory regime is a multi-annual incentive-based regime, i.e. where the regulated entity faces demand and cost risks between regulatory resets. The key factor in determining the demand risk is the length of the regulatory period and the form of regulation. Other risk factors – such as the composition of demand – are secondary. Simply, if the airport does not face demand/cost risk, then the composition of demand is also irrelevant. We identify AdP, Auckland, AENA and Zurich as operating under multi-annual incentive based controls, and therefore the principal comparators.[13]

As a consequence, we do not agree with the majority of comparators chosen by SE in in its estimate of Dublin Airport's beta. In particular, as we set out in our previous reports for DAA:[14]

- Sydney is not subject to any formal price control, and is not located in the European market, making it a poor comparator for Dublin.

- Vienna operates on a one-year price control regime, which is lower risk and not comparable to Dublin's multi-year framework.

- Fraport's price control framework exhibits flexibility regarding the length of the control period, making it lower risk than Dublin's 4-year price control.

In addition, Copenhagen and Auckland have unreliable total return data – only 1 per cent of Copenhagen airport's shares are listed, while Auckland trades on the poorly – diversified NZX exchange (of which Auckland itself makes of 6 per cent of total market value). Both airports also exhibit higher illiquidity than other listed comparators, as their share prices exhibit a bid-ask spread of 1 per cent or more (see Appendix A).

We also believe that SE should not place weight on asset betas for unlisted comparators based on regulatory determinations (e.g. for Heathrow itself), as these regulatory beta decisions are not directly based on market evidence but instead rely themselves on a comparator set, and reflect the regulators' view of the relative risk. Heathrow Airport also benefits from substantive and new traffic sharing arrangement, and where CAA has made a material downwards revision to the beta estimate – see section 2.1.3.1.

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[13] As we note above in this section, however, we do not include Auckland in our beta estimate for Dublin due to concerns regarding its stock return data. NERA (1 July 2019), Cost of Capital for Dublin Airport for 2019 Determination, Section 2.

[14] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, pp.13-14 and p.17.

The betas are also determined by the regulator based on a specific information cut-off date and often dated; e.g. the decision for Gatwick is from 2014

CAR/SE's reasons for not placing greater reliance on AENA and ADP are incorrect

We understand that CAR and SE object to a small comparator set that places substantial weight on AENA and ADP. In particular, they express concerns regarding:[15]

i)   AENA and ADP's greater size compared to Dublin

ii)   AENA and ADP ownership of portfolios of airports, which CAR and SE state may provide diversification benefits.

iii)   There are differences in the regulatory regimes.

We do not believe that AENA's or ADP's greater size is a beta risk factor. To the extent it is, it is likely that AENA and ADP greater size means that they display lower beta risk than Dublin Airport and therefore their empirical betas understate Dublin Airport's risk.

In terms of these two comparators owning a portfolio of airports, we note that the CAA has considered this issue and has noted that the directional impact on beta risk is uncertain. The CAA noted that, while the presence of smaller and riskier airports in the portfolio may increase beta risk, the smaller airports may provide some diversification benefits that place downward pressure on the company beta, meaning the overall impact of the additional airport holdings is not clear.[16]

CAA also sets out that the majority of activity for these two companies is derived from their main domestic airport. We agree with this finding. As shown in Table 2.1 and Table 2.2, around 80 per cent and 90 per cent of revenues for ADP and AENA respectively are generated from their domestic markets.

Table 2.1: ADP Paris revenue as a percentage of total revenue, 2017-2021

	2017	2018	2019	2020	2021
Paris Airport Revenue (EURm)	2,974.0	2,721.0	3,662.0	1,785.0	2,131.0
Total Revenue (EURm)	3,665.0	3,683.0	4,741.0	2,232.0	2,866.0
Paris Revenue as % of total	81.1%	73.9%	77.2%	80.0%	74.4%

Source: NERA analysis based on FactSet data.

Table 2.2: AENA Spain revenue as a percentage of total revenue, 2017-2021

	2017	2018	2019	2020	2021
Spain Airport Revenue (EURm)	3,687.8	3,898.4	4,080.9	2,019.1	2,121.8
Total Revenue (EURm)	3,960.6	4,296.5	4,483.2	2,217.4	2,354.3
Spain Revenue as % of total	93.1%	90.7%	91.0%	91.1%	90.1%

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15   CAR (22 July 2022), Draft Decision on an Interim Review of the 2019 Determination in relation to 2023-2026, para 10.68.

16   CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.67.

Note: AENA does not report its Madrid airport revenue separately to other airports in Spain.
Source: NERA analysis based on FactSet data.

SE also identify differences in the regulatory regime between Dublin Airport and AENA and ADP which SE claims means that we should widen the comparator set.[17] Whilst there are differences, AENA and ADP's incentive based regulatory frameworks are the closest to Dublin Airport's own incentive based regime. Our conclusion on comparability of regulatory regimes is consistent with CAA approach to Heathrow airport, and SE itself in a report for the French regulator, as described below. In any case, including airports such as Vienna and Sydney that do not operate under incentive based regimes does not improve comparability.

In addition to ADP and AENA, we also include Zurich in our comparator analysis consistent with the CAA's use of Zurich for Heathrow and SE's own approach in separate report for French Airport regulator (ART), as we describe below.

We focus on three airports which operate under similar risk regimes consistent with regulatory practice

Our approach of focusing on airports that operate under a multi-year regulatory framework as the primary risk, and a set of three comparators instead of CAR's wide set, is consistent with CAA's Final Proposals for H7. In its recent decision, CAA determined HAL's beta based on the beta for AENA, as this operates under a multi-year incentive based framework, and in addition CAA makes reference to the average beta for four close comparators with similar regulatory regimes to Heathrow.[18]

SE claims that its large sample helps address the influence of outliers. However, SE approach of placing weight on all listed comparators has the effect of including low risk outliers.

Our determination of the sample set is entirely consistent with regulators' approaches to beta risk. SE provides no evidence that our estimates are affected by outlying observations. Indeed, as we show in Table 2.6, there is broad consistency in our comparator estimates across airports and over time.

SE's approach to identifying comparator set at odds with its approach for French regulator

SE prepared a report for French airport regulator ART in 2020 in which it estimated an airport beta for ADP which aligns with our view that the regulatory framework is the principal risk factor. In its 2020 report for the French airport regulatory ART, SE no longer uses a weighted average beta based on the wide set of comparators. Instead, SE identifies a specific "risk group" to which the target airport belongs to, placing most weight on regulatory framework, as well as limited weight on other secondary factors.[19] SE then calculates a beta estimate for the target airport by assigning equal weight to all airports in the same "risk

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[17]   Swiss Economics (22 January 2020), Assessment of airport characteristics that capture differences in Beta risk, para 5.30.

[18]   CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.151.

[19]   Swiss Economics (22 January 2020), Assessment of airport characteristics that capture differences in Beta risk, Section 3 and Section 4.

group", but no weight to airports from other "risk groups".[20] This is contrary to SE's 2022 approach, where all comparators except one (Copenhagen) received some weight.[21]

Indeed, SE's relative risk analysis identified AENA and Zurich as the closest listed comparators to Dublin Airport, while Heathrow and Gatwick are included as unlisted comparators within the same risk group.[22]

SE therefore appears to have estimated the beta using methods other than its weighted average approach elsewhere, and the general method SE uses in its report for ART is practically identical to our own beta approach.

2.1.2.2.   CAR/SE incorrectly ignores Covid risk

CAR/SE's 2022 beta assessment does not apply an uplift to Dublin Airport's beta to reflect the risk of future events comparable to the COVID-19 pandemic, based on the following reasons:[23]

▪   government and regulators' measures have mitigated the impact of COVID-19 which has reduced uncertainty in the financial markets regarding future catastrophic events.

▪   events similar to COVID-19 are sufficiently rare to not be included in the estimation of beta.

▪   the impact of COVID-19 on Dublin Airport's asset beta to be low (0-0.04).

However, we have a number of concerns with CAR/SE's approach:

▪   Empirical evidence suggests that betas for airports have increased since the pandemic, and are yet to reach pre-pandemic levels;

▪   Dublin Airport has faced greater peak-to-trough reduction in passengers during the COVID-19 pandemic than its comparators, suggesting higher beta risk;

▪   Comparator airports received COVID-19 mitigation measures and have risk sharing mechanisms built into their regulatory framework; and

▪   The risk of future pandemics and events posing similar risks to the airport industry should not be ignored.

Empirical evidence suggests that betas for airports have increased since the pandemic, and are yet to decline to pre-pandemic levels

As set out in Figure 2.2 below, empirical beta estimates for airports increased after COVID-19, implying higher systematic risk. SE is wrong to conclude that the impact of the pandemic on beta risk is negligible; as shown, there was an increase in beta from around 0.55 to 0.75 across the comparator set during the pandemic period, and the betas are yet to return to pre-

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[20]   Swiss Economics (22 January 2020), Assessment of airport characteristics that capture differences in Beta risk, Section 6.

[21]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, Table 15.

[22]   Swiss Economics (22 January 2020), Assessment of airport characteristics that capture differences in Beta risk, Section 4.3 and Section 5.

[23]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, pp.21-22.

pandemic levels. As we set out below, Spanish and UK airport regulators have also allowed for a pandemic uplift to beta estimates.

Figure 2.2: 2Y Rolling Asset Beta for Listed Airport Comparators, 2015-2022
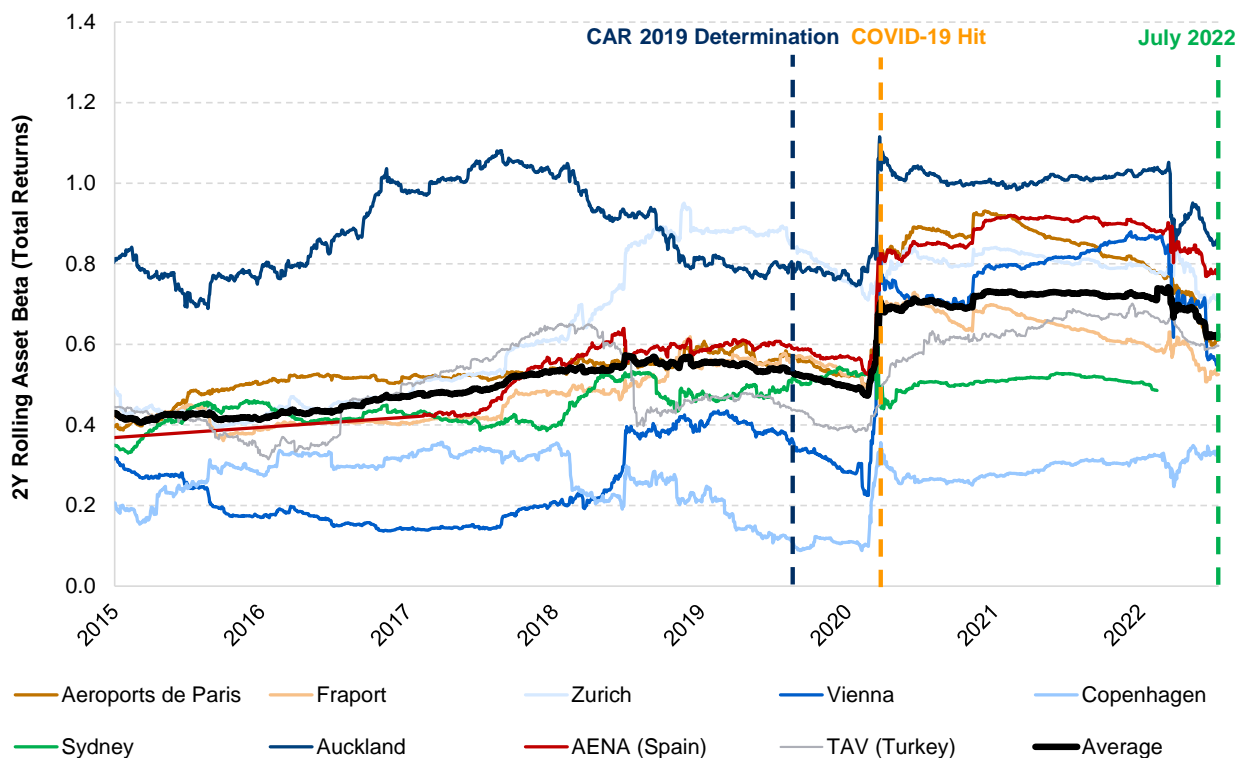
Source: NERA Analysis

DAA has faced greater peak-to-trough reduction in passengers during the COVID-19 pandemic than its comparators, suggesting higher beta risk

As set out in Figure 2.3 below, Dublin suffered a greater reduction in air traffic than its comparators following the COVID-19 pandemic.

Figure 2.3: Dublin Suffered a Greater Reduction in PAX Between 2019-2020 Than Its Closest Beta Comparators
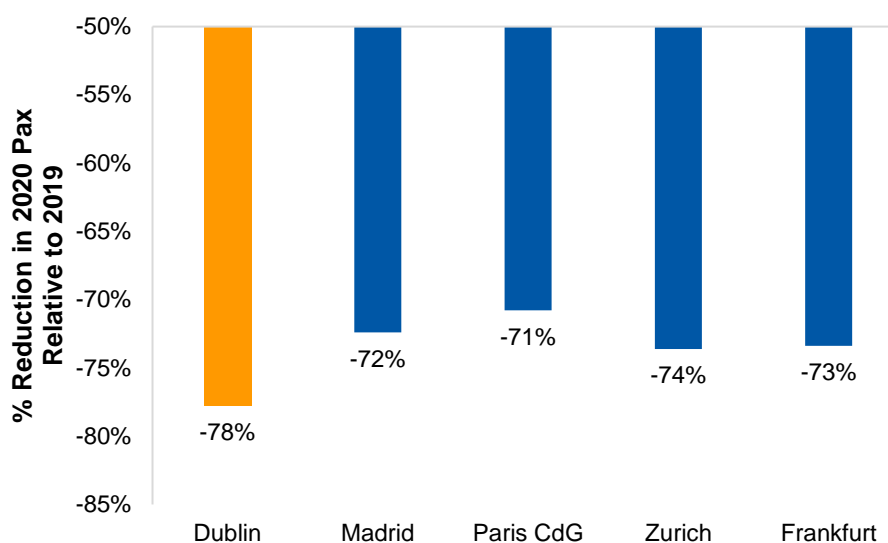
Source: NERA Analysis of Eurostat data.

One explanation for the more severe impact on Dublin compared to its comparators is that DAA has the highest international proportion of passengers compared to other comparators, as set out in Table 2.3 below. Given that international traffic was affected more severely by the pandemic than domestic air traffic (as set out in Figure 2.4), this suggests that Dublin may be more at risk of reduced traffic than its comparators in a future pandemic or similar event.

Table 2.3: Percentage Makeup of Total Flight and Passenger Numbers from International Flights from 2014-2019, with Dublin Having Greatest International Makeup

Airport	% PAX International	% Flights International
Dublin	**99.7%**	**98.5%**
Zurich	97.7%	95.9%
London	93.6%	91.3%
Paris	90.9%	89.5%
Frankfurt	88.8%	85.1%
Madrid	71.6%	66.1%

Source: NERA Analysis of Eurostat data.

Figure 2.4: International vs Domestic PAX Recovery All Comparators in 2019- 2020, International Travel More Affected than Domestic Travel on Average
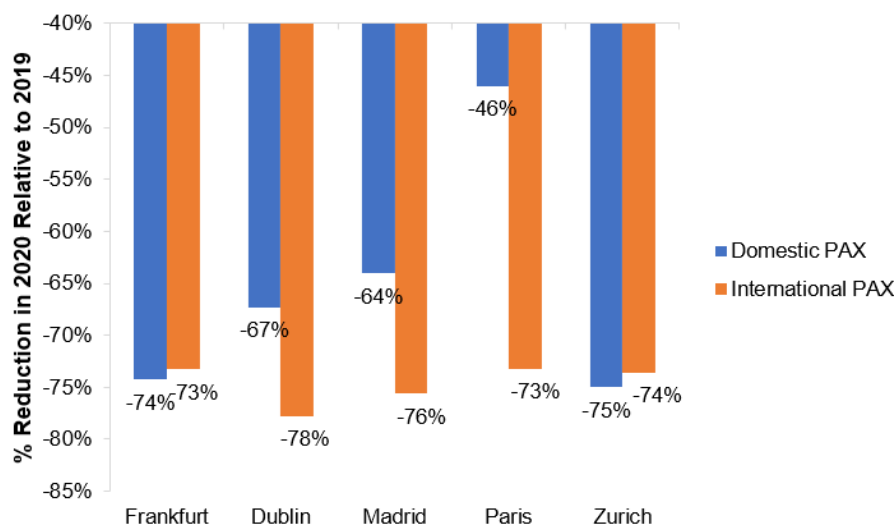
Source: NERA Analysis of Eurostat data.

Both Figure 2.3 and Figure 2.4 show a material decline in passenger numbers relative to 2019 owing to COVID-19, with international passengers impacted more acutely. We therefore find that Dublin Airport shows the greatest sensitivity to these pandemic risks when compared to comparable European airports, and therefore Dublin's beta should reflect an uplift for future pandemic events that is at least as large as the uplifts implied by comparator airports' empirical beta data (which the CAA sets at 0.02-0.11 based on its Final Proposals for H7).[24]

Comparator Airports (AENA, ADP and Zurich) also received government and regulatory support during the pandemic, hence their empirical betas are relevant to Dublin

As a result of the disruption caused by COVID-19, several regulators implemented mitigation measures designed to support airports, either immediately allowing some relief or proposing changes for the next regulatory period designed to compensate the pandemic shortfall.

In Dublin Airport's case, CAR recognised that COVID-19 resulted in "*the most significant downturn ever experienced at Dublin Airport*" and "*If left unchanged, these regulatory settlements would have unintended and disproportionate effects which would run contrary to our statutory objectives*".[25] As a result, CAR conducted (and finalised) two interim reviews aimed at mitigating the impact of COVID-19, taking actions such as: i) removing triggers, adjustments and quality incentives for 2020-2022;[26] ii) not clawing back remuneration of

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[24] CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.145. Differences in the appropriate comparator set for Dublin as compared to Heathrow may result in a different uplift based on empirical evidence, the similarity between our proposed comparator set for Dublin and CAA's proposed comparator set for Heathrow makes this range a good proxy for an appropriate uplift for Dublin in our opinion.

[25] CAR February 2022 Consultation and Issues Paper, p.5.

[26] During the second review, CAR reinstated a reduced form version of the Quality of Service adjustment. See CAR February 2022 Consultation and Issues Paper, para 2.7.

unspent capex allowances for 2020-2022 when deriving future RAB.[27] CAR estimates that, as a result of the interim reviews, the regulatory settlements improved by EUR 108 million for 2020 and 2021 and by EUR 100 to 115 million for 2022 relative to a no intervention scenario.[28] We also note that the government provided Dublin Airport with EUR 97 million in Exchequer support over 2021 under the COVID-19 Regional State Airports Programme 2021 and COVID-19 Supplementary Supports Scheme for Irish Airports.[29]

However, our analysis shows that our principal comparators – AENA, ADP and Zurich – also received substantive government support and regulatory resets through the pandemic. This means that investor perception of comparator airports' risks during the pandemic period have also taken into account the interventions of regulators, and the empirical beta estimates of comparators already take into account these risk mitigations. Therefore, the empirical betas of comparators during the pandemic provide directly relevant information for Dublin Airport's beta risk, and there is no rationale for CAR/SE to exclude the beta evidence from the pandemic period.

Table 2.4 sets COVID-19 regulatory mitigation granted to other European airports, as well as risk sharing mechanisms already built into their framework, which means that their pandemic beta evidence is relevant to Dublin Airport.

Table 2.4: Comparator Airports Received COVID-19 Mitigation Measures and Have Risk Sharing Mechanisms Built Into Their Regulatory Framework

Principal Comparators for Dublin	COVID-19 Regulatory Mitigations	Risk sharing & adjustment mechanisms
AENA (Spanish Airports incl. Madrid)	Royal Decree-Law 21/2020 of 9 June providing AENA with the right to recover costs related to incurred as a consequence of the collaboration with the health authorities and of the remaining operational safety and hygiene measures that must be adopted as a consequence of COVID-19. If these costs cannot be recovered within the framework of DORA 2017-21, they may be recovered, duly capitalised, in any of the subsequent DORAs.(1)	Airport Regulation Document (DORA) can be reviewed under extreme circumstances, e.g. a 10% drop in passenger numbers caused by natural disasters, warlike situations or terrorism.(2) If traffic is 10% lower than forecast, losses beyond this can be recovered through charges in the following year.
AdP (Charles De Gaulle)	Suspended current regulatory period and obligations. For airport charges and investments going forward ADP will annually consult with aviation users and seek approval from Autorité de Régulation des Transports (ART), the French Transport Regulatory Body, until there is certainty in forecasts of the future of aviation and CDG.(3)	Traffic risk sharing mechanism after a dead band of +/-0.5% after which 50% of outperformance and 20% of underperformance is shared between airport and airlines. Two specific review and termination clauses: - If passenger numbers breach a threshold of around 2% versus forecast for three consecutive years, or - if investment is less than 75% of that set out by the Economic Regulation Agreement (ERA). In the case of exceptional and unforeseeable circumstances that lead to a disruption of the economics of the agreement.(4)
Zurich	Extension of current regulatory period under until economic value added (EVA) of regulated till is zero or positive. This will be no later than 2025. Flexible charges regime allows Zurich to adapt charges to match uncertainties. If traffic recovers quicker, charges can be reset quicker to compensate for 2021 ramp-up discounts.(5)	Legislation provides for consultation and agreement with users. In the event of failure to agree, regulator will intervene.

Source: [1] AENA (29 July 2020), Results presentation for the six-month period ended 30 June 2020, p.14; [2] State Official Newsletter, Num. 252, Friday October 17, 2014, Articulo 27, p.83963; link: https://www.boe.es/boe/dias/2014/10/17/pdfs/BOE-A-2014-10517.pdf; [3] Group AdP (26 May 2020), Press Release – Termination of the 2016-2020 Economic Regulation Agreement (ERA) and Termination of the Public

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[27]   CAR February 2022 Consultation and Issues Paper, pp.5-6.

[28]   CAR February 2022 Consultation and Issues Paper, p.6.

[29]   See https://www.gov.ie/en/press-release/0dd30-minister-of-state-naughton-announces-108m-in-funding-for-irish-airports/.

Consultation Document for the 2021-2025 ERA, available at: https://presse.groupeadp.fr/termination-2016-2021era/?lang=en; Economic Regulation Agreement Between The Government And Aeroports De Paris, 2016-2020, link: https://www.parisaeroport.fr/docs/default-source/groupe-fichiers/finance/relations-investisseurs/r%C3%A9gulation/2016-2020/2016-2020-economic-regulation-agreement.pdf?sfvrsn=242508bd_8x; Zurich airport press release, Flughafen Zürich AG successfully concludes Negotiations on Flight Operations Charges, July 2020.

For Heathrow, the CAA proposed a series of mitigation measures as part of its October 2021 H7 Initial Proposals (following up on its April 2021 Way Forward Document), including an increase of GBP 300 million in Heathrow's RAB from 2022 onwards, and new uncertainty mechanisms to be introduced in H7: i) traffic risk sharing based on cumulative differences between outturn and forecast traffic volumes over full H7 period;[30] ii) allowance for asymmetric risks with a stand-alone revenue allowance for pandemic risks of GBP 26 to 30 million p.a.;[31] and iii) flexibility in relation to capital expenditure.[32]

Future pandemic risk should not be ignored, and recent airport decisions includes COVID-19 uplifts

In its report, SE also states that events similar to COVID-19 are sufficiently rare to not be included in the estimation of beta, and the impact of COVID-19 on Dublin Airport's asset beta is low (0-0.04).[33] We disagree, and CAR/SE's stance is not supported by recent aviation regulatory determinations.

In recent airport regulatory decisions, regulators in the UK and Spain both include explicit or implicit asset beta uplift to take in account the future pandemic risk:

- For Heathrow Airport, the UK aviation regulator CAA explicitly includes an asset beta uplift to take in account the future pandemic risk. Specifically, the CAA estimates the *unmitigated* impact of the pandemic on the asset beta to be 0.02-0.11.[34]

- For AENA, the Spanish National Commission on Markets and Competition (CNMC) estimated AENA's beta drawing on the pandemic period, when setting the allowed return

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[30] CAA (October 2021), Economic regulation of Heathrow Airport Limited: H7 Initial Proposals – Section 1: Overall approach and building blocks, pp.10-12.

[31] CAA (October 2021), Economic regulation of Heathrow Airport Limited: H7 Initial Proposals – Section 2: Financial Issues, pp.28-31.

[32] CAA (October 2021), Economic regulation of Heathrow Airport Limited: H7 Initial Proposals – Section 3: Incentives and other issues, Chapter 12.

[33] SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, pp.21-22.

[34] The CAA estimates a regression drawing on both pandemic and pre-pandemic data and it weights the pandemic data assuming that a pandemic event has a one-in-twenty or one-in-fifty-year probability. The CAA also estimates the impact of mitigation via the Traffic Risk Sharing ("TRS") mechanism to be 0.08-0.09, as the CAA considers that several proposed changes to Heathrow's regulatory framework, such as the introduction of traffic risk sharing, would mitigate the pandemic's impact on asset beta by roughly half of the increase due to the pandemic. However, we understand that there is no proposed traffic risk sharing arrangement for Dublin Airport in the upcoming price review, hence the comparable pandemic impact on asset beta estimate from the CAA is the unmitigated impact of 0.02-0.11. CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.145, para 9.151.

for the regulatory period 2022-2026. The approach was accepted by the Spanish Ministry of Transport, as we set out in our April 2022 report.[35]

In addition, we disagree with SE's assertion that one should ignore future pandemic risks in setting asset beta. First, SE's assumption that events similar to COVID-19 are rare and should be excluded from estimation beta is contrary to expectations. As a very recent example, on 23rd July 2022, WHO declared the highest alert over monkeypox outbreak and Europe has been singled out as the only global region where the risk of monkeypox is high.[36] While the monkeypox outbreak is yet to affect international travel rules, WHO commented that "*Too little was understood about the new modes of transmission which had allowed it to spread*".[37] It is therefore incorrect to rule out future pandemic risk, and a pandemic premium is required to account for this risk.

SE continues to use the incorrect formula to de-lever and re-lever betas

We also reiterate a key criticism of CAR/SE's 2019 Final Determination, which still apply to CAR/SE's 2022 Draft Decision. SE uses the Hamada re-levering formula that assumes the firm has constant debt level regardless of RAB growth, which is not supported by empirical evidence.[38] The Miller formula is more appropriate as it relies on a constant leverage ratio, rather than constant debt.[39]

2.1.3.   Our Updated Asset Beta Estimate for Dublin Airport

In this section we reiterate the approach set out in our April 2022 report to estimating Dublin Airport's asset beta for the 2023-2026 regulatory period. We first reintroduce our methodology to estimate asset betas, including how we account for heightened beta risk because of COVID and pandemic risk more generally. We then set out our preferred comparator set to estimate Dublin Airport's asset beta based on our relative risk analysis, given that Dublin Airport is not listed. Based on our methodology and our comparator set, we then conclude on a Dublin Airport asset beta range for 2023-2026.

2.1.3.1.   Estimation Methodology

Our proposed approach to estimating Dublin Airport's beta is largely unchanged from our April 2022 report, in which we set out our methodology using ordinary least squares (OLS)

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[35] Ministerio de Transportes, Movilidad y Agenda Urbana (September 2022), Documento de Regulacíon Aeroportuaria 2022-2026, p.52; CNMC (June 2021), STP/DTSP/013/21 – Acuerdo por el que se emite el informe previsto en el articulo 25.3 de la ley 18/2014, de 15 de Octubre de aprobacion de medidas urgentes para el crecimiento, la competitividad y la eficiencia en relacion al document de regulacion aeroportuaria, p.112. When estimating the asset beta, the CNMC considered whether to adjust its 5-year asset betas given the impact of the pandemic. While the CNMC recognised the pandemic impact on betas could in part be transitory, it concluded that no adjustment to the estimates (or the estimation window) was required: "*Given the discussion above, and insofar as the effects of the pandemic have not disappeared and foreseeably a part of them will persist in the beginning of the new regulatory period, this Commission does not consider appropriate to adjust the observations obtained for betas nor the observation period*" [*translated*]

[36] World Health Organization (23 July 2022), Second meeting of the International Health Regulations (2005) (IHR) Emergency Committee regarding the multi-country outbreak of monkeypox.

[37] World Health Organization (23 July 2022), Second meeting of the International Health Regulations (2005) (IHR) Emergency Committee regarding the multi-country outbreak of monkeypox.

[38] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.2.

[39] Under the Hamada formula, $\beta_{Asset} = \frac{\beta_{Equity}}{1 + \frac{D}{E} * (1-t)}$, while under the Miller formula $\beta_{Asset} = \frac{\beta_{Equity}}{1 + \frac{D}{E}}$.

statistical techniques. Table 2.5 reiterates out our approach to estimating asset betas for comparators relative to CAR/SE's 2022 methodology as well as a commentary on the discrepancies.

Table 2.5: Our Approach to Estimate Empirical Asset Betas

	CAR/SE 2022 Method	NERA Method	Notes
Data frequency	Daily and weekly	Daily	Given we filter comparators for liquidity, we consider daily data produces more statistically robust beta estimates
Estimation window	1, 2 and 5-year	2 and 5-year	We consider 2 and 5-year betas provide balance between robustness and forward-looking expectations
Market index	Regional for European stocks Local for Sydney, New Zealand, and Turkey	Regional for European stocks Local for Sydney, New Zealand, and Turkey	Same approach, although CAR/SE also consider asset betas from regulatory decisions for unlisted airports
Debt beta	0	0	Same approach
Gearing (debt)	Net debt	Net debt	Same approach
De-levering formula	Hamada	Miller	As we discuss in Section 2.1.2, Miller formula is correct
Cut-off date	31 December 2021	12 July 2022, 31 December 2019	SE excludes all 2020 observations in order to find a "non-pandemic" beta. NERA uses cut-offs dates: - 12 July 2022 (post-pandemic beta) - 31 December 2019 (pre-pandemic beta)
COVID uplift	None	Yes, for pre-pandemic beta	All betas excluding COVID-19 period datapoints should include an uplift to reflect the risk of similar future events, as explained in section 2.1.2.2

Source: NERA analysis and SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version.

As noted in Table 2.5 above, we set out two potential approaches to assessing Dublin's beta: one approach using current beta estimates, and one approach based on historical beta plus an uplift to reflect the heightened beta risk of COVID-19, or future related risks more generally.

Approach 1: Use current market evidence

Under one approach, we draw on the most recent estimates of asset betas as of the cut-off date (12 July 2022). As we set out in our April 2022, such an approach is justified given that

betas for airports have increased since the pandemic, and are yet to decline to pre-pandemic levels. The approach of using current market evidence including the pandemic period recognises that the risk of future pandemics and events posing similar risks to the airport industry should not be ignored.

We also note that these comparator airports received COVID-19 mitigation measures and have risk sharing mechanisms built into their regulatory framework – therefore the comparator betas are relevant to Dublin Airport which also enjoyed government/regulatory support.

The Spanish National Commission on Markets and Competition (CNMC) adopted a similar approach of using latest market evidence based on the pandemic period when recommending a WACC for AENA for the regulatory period 2022-2026, as we set out in our April 2022 report.[40]

Approach 2: Draw on pre-COVID betas, but include an uplift for pandemic related risks

As an alternative approach, we also draw on the CAA's approach for Heathrow Airport at H7, which places weight on data from both before and after the pandemic. The CAA estimates a regression drawing on both pandemic and pre-pandemic data and it weights the pandemic data assuming that a pandemic event has a one-in-twenty or one-in-fifty-year probability.[41]

Using this approach, the CAA estimates the *unmitigated* impact of the pandemic on the asset beta to be 0.02-0.11, but also estimates the impact of mitigation via the Traffic Risk Sharing (TRS) mechanism to be 0.08-0.09. The CAA considers that several proposed changes to Heathrow's regulatory framework, such as the introduction of TRS, would mitigate the pandemic's impact on asset beta.

However, in the case of Dublin Airport, there is no proposed traffic risk sharing arrangement, hence the comparable pandemic impact on asset beta estimate from the CAA is the unmitigated impact of 0.02-0.11.[42]

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[40]   Ministerio de Transportes, Movilidad y Agenda Urbana (September 2022), Documento de Regulacíon Aeroportuaria 2022-2026, p.52; CNMC (June 2021), STP/DTSP/013/21 – Acuerdo por el que se emite el informe previsto en el articulo 25.3 de la ley 18/2014, de 15 de Octubre de aprobacion de medidas urgentes para el crecimiento, la competitividad y la eficiencia en relacion al document de regulacion aeroportuaria, p.112. When estimating the asset beta, the CNMC considered whether to adjust its 5-year asset betas given the impact of the pandemic. While the CNMC recognised the pandemic impact on betas could in part be transitory, it concluded that no adjustment to the estimates (or the estimation window) was required: "*Given the discussion above, and insofar as the effects of the pandemic have not disappeared and foreseeably a part of them will persist in the beginning of the new regulatory period, this Commission does not consider appropriate to adjust the observations obtained for betas nor the observation period*" [*translated*]

[41]   CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.151.

[42]   CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.145. In addition to making a beta adjustment, CAA in the past has compensated Heathrow for asymmetric risks and from H7 it will provide further compensation based on expected pandemic shocks. In particular, at previous reviews, the CAA provided an asymmetric risk adjustment to passenger forecast/revenues to compensate Heathrow for non-pandemic risks. This means that under the CAA's framework, the pandemic related beta risk faced by Heathrow will continue to be compensated via parameters in addition to the proposed uplift to the WACC.

2.1.3.2.   Comparator Selection

Our starting point for the comparator set is the 9 listed comparators that CAR/SE rely on in their 2022 Determination: AENA, AdP, Auckland, Copenhagen, Fraport, Sydney, TAV (Turkey), Vienna and Zurich.[43]

First, we start by identifying whether all comparators are still listed. We find that Sydney Airport was delisted on 9 February 2022 after its acquisition by private investors.[44] The acquisition was first announced in November 2021 and was approved by shareholders on 3 February 2022.[45] Given Sydney Airport delisting and the potential effect on its beta in the months prior due to the acquisition, we do not place weight on Sydney Airport's asset beta.

Second, we identify illiquid comparator stocks, as this would bias beta estimates. We identify illiquid stocks as those that have a bid-ask spread higher than 1 per cent.[46] We find that both Copenhagen and Auckland airports have bid-ask spreads above 1 per cent over a 2-year estimation window.[47] Therefore, we do not place weight on either of these comparators.

Based on the steps above we are left with 6 comparators for which we consider we have robust asset beta estimates: AENA, AdP, Fraport, TAV, Vienna and Zurich. The next step consists of identifying the most comparable airports to Dublin Airport.

In our 2018 and 2019 reports for daa, we set out our relative risk analysis of Dublin and comparator airports, and concluded that AENA, AdP and Auckland (which we do not focus on given liquidity concerns) were the principal listed comparators, to we used to estimate Dublin Airport's asset beta. We also noted Heathrow and Gatwick as principal unlisted comparators and Fraport, Zurich and Vienna as lower risk comparators.[48]

We then considered in our April 2022 report whether there have been changes in the regulatory regime that would make our findings in 2018/2019 outdated in 2022.[49] Based on a report by CAA's consultants, Flint, which included a review of potential beta comparators for Heathrow, [50] we concluded that:

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[43]   SE (23 June 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, Table 15.

[44]   ASX (9 February 2022), Market Announcement: Sydney Airport (ASX:SYD) – Suspension from Quotation.

[45]   See Sydney Airport (8 November 2021), ASX Release – Sydney Airport enters into Scheme Implementation Deed with Sydney Aviation Alliance and https://www.reuters.com/markets/deals/sydney-airport-shareholders-set-approve-17-bln-takeover-2022-02-03/

[46]   For example, energy regulators in Germany and Austria filter illiquid comparators using a 1 per cent bid-ask spread threshold. See Bundesnetzagentur (Oct 16), Beschluss BK4-16-160, p.17; Bundesnetzagentur (Oct 16), Beschluss BK4-16-161, p.17; Frontier Economics (Jun 12), Bestimmung Der Finanzierungskosten Für Gasnetzbetreiber Gutachten Für Die EControl, pp.48-49.

[47]   We show the bid-ask spread for all comparators in Appendix A.

[48]   NERA (1 July 2019) Cost of Capital for Dublin Airport for 2019 Determination, Section 2.3.

[49]   NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, pp.14-15.

[50]   Flint (August 2021), Estimating Heathrow's beta post-COVID-19, Appendix 3.

- AENA's regime stayed broadly unchanged at the most recent price control (2022) relative to the previous regulatory framework.[51] Therefore, we consider AENA is still a principal comparator;

- AdP, as mentioned in section 2.1.2.1, is currently operating on a year-by-year price control basis. According to Flint/CAA, the regulator determined a price cap that is one-year in duration, without any mechanistic risk sharing.[52] Therefore, we consider AdP is now less comparable to Dublin Airport than in 2018/19 on a forward-looking basis, although its pre-COVID-19 beta data are relevant;

- Zurich Airport's regime has been extended as discussed in Section 2.1.2.1 and therefore has not changed materially since our 2018/2019 review. However, Flint/CAA note that the Civil Aviation Authority in Switzerland (FOCA) was planning to intervene and set new price controls under a price cap regime.[53] We note that the future adoption of a price cap regime would increase comparability with Dublin Airport, and therefore we have included Zurich within our comparator set (as per CAA for HAL).

- There were no material changes to note on the Fraport and Vienna regulatory regimes.[54]

We also review the CAA's proposed comparator set for Heathrow in its 2021 consultation. The CAA considered AENA has the best comparator for Heathrow given the similarities in regulatory framework.[55] As we set out in Section 2.1.2.1 above, the CAA's Final Proposals for Heathrow are based on a comparator set comprised solely of AENA, and a comparator set comprising AENA, ADP, Fraport and Zurich. The CAA considers the wider comparator set – comprising of the four comparators above – plus Sydney and Vienna, is of little relevance. [56]

In addition to our review of CAA's determination, we set out in Section 2.1.2.1 that other regulators have based their beta determinations on similarly focussed comparator sets. The UK Competition and Markets Authority ("CMA") used a small, refined set in its NATS appeal final decision, focusing on AENA, Fraport and AdP.[57] Meanwhile, the Spanish regulator, CNMC, focussed on AdP, Fraport, Vienna and Zurich when estimating the asset beta for AENA for the 2022-2026 regulatory period.[58]

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[51]   Flint (August 2021), Estimating Heathrow's beta post-COVID-19, p.45.

[52]   Flint (August 2021), Estimating Heathrow's beta post-COVID-19, p.45.

[53]   Flint (August 2021), Estimating Heathrow's beta post-COVID-19, p.48.

[54]   Flint (August 2021), Estimating Heathrow's beta post-COVID-19, pp.47 and 51.

[55]   CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.66. CAA also states that it placed some weight on AdP and Fraport, although their significant holdings in other geographies plus the change in AdP regime made them less comparable to Heathrow; ii) some weight on Zurich as it shared some regulatory regime characteristics with Heathrow; and iii) limited weight on Sydney and Vienna airports, which have different regulatory regimes from Heathrow.

[56]   CAA (June 2022), Economic regulation of Heathrow Airport Limited: H7 Final Proposals – Section 3: Financial Issues, para 9.151.

[57]   CMA (23 July 2020), NATS (En Route) Plc/CAA Regulatory Appeal – Final Report, para 13.73.

[58]   CNMC (June 2021), STP/DTSP/013/21 – Acuerdo por el que se emite el informe previsto en el articulo 25.3 de la ley 18/2014, de 15 de Octubre de aprobacion de medidas urgentes para el crecimiento, la competitividad y la eficiencia en relacion al document de regulacion aeroportuaria, p.104.

Finally, as we set out in section 2.1.2.1, the majority of listed comparators included by CAR and SE are not relevant to estimating Dublin Airport's asset beta, either due to i) incomparable regulatory regimes and ii) insufficient or illiquid stock return data.

2.1.4. Conclusion on Asset Beta

In summary, we reiterate our two proposed approaches to estimating Dublin Airport's asset beta:

- Under one approach, we place weight on the most recent estimates of asset betas, with no adjustment or weight given to solely pre-COVID estimates. The rationale for using current estimates is that there is still uncertainty around COVID-19 risks, and investors' perception of risk has changed. Also, Dublin Airport was not compensated for pandemic related risks at previous price controls – relying on pre-pandemic betas would mean these risks were ignored to date and would be largely ignored in the future as well.

  Following this approach, we conclude on an asset beta range of 0.70-0.78, based on the average 2-year and 5-year empirical asset beta estimates of close comparators (AENA, AdP and Zurich). We rely on the average asset beta estimates across our chosen comparator set, in contrast to our previous approach in our April 2022 report (in which we formed an asset beta range based on the maximum and minimum asset beta estimates for individual comparators). We make this change in approach in order to avoid overreliance on any single observation, and therefore address any concerns around the impact of outlying data observations.

- Alternative approach based on the CAA's estimate of pandemic uplift (0.02-0.11) which reflects the increase in asset beta due to pandemic risk, and our estimate of Dublin Airport's pre-pandemic asset beta of at least 0.6, as set out in previous NERA reports.[59] Under this approach, we conclude on an asset beta range of 0.62 to 0.71. Such an approach potentially provides a more enduring approach to estimating Dublin Airport's beta, by drawing on its beta in "normal times" and explicitly accounting for pandemic risk events.

The results of our asset beta estimation for Dublin Airport comparators as of i) SE's estimation window (as of 31 December 2021) and ii) the post-pandemic period (as of 12 July 2022) can be seen in Table 2.6 below.

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[59] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.18; NERA (1 July 2019), Cost of Capital for Dublin Airport for 2019 Determination, Section 2.

Table 2.6: We Estimate a Beta Range of 0.70 to 0.78, Based on 2-Yr Betas for Closest Comparators

	31 December 2021 (CAR/SE Cutoff)		12 July 2022		Notes
	2Y	**5Y**	**2Y**	**5Y**	
Close comparators					
AENA	0.90	0.82	0.78	0.81	*5-yr price cap as per Dublin + identified by CAA as comparator for HAL + identified by SE as comparator for Dublin*
AdP	0.80	0.82	0.61	0.76	*Historically 5-yr cap but de-risked to 1-yr*
Zurich	0.80	0.83	0.71	0.79	*Identified by CAA as comparator for HAL + identified by SE as comparator for Dublin*
Other listed airports					
Auckland	1.02	0.93	0.86	0.95	*Constitutes high % of domestic market + data quality issues*
Fraport	0.60	0.67	0.53	0.62	*Lower risk regime*
Vienna	0.86	0.70	0.55	0.64	*Lower risk regime*
Copenhagen	0.32	0.28	0.34	0.28	*Lower risk regime + data quality issues*
Sydney	0.49	0.50	0.49	0.50	*Lower risk regime + data quality issues*
TAV	0.68	0.59	0.60	0.59	*Lower risk regime*
Average (all)	**0.72**	**0.68**	**0.61**	**0.66**	
Average (close comps excl. AIA)	**0.83**	**0.82**	**0.70**	**0.78**	*AENA, AdP and Zurich*

Note: Empirical approach for both cut-off dates is NERA approach described in Table 2.5; ADP and Fraport estimates based on net debt derived from the annual reports; Sydney Airport results under 12 July 2022 cut-off date are for its estimates as of 9 February 2022, given delisting after.
Source: NERA analysis.

Under our two proposed approaches, we therefore estimate an asset beta range for Dublin Airport equal to:

▪ 0.70-0.78, based on the average of comparator asset betas as of July 2022; and

▪ 0.62-0.71, based on comparator asset betas as of December 2019 with an uplift to reflect the risk of future events comparable to the COVID-19 pandemic.

2.2. Estimating RFR

2.2.1. Summary of 2022 CAR/SE Decision

The 2022 Draft Decision CAR and 2022 SE report maintain the RFR methodology set out in SE's 2019 report. SE estimates a real RFR of -1.07 per cent, relying on evidence from current yields, adjusted to reflect market expectations for the regulatory period of 2023-2026.

▪ For current yields, SE relies on 1, 2 and 5-year averages of nominal yields from Irish and German government bonds, deflated using an average inflation rate from ECB survey

forecasts and index-linked German government bonds . SE does not include a country risk premium when using Germany bond yields as estimates for RfR.

▪ To reflect market expectations, SE applies a forward rate adjustment, calculated based on ECB forward estimates of both AAA-rated and all Euro area bonds rather than using Ireland's forward rate adjustment.

In our April 2022 report, we raised two main concerns with the CAR/SE's approach: i) its failure to include a country risk-premium when using Germany bond yields as estimates for RfR; and ii) not using Ireland's forward rate adjustment, which is required to be consistent with use of a national RfR.[60] However, we also noted that under a TMR approach to setting the cost of equity the overall allowed cost of equity is not overly sensitive to the RFR.

2.2.2.   Our Updated Estimate of RfR

We update our estimate of the nominal RfR for Dublin Airport over the period 2023-2026 set out in our April 2022 report. We rely on 1-year, 2-year and 5-year averages of Irish 10-year government bond yields plus a forward uplift based on 10-year nominal Irish forward rates.[61]

Figure 2.5: Irish and German Government Bond Yields Have Risen Since CAR/SE's Evidence Period, And Forward Rates Indicate Increasing Yields Over 2023-2026
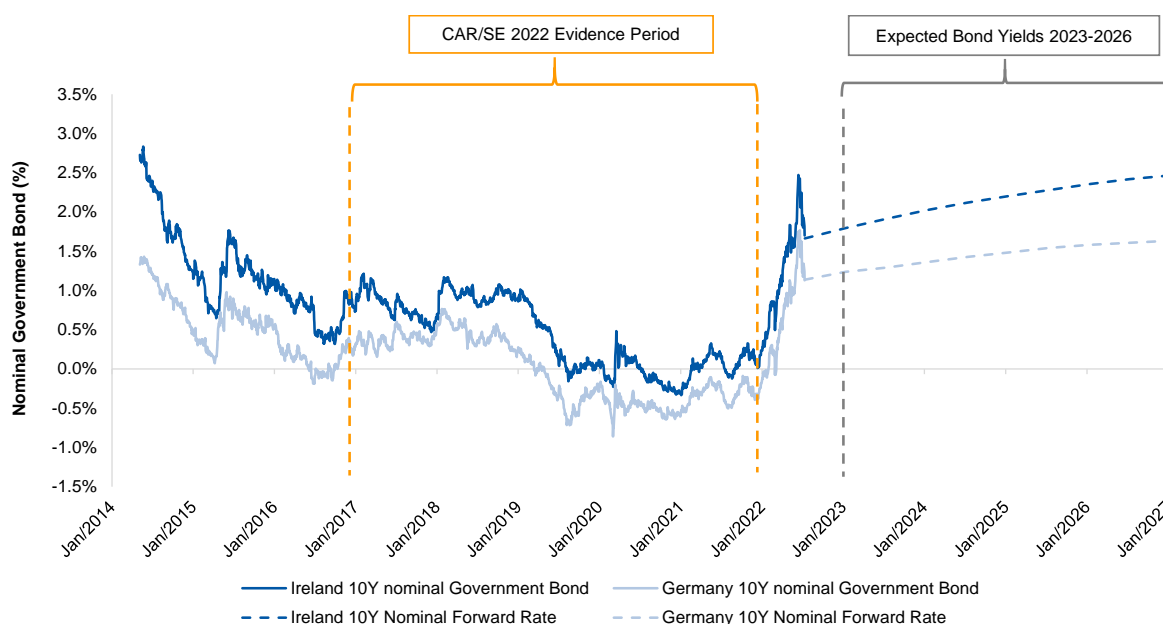
Note: Cut-off date for spot nominal yields is 12 July 2022. Forward curve date is 12 July 2022.
Source: NERA analysis.

Our approach is broadly consistent with CAR/SE's 2022 RfR approach insofar as we use similar averaging periods of bond yields and include a forward rate adjustment. However, as discussed in Section 2.2.1, we consider it more appropriate to place weight on national, i.e.

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[60]   NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.19.

[61]   Specifically, our forward rate uplift is based on expected yield during the 2023-2026 period, more specifically the midpoint of this period.

Irish bond yields and forward rates. In our view, in order to rely on German government bond yields, a country risk premium (CRP) should be added to estimate a true Irish RfR, where the CRP would draw on the difference between Irish and German government debt yields. However, we would arrive at the same result for the RfR by relying on Irish debt yields only.

By applying our preferred approach of current rates on Irish government bonds, combined with an uplift reflecting Irish forward rates and a long-term ECB inflation forecast, we arrive at a real RfR estimate of -0.07 to 0.3 per cent. This is around 1.0-1.37 per cent higher than the midpoint of CAR/SE's 2022 determination of RfR. This difference reflects:

i)   Irish country risk which is not included in CAR/SE's 2022 RfR estimate; and

ii)   Bond market movements between SE's cut-off date (31 December 2021) and our cut-off date (12 July 2022).

Table 2.7: We Estimate a Real RfR of -0.07 to 0.30 per cent

	Lower Bound (%)	Upper Bound
Ireland 10Y nominal rate (1Y/2Y/5Y average)	0.32%	0.70%
Forward rate uplift	1.71%	1.71%
ECB long-term inflation forecast	2.10%	2.10%
NERA Real RfR	**-0.07%**	**0.30%**

Source: NERA analysis.

2.3.   TMR

2.3.1.   Summary of 2022 CAR/SE Decision

SE has not altered its TMR methodology from its 2019 report, which it based on:

i)   "Backward-looking estimates", i.e. long-term historical averages; and

ii)   "forward-looking estimates" i.e. estimates from a dividend discount model (DDM).

For its backward-looking estimates, SE uses a Blume averaging method for the Irish and European equity returns reported by DMS for the period 1900-2021 and a holding period assumption of 10 years.[62] Rather than estimating a World TMR, SE estimated an historical European TMR range of 5.97 to 6.81 per cent based on the European and Irish equity returns, respectively.[63]

For the forward-looking estimates, SE relies on its own single period DDM model using a large cap index, concluding on a forward-looking TMR range of 5.70 to 5.81 per cent.[64] SE

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[62]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, p.18.

[63]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, p.18.

[64]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, p.19.

uses a dividend growth rate based on historical dividend growth rate rather than forward-looking dividend growth forecasts.

SE concludes on a TMR range of 5.70 to 6.81 per cent (and a mid-point of 6.25 per cent), based on the minimum and maximum estimates from the forward-looking and historical evidence, respectively.[65]

As we set out in out April 2022 report, we agree with CAR/SE's use of long-run historical evidence to inform TMR but identified two key issues:[66]

▪ Equity market evidence supports a holding period assumption of 1-5 years, rather than 10 years as SE assumes; and

▪ SE should have used the World TMR measure, which is more stable in terms of sample selection and based on a wider set of countries than the European TMR measure used by SE.

As in our April 2022 report, we still do not agree with SE's DDM estimates, which are based on approach SE's reliance on DDM was erroneous because: i) an unrealistic single stage model; ii) a large cap index, rather than a more appropriate broad-market stock index; and iii) a dividend growth assumption based on historical growth, rather than more relevant forward-looking dividend growth forecasts.

2.3.2. Our Estimate of TMR

We reiterate the approach to estimating TMR set out in our April 2022 report, i.e.:[67]

▪ Place full weight on long-run historical data rather than rely on forward-looking DDM data. We consider forward looking evidence should be treated with caution, given the relative sensitivity of the results to the long-term dividend growth assumption, for which there are no independent analyst forecasts. The use of historical evidence as a measure of the expected TMR is supported by the stability of the TMR over time as documented in financial literature;[68]

▪ Rely on Blume averaging method, consistent with SE's approach, but using holding periods of 1 to 5 years, as opposed to 10 years. As discussed in our past reports, there is strong equity market evidence pointing to 1 to 5 year holding periods, even for investors typically regarded as having longer-term investment horizons (e.g. pension funds and retail investors);[69] and

▪ Rely on Irish and World TMR, as opposed to SE's Irish and European TMR estimates. As discussed above, we consider the European TMR to be far more sensitive to outliers than the World TMR, which is a more stable measure and includes the relevant and deeply liquid US market.

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[65] SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, pp.19-20.

[66] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.21.

[67] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, Section 2.3.2.

[68] NERA (11 December 2018), Cost of Capital for Dublin Airport – 2019 Determination, p.11.

[69] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.22.

Table 2.8 sets out our (real) TMR estimates for Ireland, Europe, and the World, under the Blume averaging method for holding periods of 1 to 10 years. We conclude on a (real) TMR range of 6.8 to 7 per cent, based on Irish and World markets and holding periods of 1 to 5 years. Our estimate is higher than CAR's 2022 Determination of 5.7-6.8 per cent, reflecting our different methodological choices.

Table 2.8: We Estimate a Real TMR of 6.8 to 7 per cent

	Blume Average (1900-2021)
Ireland	
1Y holding	7.0%
2Y holding	7.0%
5Y holding	6.9%
10Y holding	6.8%
Europe	
1Y holding	6.1%
2Y holding	6.1%
5Y holding	6.0%
10Y holding	6.0%
World	
1Y holding	6.8%
2Y holding	6.8%
5Y holding	6.8%
10Y holding	6.7%

Source: NERA analysis of DMS 2022 Yearbook, p.21.

2.4. Summary on cost of equity

Using our updated estimates of beta, RfR and TMR, we calculate two estimates of Dublin Airport's cost of equity for the 2023-2026 period:

i) We calculate a cost of equity of 9.5-10.7 per cent based on current market evidence for beta; and

ii) We calculate a cost of equity of 8.4-9.8 per cent based on a pre-pandemic beta including an uplift for future events similar to COVID-19.

Table 2.9: We Estimate a Post-Tax Cost of Equity of 9.5 to 10.7 per cent, Based on Current Beta Estimates

Parameter	CAR 2022 Draft Determination	NERA 2022 Estimate	
		Lower Bound	Upper Bound
Gearing	50%	50%	50%
Risk Free Rate	-1.07%	-0.07%	0.30%
Total Market Returns	6.25%	6.8%	7.0%
Equity Risk Premium	7.32%	6.7%	6.6%
Asset Beta	0.56	0.70	0.78
Equity Beta	1.05	1.40	1.56
Cost of equity (after tax)	**6.60%**	**9.48%**	**10.75%**

Source: NERA analysis; CAR (24 October 2019) Determination on the Maximum Level of Airport Charges at Dublin Airport 2020-2024, p.94.

Table 2.10: We Estimate a Post-Tax Cost of Equity of 8.4 to 9.8 per cent, Based on Pandemic Beta Risk Uplift of 0.02-0.11

Parameter	CAR 2022 Draft Determination	NERA 2022 Estimate	
		Lower Bound	Upper Bound
Gearing	50%	50%	50%
Risk Free Rate	-1.07%	-0.07%	0.30%
Total Market Returns	6.25%	6.8%	7.0%
Equity Risk Premium	7.32%	6.7%	6.6%
Asset Beta	0.56	0.62	0.71
Equity Beta	1.05	1.22	1.56
Cost of equity (after tax)	**6.60%**	**8.39%**	**9.81%**

Source: NERA analysis; CAR (24 October 2019) Determination on the Maximum Level of Airport Charges at Dublin Airport 2020-2024, p.94.

3. Cost of Debt

In this section, we summarise CAR's approach to setting the cost of debt in its 2022 Draft Decision, our concerns with its approach and our estimate of Dublin Airport's cost of debt.

3.1. Summary of 2022 CAR/SE's Decision

SE's approach to estimating the cost of debt in its 2022 report is based on a weighted average of the cost of embedded debt and new debt for a notional investment grade credit rating. The cost of new debt is based on a notional rating of BBB+, using yields on the iBoxx EUR BBB-rated benchmark index with maturities of 10+ years, with an average time to maturity of 14 years. SE then adjusts this yield upwards for a forward rate uplift, plus issuance costs of 10 bps, and adjusted for the spread between BBB and BBB+ credit rating of between 7 and 13 basis points. SE opts to use a European forward rate rather than an Irish one, in line with its RfR approach as set out in Section 2.2.

Overall, SE calculates the cost of debt allowance for Dublin Airport to be -0.31 to 0.11 per cent, with a central estimate of -0.10 per cent (assuming a BBB+ credit rating).[70]

We raised three main criticisms of SE's cost of debt approach in our April 2022 report, two of which still apply to SE's updated estimate of cost of debt.[71] In summary:

▪ SE fails to include issuance/debt transaction costs to the bank margin for embedded debt costs, which is inconsistent with regulatory precedent;

▪ SE's approach of applying a forward uplift based on the European forward rate (instead of the Irish forward rate) is incorrect as it fails to fully reflect Irish country risk in comparison to other high-rating Euro-area countries.

We acknowledge that SE has changed from its previous approach of using two iBoxx indices, one with maturity 7-10 years and one with maturity 10+ year index yields, to focusing exclusively on the 10+ year index. As set out in our April 2022 report, the 10+ year index is consistent with market evidence on the efficient tenor at issuance and we therefore support SE's sole use of this index.[72]

3.2. Our Estimate of Cost of Debt

In this section we update our estimate of Dublin Airport's cost of debt, which we set out in our April 2022 report.

3.2.1. Cost of Embedded Debt

We calculate Dublin Airport's cost of embedded debt based on data on outstanding debt provided by daa. We calculate an average cost of debt across all issues in Dublin Airport's debt book, weighted by principal amount, and deflate using ECB long-term inflation

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[70] SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, p.35.

[71] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.25.

[72] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.25.

expectations (in line with our approach to deflation the RfR). We estimate embedded debt of -0.46 per cent in real terms.

Table 3.1: We Calculate a Dublin Airport Cost of Embedded Debt of -0.46 per cent

Issue	Nominal All-in yield	Real All-in yield
▉	3.70%	1.57%
▉	4.16%	2.02%
▉	4.62%	2.47%
▉	0.94%	-1.13%
▉	0.91%	-1.16%
▉	1.55%	-0.53%
▉	0.50%	-1.56%
▉	1.60%	-0.49%
▉	1.05%	-1.03%
Weighted average	**1.53%**	**-0.56%**

Note: Weighted average calculated based on amount outstanding as of July 2022 as per daa's data; all-in yield calculated as the sum of interest rate and bank margin.
Source: NERA analysis of daa's data.

3.2.2.   Cost of New Debt

We generally agree with CAR/SE's approach to estimating the cost of new debt in the 2022 Draft Decision, by relying on iBoxx EUR non-financial corporate bond 10+ year yields and applying an adjustment to derive a notional rating of BBB+.

As shown in Figure 3.1 below, CAR/SE's chosen iBoxx index yield has increased substantially between SE's chosen cut-off date (31 December 2021) and the date of this report. As a result, the iBoxx yield used in our updated cost of new debt estimate is substantially higher than the yield reported in CAR/SE's 2022 Draft Decision (in nominal terms).[73]

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[73]   SE (11 July 2022) Dublin Airport Cost of Capital for 2022 Determination – Final Version, para 83. SE reports a real iBoxx yield of -0.4 to 0.31 per cent but does not report a nominal yield.

Figure 3.1: iBoxx BBB EUR Non-financials Have Increased since SE's 2021 Cut-Off Date

We set lower and upper bounds to the cost of new debt based on the highest and lowest iBoxx index historical averages by period length (i.e. we base the lower and upper bounds on the minimum and maximum of the 1-year, 2-year and 5-year average iBoxx yield). As set out above in this section, we also include an uplift to the BBB-rating cost of new debt to reflect the Irish forward rate, in line with our approach to estimating the RfR.

Table 3.2: We Estimate a BBB Real Cost of New Debt of 1.05 to 1.44 per cent

	Lower bound (%)	Upper bound (%)
Nominal cost of new debt BBB rating	1.47%	1.86%
Forward rate uplift	1.71%	1.71%
ECB long-term inflation forecast	2.10%	2.10%
Real cost of new debt BBB rating	**1.05%**	**1.44%**

Finally, we adjust our BBB-rated cost of new debt to reflect DAA's BBB+ rating, by estimating the spread between BBB+ and BBB ratings based on the spread between the iBoxx non-financial corporates 10+ index for A-rated debt and BBB-rated debt.

Table 3.3: We Estimate a Dublin Airport BBB+ Real Cost of New Debt of 0.98 to 1.18 per cent

	Lower bound (%)	Upper bound (%)
Real cost of new debt BBB rating	1.05%	1.44%
Downward adjustment from BBB to BBB+	-0.13%	-0.08%
Real cost of new debt BBB+ rating	**0.92%**	**1.36%**

Source: NERA analysis.

3.2.3. Conclusion on Cost of Debt

We calculate Dublin Airport's overall cost of debt allowance based on our estimates of the company's cost of embedded debt and cost of new debt. We combine the two estimates based on the average expected share of new debt across all four years in the 2023-2026 period of 26 per cent, as shown in Table 3.4 below.

Table 3.4: daa's Forecasted Total Debt

EUR million	2023	2024	2025	2026	Average
Total debt	■	■	■	■	
New debt issuance	■	■	■	■	
New debt as % of total debt	**0%**	**24%**	**39%**	**40%**	**26%**

Note: Amounts are cumulative, not issues per year.
Source: NERA analysis of daa's data.

Finally, we add a transaction cost of 10-20 basis points to our cost of debt estimates, in line with our April 2022 report, to reflect regulatory precedent from the CAA, CMA and Ofgem.[74] Including this transaction cost, we estimate a total cost of debt for Dublin Airport of -0.08-0.14 per cent.

Table 3.5: We Estimate a Dublin Airport Real Cost of Debt of -0.08 to 0.14 per cent

Real, %	Lower Bound	Upper Bound
Cost of new debt	0.92%	1.36%
Cost of embedded debt	-0.56%	-0.56%
Share of new debt	26%	26%
Transaction cost	0.10%	0.20%
Cost of debt	**-0.08%**	**0.14%**

Source: NERA analysis.

3.3. Gearing

CAR/SE's 2022 Draft Decision does not change the approach to setting notional gearing of 50 per cent as set out in CAR's 2019 determination. As set out in our April 2022 report, we

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[74] NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.29.

generally agree with CAR/SE's notional gearing approach and we do not see any evidence that CAR should deviate from its 50 per cent determination based on:[75]

i)   daa's actual gearing data for 2021-22 (███████████████████ ████████████████████ and

ii)   Gearing decisions from the CAA and CNMC for Heathrow and AENA respectively (ranging between 33 and 62 per cent).

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[75]   NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, pp.29-30.

4.   Conclusions on Cost of Capital

By combining our cost of equity estimate set out in Section 2, our cost of debt estimate set out in section 3 and our notional gearing assumption of 50 per cent, we develop two ranges for Dublin Airport's cost of capital:

▪   We calculate a cost of capital of 5.9-6.7 per cent based on current beta estimates; and

▪   We calculate a cost of capital of 5.3-6.2 per cent based on a pre-pandemic beta including an uplift for future events similar to COVID-19.

As can be seen in Table 4.1, our cost of capital estimates also includes a 50 basis points uplift for aiming up. CAR/SE's 2022 approach to aiming up is unchanged from CAR's 2019 determination, which applied a 50bps uplift to the pre-tax WACC to reflect aiming up to reflect the risk of measurement error and asymmetric economic effects of underinvestment compared to overinvestment.[76] As we discuss in our April 2022 report, we adopt a 50bps aiming-up component, in line with CAR/SE's 2022 approach, which we consider is a conservative estimate given Dublin Airport's higher cash-flow risks in the event of future pandemic events.[77]

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[76]   CAR (22 July 2022), Draft Decision on an Interim Review of the 2019 Determination in relation to 2023-2026, para 10.44.

[77]   NERA (21 April 2022), Cost of Capital for Dublin Airport for 2023-2026 Regulatory Period, p.32.

Table 4.1: 1) Based on Current Betas, We Estimate Cost of Capital of 5.9 to 6.7 per cent; 2) Based on Pre-COVID beta of 0.6+ uplift, Estimated Range is 5.3 to 6.2 per cent

Parameter	CAR 2022	Approach 1: Current beta estimates		Approach 2: Pre-COVID beta 0.6+ uplift (0.02-0.11)	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
Gearing	50%	50%	50%	50%	50%
Risk Free Rate	-1.07%	-0.07%	0.30%	-0.07%	0.30%
Total Market Returns	6.25%	6.75%	7.00%	6.75%	7.00%
Equity Risk Premium	7.32%	6.82%	6.70%	6.82%	6.70%
Asset Beta	0.56	0.70	0.78	0.62	0.71
Equity Beta	1.05	1.40	1.56	1.24	1.42
Cost of equity (after tax)	6.60%	9.48%	10.75%	8.39%	9.81%
Cost of debt (pre - tax)	-0.10%	-0.08%	0.14%	-0.08%	0.14%
Pre-tax WACC (before aiming up)	**3.72%**	**5.38%**	**6.21%**	**4.76%**	**5.68%**
Aiming up	0.50%	0.50%	0.50%	0.50%	0.50%
Pre-tax WACC (post aiming up)	**4.22%**	**5.88%**	**6.71%**	**5.26%**	**6.18%**

Note: Approaches to beta: 1) Use most recent estimates of asset betas, with no adjustment or weight given to solely pre-COVID estimates. We rely on a 12.5 per cent tax rate. 2) Based on the CAA's estimate of pandemic beta uplift (0.02 to 0.11), and our estimate of Dublin Airport's pre-pandemic asset beta of at least 0.6
Source: NERA analysis; CAR (22 July 2022), Draft Decision on an Interim Review of the 2019 Determination in relation to 2023-2026, Table 10.2.

Appendix A. Liquidity Analysis

Table A.1 sets out the bid-ask spreads for CAR/SE's 2022 listed comparator set. As described in section 2.1.3.2, we consider comparators who cross the 1 per cent bid-ask spread as not meeting our liquidity threshold.

Table A.1: Bid-Ask Spread for Dublin Airport CAR/SE Comparators

	2Y	5Y
AENA	0.1%	0.1%
AdP	0.1%	0.1%
Zurich	0.0%	0.1%
Auckland	1.1%	0.9%
Fraport	0.7%	0.5%
Vienna	0.8%	0.7%
Copenhagen	1.1%	0.9%
Sydney	0.3%	0.6%
TAV (Turkey)	0.1%	0.2%

Source: NERA analysis

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