Analysis of risk-share mechanisms

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Executive summary

To date, the risks of deviations from ex ante forecasts have largely been allocated to Dublin Airport, according to principles of incentive-based regulation.

- Dublin Airport can outperform by reducing its costs, or by increasing its level of commercial revenue or the number of passengers by more than is forecast ex ante.
- Dublin Airport bears the risk of underperformance in the event that its costs are higher or its traffic or commercial revenue are lower than forecast.
- Users benefit from outperformance over time as more challenging assumptions (and thus lower prices) are built into subsequent price reviews.

As noted by CAR, the framework in place at Dublin Airport has worked well to date and has been supported both by the airport and users.[1] This is because it creates strong incentives for Dublin Airport to efficiently manage its costs, and to grow traffic and commercial revenue. However, as a result of the uncertainty faced by the aviation industry, CAR is considering whether the current approach to risk allocation remains appropriate, or whether within-period risk-share mechanisms should be introduced.

Different types of risk-share mechanisms are deployed by regulators to address the risk/reward balance in different areas. A number of regulators in other jurisdictions have introduced such mechanisms for airports, as well as in other sectors. Generally, mechanisms introduced by regulators can be classified as traffic risk-share, cost or performance-sharing, cost pass-through, or reopeners. CAR has proposed four potential mechanisms: traffic-risk share (TRS), general risk-share (GRS), CAPEX adjustment and OPEX pass-through.

Risk-share mechanisms can be effective regulatory tools to protect the airport and its users from uncertainty and significant deviations from ex ante forecasts. At the same time, such mechanisms can significantly alter the incentives underpinning the regulatory regime. It is therefore important to ensure that any mechanism introduced provides the regulated entity with the incentive to efficiently manage its costs, grow traffic, and foster its commercial activities. In particular, a number of design aspects need to be taken into account in order to calibrate the level of risk allocated to the airport and users, and to ensure that mechanisms are only triggered when necessary.

For example, if a traffic risk-share mechanism were to be introduced, the implementation of a deadband and different bands of sharing for different levels of variation from forecasts would provide some potential for out- or underperformance. This would ensure some consistency with the existing regulatory framework, as well as enhanced protection to the airport and users in case of more severe deviations. Complete protection against volume risk may have the detrimental effect of reducing the airport's incentive to grow traffic.

On the other hand, even if deadbands and different sharing rates are used, a GRS mechanism would involve a wholesale change to the regulatory framework, positioning it closer to a rate of return form of regulation. Dublin Airport would have weaker incentives and be less accountable for operational

[1] Commission for Aviation Regulation (2022), 'Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper', 4 February, p. 20–21.

decisions taken over the course of a regulatory period, as the effects would be shared with airport users.

The proposed CAPEX adjustment mechanism artificially strengthens the link between short-term fluctuations in traffic and long-term investments. As such, the design of the proposed mechanism is not supported by regulatory precedent.

Pass-through mechanisms are common regulatory tools in the airport context, as well as in other regulated sectors. Provided that the set of uncontrollable costs is well-defined in advance by the regulator, pass-through mechanisms can be an effective way to de-risk the regulated entity while maintaining high-powered incentives.

If any of the mechanisms proposed by CAR were to be introduced, the timing of the adjustment of charges is an important aspect to consider. The application of the sharing mechanisms can result in tariff adjustments either during the price control period or at the beginning of the following period. The first approach has the advantage of addressing any shocks that are creating cash flow issues for the regulated entity in a more timely manner; however, it can lead to significant within-period tariff fluctuations, including tariffs potentially increasing when traffic is low and tariffs reducing when traffic is high.

For example, if a risk-share mechanism had been in place at Dublin Airport during 2020/21, tariffs would have increased significantly due to the drop in traffic. It is unlikely that such an increase in tariffs would have been possible. As such, the design of any mechanism would need careful consideration to ensure that it does not merely act to cap upside while leaving downside risk with the airport.

Indeed, as demonstrated by the COVID-19 pandemic, risk-share mechanisms are not the right tool to address extreme deviations from forecasts. Airports that had these mechanisms in place still needed to suspend or reopen existing price controls, given the extent of the shock. Price control reopeners are a more suitable way to protect from the ‘unknown unknowns’.

If a risk-share mechanism is introduced, it would also be important to consider implications for other areas of the regulatory framework—including, for example, the cost of capital.

1 Introduction

1.1 Purpose

The purpose of this report is to consider the options that the Commission for Aviation Regulation (CAR) has set out for sharing risk between Dublin Airport and its users over the course of the next regulatory period. It considers the strengths and weaknesses of different approaches, as well as their potential application given the current circumstances facing the Irish aviation market, drawing on precedent from the aviation sector and other regulated industries.

1.2 Context

The 2019 Determination for Dublin Airport, published in October 2019, set out the maximum level of airport charges for the 2020–24 period. Due to the outbreak of COVID-19 in early 2020, CAR carried out two interim reviews in 2020 and 2021, addressing the impact of the pandemic on the regulatory settlements without undertaking a full redetermination. As part of the last interim review, CAR determined that it would undertake a full review of the regulatory settlement in 2022 for the period 2023–26.

On 4 February 2022, CAR published its Issues Paper, beginning the process for the third interim review and setting the maximum level of airport charges at Dublin Airport for 2023-26.[2] CAR is consulting on a range of measures with regard to the regulatory building blocks, such as OPEX, commercial revenue, and the cost of capital.

In its Issues Paper, CAR also noted that it is seeking stakeholder views about introducing a risk-share mechanism to address the uncertainty in the coming years, and more generally regarding the approach for mitigating the risks brought about by the pandemic.[3]

The regulatory framework at Dublin Airport is based on a building blocks approach whereby the regulatory control takes the form of a cap on the revenue yield per passenger for a period of five years. To date, the risks of deviations from ex ante forecasts have largely been allocated to Dublin Airport, according to principles of incentive-based regulation:

- the airport can outperform by reducing its costs, or by increasing the level of commercial revenue or the number of passengers by more than is forecast ex ante;
- the airport bears the risk of underperformance in the event that its costs are higher or its traffic or commercial revenue are lower than forecast;
- the outturn level of performance is taken into account at the next regulatory review, when prices are reset.

As part of its Issues Paper, CAR highlighted that the uncertainty with regard to traffic forecasts will be a ‘key feature’ of the 2022 review. CAR has also acknowledged that while the approach to risk allocation has worked well to date, and it has been supported by both the airport and airport users, the current level of uncertainty and risk faced by Dublin Airport may have an

[2] Commission for Aviation Regulation (2022), ‘Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper’, 4 February, available at https://www.aviationreg.ie/_fileupload/Issues%20Paper.pdf.
[3] Commission for Aviation Regulation (2022), ‘Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper’, 4 February, p.3.

impact on its cost of capital and credit assessment.[4] As a result, CAR is considering whether the previous approach to risk allocation remains appropriate for the 2023–26 period, or whether within-period risk-share mechanisms should be introduced.

CAR has set out four potential approaches to risk allocation.[5]

1. **Traffic risk-share mechanism (TRS).** Under this approach, the price cap formula would be adjusted for deviations between outturn and forecast traffic. As such, the rationale for a TRS mechanism would be to limit the impact of uncertainty regarding the evolution of passenger traffic over the coming years.
2. **General risk-share mechanism (GRS).** This would involve adjusting the price cap formula based on variations between actual and forecast profit (EBITDA). Therefore, in addition to taking account of deviations from forecast traffic, such a mechanism would also take account of deviations from OPEX and commercial revenue forecasts.
3. **CAPEX adjustment mechanism.** The amount of CAPEX that is subject to clawback at the end of the regulatory period could be adjusted to reflect traffic deviations from forecasts above a predefined threshold. In the case of outperformance in traffic, a portion of the additional revenue would be subject to clawback unless it was spent on additional CAPEX.
4. **Maintaining the current approach.** The status quo, characterised by Dublin Airport facing most of the risk of deviations from forecasts according to the principles of incentive-based regulation, could be maintained. This could be accompanied by more minor adjustments, such as an extension of the OPEX pass-through mechanism or adjustments for construction price inflation.

Dublin Airport has asked Oxera to review CAR's proposed risk-share mechanisms and consider their potential benefits and disadvantages in light of regulatory best practice and international precedents.

1.3 Structure

This report is structured as follows.

- Section 2 explores the rationale for risk-share mechanisms in economic regulation, outlining a series of principles to consider when designing such mechanisms.
- Section 3 discusses advantages and disadvantages of the risk-share mechanisms proposed by CAR, and includes relevant regulatory precedents.
- Section 4 concludes.

[4] Commission for Aviation Regulation (2022), 'Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper', 4 February, p. 21.
[5] Commission for Aviation Regulation (2022), 'Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper', 4 February, p. 16.

2 Overview of risk-share mechanisms

2.1 Introduction

Economic regulation typically involves setting a cap on the growth of prices or revenues on a forward-looking basis for a multi-year period. The aim is to provide the regulated company with incentives to be cost-efficient, and to provide price certainty over time. Such frameworks give the company an incentive to outperform the assumptions built into the price control determination by allowing the company to keep additional profits associated with outperformance (and making it bear the risk of underperformance). This outperformance is usually passed on to users at the next regulatory review, when prices are reset.

Dublin Airport can outperform the regulatory assumptions by:

- reducing costs (where this can be done without degrading quality of service or neglecting asset condition);
- increasing the number of passengers served by more than is assumed in the regulatory settlement;
- achieving commercial revenue growth above the forecast level;
- securing financing efficiencies—for example, by raising new debt at a lower cost than assumed in the regulatory settlement.

Users benefit from outperformance over time as more challenging assumptions (and thus lower prices) are built into subsequent price reviews. Incentive regulation is built on the principle that achieving profits above the allowed rate of return is a commensurate reward for outperformance, such that regulation mimics the dynamics of a competitive market to the extent possible. However, in practice, regulators and regulated companies face scrutiny when there is outperformance, particularly when the outperformance is (believed to be) the result of external factors, rather than genuine efficiencies or management-driven improvements.

At the same time, Dublin Airport bears the risk of underperformance in the event that its costs are higher or its traffic is lower than forecast. Downside deviations from forecasts resulting from factors outside of management control and/or that are unforeseeable at the time of the price control determination can have a detrimental impact on the financial performance of the regulated company and on its ability to efficiently finance its operations.

In order to mitigate such risks, some regulators have developed tools to ensure the sharing of gains or losses between companies and users during the price control period, and to provide protection against deviations from forecasts. In the remainder of this section, we explore some of the issues and design principles that need to be considered when developing such risk-share mechanisms.

2.2 Types of risk-share mechanisms

A first issue to consider in developing a risk-share mechanism is its **purpose** and the aspects that it is supposed to cover. Within-period adjustment mechanisms can be designed to change the risk/reward balance in a number of areas. It is important for the objective to be well-defined, as the optimal design of the mechanism is likely to differ depending on what it is intended to

achieve. Generally, sharing mechanisms fall into one of a few categories, as follows.

- **Protecting against (significant) variances in cost or traffic forecasts**. A number of airports have out/underperformance-sharing mechanisms for cost and/or traffic performance during the price control period. Related to this is the choice of the most appropriate measure to trigger the adjustment, such as: (i) the deviation of outturn costs or traffic from forecast; or (ii) a measure of overall financial performance (or profitability).
- **Protecting against specific cost increases for specified items that are determined to be outside of management control ('known unknowns')**—for example, increases in airport security costs, which are driven by border agencies and/or government legislation. These factors are typically dealt with through cost pass-through mechanisms, which increase allowed revenues by the differential (or a portion of the differential) between forecast and outturn cost. An important feature of these mechanisms is that the items subject to cost pass-through are specified ahead of the price control period.
- **Protecting against unknown, unforeseeable factors ('unknown unknowns')**—a clear example is the COVID-19 pandemic. These factors are usually dealt with through general provisions to reopen the price control should an unforeseen event materialise. General reopener provisions are common but rarely triggered, as they are usually subject to a high materiality threshold (i.e. there needs to be significant deviation from forecasts to trigger the mechanism).
- **Preventing companies from delaying investments within period**—a number of airports face penalties if capital projects are not delivered on time. There may also be provisions regarding the extent to which airports can recover overspend on capital projects, depending on whether it is deemed to be efficient overspend.

2.3 Design of risk-share mechanisms

Once the most appropriate type of mechanism is identified according to its intended purpose, a number of detailed **design aspects** need be considered to properly calibrate the risk allocation between users and the regulated entity. These typically include the following.

- **Deadbands/materiality thresholds.** For reasons of practicality, cost, and proportionality, sharing mechanisms are often subject to a pre-specified threshold such that an adjustment is made only in the event of more significant deviations from forecast. For example, a deadband may be set such that there is no risk-sharing applied if traffic is within 2% of forecasts.
- **One-sided vs two-sided.** Mechanisms can be designed to allow for only positive adjustments to tariffs as a result of underperforming relative to forecasts, reductions in tariffs when forecasts are exceeded, or both. We note that most risk-share mechanisms are two-sided.
- **Symmetry.** In a two-sided scheme, the level of sharing can be the same (symmetric) or different (asymmetric). For example, the airport might be required to share a higher proportion of outperformance (e.g. sharing of 50% of any cost reductions) than the level of protection it receives for underperformance (e.g. recovery of 25% of cost overruns).

- **Sharing rates.** The higher the sharing rate with users, the lower the risk borne by the company. This may dilute the incentives for the company to make efficiencies, which can harm users in the long run—even if they receive a higher proportion of any such savings in the short run.

  At the same time, a lower sharing rate will place more of the upside/downside risk on the regulated company. Therefore, it is important to find an appropriate balance between passing on savings to users and incentivising the company to make savings. In some cases, regulators impose a number of different bands as part of a risk-share mechanism, with different sharing rates applied to each band.

- **Timing of the adjustments.** The application of the sharing mechanisms can result in tariff adjustments either during the price control period—e.g. on an (n+1) or (n+2) basis—or at the beginning of the following period. The first approach has the advantage of addressing any shocks that are creating cash flow issues for the regulated entity in a more timely manner.

  However, it can lead to significant within-period tariff fluctuations, including tariffs potentially increasing when traffic is low and tariffs reducing when traffic is high. For example, if a risk-share mechanism had been in place at Dublin Airport during 2020/21, tariffs would have significantly increased due to a reduction in traffic of over 70%. Given that airlines were also facing significant financial hardship, such an increase in tariffs is unlikely to have been possible.

- **Triggering of the mechanism.** Sharing mechanisms can be defined in advance, such that they result in automatic adjustments once outturn performance is observed. Alternatively, the extent of sharing can be determined through a reopening of the price control if performance differs by more than a pre-specified threshold.

- **Use of out/underperformance.** An additional aspect to consider is the use of the financial resources resulting from the sharing. While the most common type of sharing mechanism uses the out/underperformance for reducing/increasing charges, there could be alternative approaches—e.g. a requirement for a proportion of any outperformance to be reinvested in airport infrastructure, or the development of a 'risk buffer' to protect against future shocks.

2.4 Summary

Different types of risk-share mechanisms can be deployed to address the risk/reward balance in different areas. Generally, mechanisms introduced by regulators can be classified into traffic risk-sharing, cost or performance-sharing, cost pass-through and reopeners. For each of these mechanisms, there are a number of design aspects—such as deadbands, sharing rates, symmetry, and the timing of the application of the mechanism—that are important to consider to calibrate the level of risk allocated to the airport and users, and to ensure that mechanisms are only triggered when necessary while preserving the effectiveness of the incentives in place.

In the following section, we discuss advantages and disadvantages of the risk-share mechanisms proposed by CAR, in light of the principles outlined above and relevant regulatory precedents.

3 Risk-share options proposed by CAR

3.1 Introduction

As discussed in section 0, CAR's Issues Paper outlined four potential approaches for risk-sharing. In terms of design considerations, CAR clarified that any potential mechanism introduced is likely to be symmetric, and therefore targeted at both out- and underperformance.[6] CAR also suggested that it would introduce a 'deadband', as well as different sharing rates at different levels of deviation from the forecasts.[7]

In addition, CAR noted the need to account for trade-offs and inter-dependencies among risk-share mechanisms and the building blocks. An example is the cost of capital, which is set to reflect the level of risk faced by the regulated entity. Changes to the airport's risk profile as a result of the implementation of a within-period risk-share mechanism may impact the cost of capital.[8]

CAR recognised that notwithstanding the role of within-period risk-sharing mechanisms, the most appropriate way to limit the risk of extreme downside deviations from forecasts may be the reopening of the regulatory settlement, as CAR has done during the COVID-19 period thus far. To that extent, another option envisaged by CAR is to provide an ex ante commitment to reopen the determination if and when a predefined level of variance from forecasts materialises.[9,10]

In section 2, we discussed how within-period adjustment mechanisms can be designed to address risk allocation in a number of areas. Depending on the objective, regulators use a variety of tools to alter the allocation of risk in situations where performance deviates from the forecasts set at the time of the price review.

In what follows, we explore advantages and disadvantages of the risk-share options proposed by CAR. We also present examples of how such mechanisms have been implemented at other airports, and in other regulated sectors.

3.2 Traffic risk-share mechanism

Due to the uncertainty around traffic forecasts for the 2023–26 period, CAR is considering introducing a traffic risk-share mechanism. Although there may appear to be a strong motivation for such a scheme in the context of the current traffic uncertainty, a number of factors are important to consider in determining the merits of such a mechanism.

First, the extent to which the airport would be protected from volume risk, and therefore how much risk would be allocated to users, would need to be determined. As illustrated in Box 3.1, regulators have adopted a range of approaches. In some cases, for example, regulators have imposed deadbands

[6] Commission for Aviation Regulation (2022), 'Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper', 4 February, p. 17 and p. 19.
[7] Commission for Aviation Regulation (2022), 'Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper', 4 February, p. 17 and p. 18.
[8] Commission for Aviation Regulation (2022), 'Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper', 4 February, p. 22.
[9] Commission for Aviation Regulation (2022), 'Third Interim Review of the 2019 Determination on Airport Charges at Dublin Airport – Methodological Consultation and Issues Paper', 4 February, p. 22.
[10] In the 2020–2024 Determination CAR did not specify the conditions for triggering an interim review but only referred to significant changes in circumstances. See Commission for Aviation Regulation (2019), 'Determination on the Maximum Level of Airport Charges at Dublin Airport 2020-2024', 24 October, p. 126.

of +/- 0.5% (see Aéroports de Paris) or +/- 5% (see Aeroporti di Roma), within which all risk is allocated to the airport. Regulators have also adopted sharing rates that increase as the difference between outturn volumes and forecasts increases, thereby ensuring a greater level of risk-sharing in cases of significant deviations.

Box 3.1 Traffic risk-share mechanisms: regulatory precedent

Aeroporti di Roma (AdR)

If outturn WLUs ('Work Load Units') over forecast are:

1. within a range of -5% to 5%, AdR bears all traffic risk;
2. higher than +5%, 50% of the higher income is set aside for future investments;
3. lower than -5%, 50% of the lower income is included as allowed costs in the following five-year period;
4. higher than +6% or lower than -6%, this may lead to a reopening of the price control.

Aeroports de Paris (AdP)

For the 2011–15 charges period, the tariff cap determined in the economic regulatory agreement (ERA) incorporated an adjustment mechanism for deviations between outturn and forecast traffic. The ERA justified the adjustment mechanism as follows:[1]

> This adjustment factor is consistent with an equitable sharing of traffic risks between Aéroports de Paris and the airlines. Moreover, it is also in line with the specific nature of an airport operator's business model, whose cost structure is not very adaptable to the volume of activity in the short term.

This traffic adjustment method (called the 'TRAF factor') measured deviations in passenger traffic at Paris-Charles de Gaulle and Paris-Orly. The TRAF mechanism specified a buffer zone within which no adjustment to the tariff formula was to be made. This buffer zone was set at +/-0.5% annual variance in passenger traffic. Beyond this buffer zone, 50% of the traffic deviation was applied to adjust all fee caps in the following year.

For the 2016–20 regulatory period, AdP proposed to extend this adjustment mechanism while introducing an asymmetry in the bonuses/penalties, allocating more risk to airlines. In addition, AdP proposed to define a new zone that would replace the associated penalty with new capacity investments if a sharp rise in traffic required the provision of new airport infrastructure. AdP proposed the following modifications to the mechanism:

- distributing traffic risk asymmetrically between airlines (bearing 70% of the risk) and AdP (bearing 30% of the risk);
- capping of the TRAF factor effect at -0.5% to +0.2% of the tariff cap for each period of application;
- replacing the price penalty by new investments not included in the investment plan if the growth in passenger traffic exceeds 3.5%. Such new investments would be financed by the income generated by the additional traffic.

The 2016–20 ERA adopted the cap to the TRAF factor proposed by AdP (-0.5% to +0.2% of the tariff cap). Within these limits, the TRAF factor is then calculated so that 50% of the surplus or 20% of the shortfall in the projected income from fees is offset by an adjustment of fee rates.

European air traffic control

The regulatory framework for European air traffic control, which applies to the Irish Aviation Authority, includes a volume risk-sharing mechanism that partially protects air navigation service providers (ANSPs) from substantial fluctuations in traffic. The ANSP bears all the risk on differences of up to 2% from the forecast traffic levels (i.e. there is a 2% symmetrical deadband) and 30% of the risk on differences of up to 10%. For differences in excess of 10%, ANSPs are protected from all risk because it is passed through to users two years later (i.e. n+2).

In response to the exceptional circumstances of the COVID-19 pandemic, the TRS scheme was amended for 2020 and 2021. In particular, a new target cost baseline for 2020 and 2021 was set on the basis of the actual and expected cost savings by ANSPs. Moreover, the revenue recovery will be spread over a period of five to seven years starting from 2023 (instead of the previous two-year lag).

Heathrow Airport

In its initial proposals for Heathrow's H7 review, the CAA confirmed that it intends to introduce new arrangements for traffic/revenue risk-sharing based on the new information on risks that have emerged since the COVID-19 pandemic began. The CAA considers that this will make the regulatory arrangements more flexible, to allow for the setting of a five-year price control and smoothing of charges increases. The CAA also said that introducing a risk-share mechanism will ensure that Heathrow Airport Limited's (HAL's) cost of capital and the allowed returns that airport charges support are not unduly increased. While HAL put forward a revenue risk-sharing arrangement, the CAA considered that this approach would dilute HAL's incentives to optimise commercial revenues, which could lead to higher charges in the long run. The CAA instead proposed a TRS mechanism.

The CAA noted that when selecting the parameters for the TRS mechanism, it took account of factors such as: the likely impact of traffic changes on OPEX and commercial revenue; the extent of traffic risk that HAL has experienced in the past; and incentives for HAL to continue to grow traffic.

The risk-sharing adjustment is based on the cumulative difference between outturn and forecast traffic volumes over the full H7 period through an adjustment to HAL's RAB at the start of H8. The CAA noted that this will ensure that customers are protected from increases in charges during the difficult periods that would typically be associated with lower levels of demand. The CAA has proposed moderate risk-sharing, of between 40–60% in a central band around the forecast of passenger levels, and stronger risk-sharing of 90–100% when traffic is more than 10% higher or lower than forecast.

Note: [1] Aéroports de Paris (Economic Regulation Agreement 2011-15).

Source: Oxera, based on various regulatory documents.

In the case of Dublin Airport, where the regulated entity has so far borne 100% of the volume risk, if a traffic risk-share mechanism were to be introduced, the implementation of a deadband and different bands of variance would provide some potential for out or underperformance. This would ensure some consistency with the existing regulatory framework, while also providing enhanced protection to the airport and users in case of more severe deviations. Complete protection against volume risk may have the detrimental effect of reducing the airport's incentive to grow traffic.

Another consideration is that the level of risk might not necessarily be symmetric or linear below and above the passenger forecast—for example, if the relationship between traffic and revenue differs from the relationship between traffic and costs.

Typically, for an airport with Dublin's commercial and regulatory characteristics, the relationship between revenue and passenger numbers would be expected to be relatively linear. Where airport regulation is based on a revenue yield (rather than total revenue) cap, regulated revenue is linear by construction—i.e. a 10% increase in passengers above the level assumed at the regulatory determination would lead to a 10% increase in regulated revenue. Although not deterministically calculated in the same way, there is a similar trend for commercial revenue, with greater footfall in the airport leading to greater commercial revenue.

If operating costs vary with traffic in a similar way to revenue, any increase in revenue would be offset by an equivalent increase in costs. Conversely, any

decrease in revenue would be offset by an equivalent decrease in costs. As such, there may not be a need for a traffic risk-share mechanism.

However, in practice, operating costs are unlikely to follow a similar trend given the level of fixed costs in the overall OPEX base. By definition, fixed costs do not vary with passenger numbers, and as such *reduce* the elasticity of OPEX with respect to passenger numbers. In other words, a 10% reduction in passengers is likely to lead to less than a 10% reduction in OPEX. This would accentuate the driver for a traffic-risk share mechanism—the greater the proportion of fixed costs, the lower the scope for a change in OPEX to offset the impact of passenger numbers deviating from the level assumed at the final determination.

The characteristics of a cost base with both fixed and variable components is such that the OPEX elasticity will not necessarily be constant across different passenger numbers. As the number of passengers approaches zero, the proportion of fixed costs in the overall OPEX base will increase, and the elasticity will tend to zero. Conversely, as the number of passengers grows, so too will variable costs, leading to fixed costs as a share of overall OPEX declining. As the share of variable costs increase, the elasticity of costs with respect to passengers would be expected to rise. CAR would need to ensure it robustly captures such dynamics when designing a traffic risk-share mechanism.

Another factor that would need to be taken into account is the timing of the adjustments to the price cap following deviations from forecasts. Adjustments can be applied during the price control, such as on an (n+1) or (n+2) basis, or as part of setting the subsequent price control. In principle, the sooner the deviations from forecasts are reflected in charges, the more effective the mechanism is in fulfilling the objective of protecting the airport from financeability issues.

At the same time, within-period adjustments may cause fluctuations in airport charges. For example, consider a mechanism with a deadband of 2% and a sharing rate of 50% for any deviations beyond 2%. A 12% reduction in traffic from forecasts in year n may result in a 5% increase in charges either at (n+1*)* or (n+2*)*. If the downturn in traffic is caused by a macroeconomic shock, then it may not be feasible to raise charges to this extent.

It is for this reason that some regulators only make adjustments to charges at the beginning of the next control period. For example, as part of Heathrow's H7 review, the CAA proposed a risk-sharing adjustment based on the cumulative differences between outturn and forecast traffic volumes over the full H7 period—see Box 3.1. This adjustment will be made to HAL's RAB at the start of H8 to avoid increases in charges in periods of low demand. While this helps to mitigate the issues described above, if there is a negative macroeconomic shock at the end of a regulatory period, it may still be difficult to raise prices at the beginning of the next period. On the other hand, if there is a shock in the first year of a price control period, the company would have to wait five years for an adjustment to prices, which may not help with any financeability issues.

Another approach would be to spread the recovery of the lost revenues over a longer period of time. As an example, the traffic risk-share mechanism applied in the European air traffic control sector has been temporarily modified to allow for a longer recovery of the revenue lost by air navigation service providers (ANSPs) in 2020 and 2021 over a five-to-seven-year period, rather than the

previous two-year period—see Box 3.1. However, this does not help to address immediate cash flow issues.

Even if the recovery of revenue is spread over a longer period of time, or deferred to the next period, a TRS is unlikely to be the right tool to address extreme traffic deviations from forecasts. Due to the pandemic, Dublin Airport experienced a reduction in passengers of 78.6% and 75.9% (compared to forecasts) in 2020 and 2021 respectively. Given the extent of the shock to the business, an interim review would have been necessary even with a TRS mechanism in place. Indeed, a number of airports that had risk-share mechanisms in place, such as AdP, still suspended the price control period.

Notwithstanding the need to address the uncertainty surrounding forecasts over the next regulatory period, a number of potential issues with introducing a TRS mechanism should be taken into account.

- The mechanism would dilute incentives for the airport to grow traffic. The use of properly calibrated deadbands and sharing factors could mitigate this effect and ensure a certain level of consistency with the framework currently applied at Dublin Airport, in line with the principle that the regulated entity should face risks and rewards within reasonable bounds.
- The application of a TRS mechanism may lead to higher charges for airport users when they are already facing the impact of low demand. This could make it difficult to adjust charges in the event of a significant downturn. If the TRS applies when traffic is above forecast, but is then not applied when traffic is below forecast, it will create an asymmetric risk for the airport.
- The TRS would only address a specific area of uncertainty. Commercial revenues, which depend on traffic and directly impact the level of allowed revenues under the single-till regime, are not taken into account.
- The TRS is not the right tool to address extreme deviations from forecasts. As demonstrated by the COVID-19 pandemic, price control reopeners are a more suitable way to protect from the ‘unknown unknowns’.

Another potential approach to mitigate the consequences of extreme deviations from forecasts is RAB reconciliation. As a result of exceptional circumstances (such as the COVID-19 pandemic), outturn revenues may be so low that the airport cannot recover its operating expenditure or the regulatory depreciation that is being permanently deducted from the RAB.

By capitalising a certain share of lost revenues, the RAB reconciliation approach can be an effective way to address financeability issues. In addition, as the lost revenues are dealt with through the RAB rather than charges, this approach has the advantage of smoothing price increases over the lifetime of the assets, and the immediate impact on prices can be minimised.

3.3 General risk-share mechanism

Performance-sharing mechanisms represent a broader form of risk-sharing that captures elements beyond traffic out- or underperformance. These schemes can take the following forms.

- **Cost sharing:** charges are adjusted to reflect a share of the difference between allowed and actual costs. In the airport context, an example is AdR, to which 50% of the difference between actual and allowed OPEX as at the last year of each price control is applied by adjusting the level of allowed revenues at the first year of the following price control. Other

examples are the regulated energy and water sectors in Great Britain, where a portion of the out- or underperformance in total expenditure (TOTEX) is shared with consumers—see Box 3.2 below.

- **Financial performance sharing:** mechanisms that lead to increases or reductions in the charges levied on airlines (or reinvestment) if financial performance, as measured by an agreed metric or set of metrics (e.g. return on capital employed, return on regulated equity, or credit ratios), is below/exceeds a predefined level. One example is the Return Adjustment Mechanism applied to energy networks in Great Britain, which considers deviations from the return on regulated equity.[11]

The GRS mechanism proposed by CAR would adjust charges according to deviations from a target level of EBITDA, with similar considerations to the TRS with regard to banding, sharing factors, and the timing of adjustments. The proposed mechanism lies between the two types set out above: on the one hand, it holistically considers costs and revenues, while on the other it focuses on the airport's operational performance without accounting for the outturn level of total returns.

Profit-sharing mechanisms are a more extreme form of risk-sharing; they not only capture the effect of traffic deviations from forecasts, but also variations in OPEX and commercial revenues. Such a scheme could provide the airport or users with a higher level of protection from excessive losses or profits that can result from factors outside of management control. However, there are a number of potential downsides of such an approach.

- The introduction of a GRS mechanism would represent a material change in the regulatory incentives that have applied to Dublin Airport over a prolonged period of time.
- Notwithstanding the presence of a deadband, the GRS scheme would position the framework closer to a rate of return form of regulation, whereby the regulated entity would have weaker incentives to manage its costs efficiently or to foster its commercial activities. In the long run, this could lead to higher prices for users.
- In practical terms, if the airport were to outperform in one area, the incentives to outperform in other areas may be diluted if doing so would trigger the sharing mechanism.

There are also a series of practical issues concerning the design of the GRS scheme that would need to be taken into account. CAR mentioned that the scheme 'would be based on EBITDA variations', although it is not clear at this stage how the target EBITDA level or the deadband would be defined. Defining such targets is likely to involve a certain degree of regulatory discretion, as these could be set according to Dublin Airport's historical financial performance, international benchmarking, or the regulator's expectations.

More than the other proposed mechanisms, a profit-sharing scheme would make Dublin Airport less accountable for operational decisions taken over the course of the regulatory period, as the effects would be shared with airport users. It would also bring an added level of complexity and regulatory discretion to the price control. In addition, as in the case of the TRS, the GRS would lead to higher charges for airport users at a time when they are already

[11] A similar approach, known as 'financial tramlines', was previously used in the Scottish water sector. See Oxera (2012), 'Regulatory 'financial tramlines' for Scottish Water', note prepared for WICS, February.

facing the impact of low demand (if adjustments are made within period). If adjustments are made as part of the subsequent price control period, it is unlikely to address cash flow issues faced by the business.

Box 3.2 Performance-sharing mechanism: regulatory precedent

Aeroporti di Roma (AdR)

A profit-sharing mechanism is applied to AdR, according to which the OPEX baseline at the beginning of each price control period is adjusted to reflect 50% of the difference between the allowed and outturn OPEX resulting from the last year of the previous period. The mechanism is symmetric; AdR shares 50% of the OPEX out or underperformance with users.

GB energy networks

The 'TOTEX Incentive Mechanism' (TIM) is applied by Ofgem in its RIIO-2 price control. TOTEX outperformance or underperformance is shared with consumers in proportion to the incentive rate, which in turn depends on the confidence that Ofgem has in the efficiency of the costs proposed by the companies. The sharing rate is set individually for each company and in RIIO-2 it ranges from 33% to 50%. The mechanism is symmetric and does not include a deadband.

The 'Return Adjustment Mechanism' (RAM) is applied by Ofgem in its RIIO-2 price controls. The purpose of this mechanism is 'to provide protection to consumers and investors in the event that network licensees' returns are significantly higher or lower than anticipated at the time of setting the price control'. According to the RAM, if the return on regulated equity (RoRe) deviates from the allowed return on equity by more than 300bps, 50% of the out- or underperformance is shared with consumers. If RoRe deviates from the allowed return on equity by over 400bps, 90% is shared with consumers.

Source: Oxera, based on various regulatory documents.

3.4 CAPEX adjustment mechanism

It is common regulatory practice to apply CAPEX true-ups at the end of each price control period, resulting in a clawback in the event of non-delivery or allowing the regulated company to recover the overspend for the portion deemed efficient. In some cases (see Box 3.3 for examples for Aena, AdP and Italian airports with more than 1m passengers per year),[12] regulators impose penalties for delayed or unrealised investments.

The CAPEX Adjustment Mechanism proposed by CAR differs from the examples above as it combines the 'log up/down' of the RAB at the end of each price control with elements of the traffic risk-share mechanism. In particular, according to the proposed scheme, the level of clawback of CAPEX underspend at the following price review would be adjusted based on the difference between forecast and outturn traffic outside of a deadband.

For example, with a 5% deadband and a 15% reduction in traffic, the quantum of allowed CAPEX not subject to clawback would be set at 10%. The scheme would work symmetrically, such that a portion of the additional revenue as a result of the outperformance on traffic would be subject to clawback if not invested in additional CAPEX.

The CAPEX adjustment mechanism would only partially reduce the level of risk borne by Dublin Airport; in a traffic downside scenario, the proportion of lost revenues to be recovered would be limited to a proportion of the unspent CAPEX. However, contrary to the TRS and the GRS mechanisms, the application of the scheme would not involve direct or immediate adjustments to

[12] Applied to the Italian airports that are subject to the regulation of the Italian Transport Regulatory Authority (ART).

the price cap, therefore limiting fluctuations in airport charges. The scheme would also provide a certain level of protection for Dublin Airport when rebalancing its CAPEX programme in response to a downturn in traffic.

At the same time, the proposed mechanism would create a direct and immediate link between traffic and investments. However, CAPEX is, by its nature, for long-term investments, and it may not be appropriate to alter the CAPEX programme based on small and short-term deviations in traffic from forecasts. This is likely why CAR's proposed design of the scheme is not supported by regulatory precedents in other jurisdictions or sectors.

Box 3.3 CAPEX adjustment mechanisms: regulatory precedent

Aena

Aena incurs penalties (in the form of lower allowed revenue per passenger) where strategic investments are not delivered on schedule. The penalty for such delays can be up to 5% of the value of the annual CAPEX programme.

Aéroports de Paris (ADP)

ADP can be penalised, or receive a bonus, depending on whether its investments and development projects are carried out according to the proposed schedule. The bonuses and penalties are offset against each other yearly, and only a net penalty is taken into account when making an adjustment to the tariff formula. The net annual penalty applicable represents at most -0.1% of overall fee revenue.

Italian airports with more than 1m passengers per year

According to the new regulatory model for Italian airports with more than 1m passengers per year, the CAPEX component of the charges is annually adjusted to account for the percentage of unrealised investments of the total planned investments of the previous year. Additionally, a penalty is applied if the delay on the investments is attributable to the airport. The penalty is calculated by multiplying the tariff adjustment by the WACC, accounting for the percentage of the delay that is attributable to the airport operator.

Source: Oxera, based on various regulatory documents.

3.5 OPEX pass-through

Pass-through mechanisms are a common regulatory tool in the airport context and other regulated sectors. According to this approach, there are defined categories of costs, generally outside of the regulated entity's control (e.g. security), for which any increase in costs beyond what was forecast as part of the determination is passed through to customers. The adjustment to charges can be applied yearly or at the beginning of the following price control period.

Such a mechanism is typically only applied to costs that the regulated entity has no control over, as it may not be appropriate to fully allocate the risks associated with those costs to the airport. However, such a mechanism should not be used for costs within the control of the regulated entity, as this could reduce its incentive to increase its efficiency.

An OPEX pass-through mechanism focused on Local Authority Rates and direct charges set out in new or amended primary and secondary legislation exceeding €0.5m per year was introduced in the 2019 determination for Dublin Airport and removed for 2020–22. CAR is now consulting on whether to reimplement the mechanism, and on possible changes to its conditions and applications. CAR is also considering whether to apply a construction price inflation index instead of the consumer price index (CPI) for the reconciliation of outturn capital expenditures with initial allowances.

Provided that the set of uncontrollable costs is well defined in advance by the regulator ('known unknowns'), pass-through mechanisms can be an effective way to de-risk the regulated entity while maintaining high-powered incentives. As shown in Box 3.4, pass-through mechanisms are supported by regulatory precedents, including Heathrow, Aena and AdR, to address issues such as changes in input prices or new legislative provisions.

Box 3.4 Cost pass-through mechanisms: regulatory precedent

Heathrow Airport

The Q6 price control included a pass-through mechanism for security cost increases resulting from a security standard tighter than what was assumed ex ante by the CAA. The CAA set the pass-through factor at 90% of the cost increase above a deadband of £19m. The mechanism was designed symmetrically.

Aena

- **Input cost inflation**—adjustments can be made where there is an unforeseen change in input costs that is outside the control of management and cannot be offset by efficiency measures without compromising the quality of service standards established by the DORA. Such adjustments are confined to situations in which the input price index used to calculate allowed revenues is more than 1% higher than forecast. Any proposed changes are subject to approval by the Council of Ministers.
- **New investment requirements**—allowed revenues can be adjusted where an unforeseen change in Spanish or EU legislation leads to a requirement for additional investment that will result in Aena exceeding its annual CAPEX limit of €450m. Any proposed changes are subject to approval by the Council of Ministers.

Aeroporti di Roma (AdR)

Airport tariffs are adjusted annually to reflect incremental charges due to the entry into force of new legislative provisions.

GB energy networks

Pass-through mechanisms are among the types of 'Uncertainty Mechanisms' adopted by Ofgem as part of the RIIO framework. Pass-through mechanisms adjust allowances for costs incurred by network companies over which they have limited control, such as business rates and bad debt. Ofgem also provides annual true-ups for differences between input price inflation for labour/materials and general inflation (known as 'real price effects').

Gas Network Ireland

Gas Network Ireland (GNI) is provided an ex ante allowance for pass-through costs. Any difference between the allowances and actual outturn costs are corrected for through a look-back review. In the PC4 price control, the Commission for Regulation of Utilities (CRU) included, among others, the following items within the pass-through costs: Scottish rates, Irish rates, CO_2 costs, CRU levy. In the recent Consultation Paper for the PC5 price control, the CRU confirmed the PC4 approach.

Source: Oxera, based on various regulatory documents.

3.6 The impact of the proposed risk-share mechanisms on the allowed cost of capital

The introduction of the mechanisms described above would change the risk allocation between Dublin Airport and airport users. Reducing the risk faced by Dublin Airport with respect to traffic or expenditure would alter the risk profile of the regulated entity, likely influencing the asset beta and, ultimately, the allowed cost of capital.

The asset beta captures the 'systematic' risk to which a company is exposed, reflecting the undiversifiable risk of holding Dublin Airport equity in a portfolio of

assets. In other words, the asset beta determines the return required by investors to hold equity of a specific company—the higher the risk associated with a company, the higher the beta. Risk-sharing mechanisms, particularly the TRS and the GRS, may reduce Dublin Airport's exposure to volatility, therefore lowering its asset beta.

In the 2019 Determination, the asset beta was estimated as the weighted average of the observed asset betas for a set of nine listed comparator airports. Airports were weighted on the basis of their comparability to Dublin Airport with respect to the regulatory environment, demand structure and business structure. The aspects considered to determine the comparability of the regulatory environment included whether the framework applied to each airport allowed for within-period adjustments to reflect deviations from traffic forecasts, awarding a higher weight to airports with no or limited TRS mechanisms. If such an approach to estimate the asset beta were to be confirmed for the 2022 review, the introduction of a risk-share mechanism is likely to be reflected in the composition of the set of comparators, and on the weight attributed to different airports.

It is important to note that the extent to which Dublin Airport's allowed cost of capital will be impacted by the introduction of a risk-share mechanism would depend on the design of the mechanism. Factors such as deadbands, sharing rates and symmetry will determine Dublin Airport's risk exposure.

The impact of the introduction of a TRS on the allowed cost of capital has been recently considered by the CAA as part of its Initial Proposals for Heathrow for the next regulatory period. In particular, the CAA estimated the effect that the TRS would have in terms of mitigating the increase in the asset beta, based on the percentage of cash flow losses that would be avoided in the event of a future pandemic-type event: according to such an approach, the asset beta was reduced by 0.02–0.07. The CAA also stated that the impact of the TRS on Heathrow's pre-pandemic beta will be accounted for when choosing the point estimate for the cost of capital.[13]

[13] UK Civil Aviation Authority (2021), 'Economic regulation of Heathrow Airport Limited: H7 Initial Proposals Section 2: Financial issues', October, paras 9.69–9.74.

4 Summary

This note has considered CAR's proposals for risk-sharing mechanisms for Dublin Airport for the period 2023–26. The advantages and disadvantages of each mechanism have been discussed, taking into account design principles and the potential changes to the incentives underpinning the regulatory framework, considering regulatory best practice and international precedent. The table below summarises our findings.

Table 4.1 Summary of risk-share mechanisms

Type of risk-share mechanism	Design considerations	Advantages	Disadvantages
Traffic risk-share mechanism (TRS)	• symmetry and definition of bands of variance and sharing rates • timing of the adjustment (within-period vs at the end of price control)	• relatively simple to implement • can be useful in addressing uncertainty regarding traffic forecasts • shares the risk of unforeseen traffic deviations between Dublin Airport and users	• may cause fluctuations in charges, and is likely to cause large price increases when there are negative traffic shocks, which the market may not be able to bear • reduced incentives for Dublin Airport to grow traffic • only provides protection on aeronautical revenue • may not be sufficient in addressing extreme deviations from forecasts
General risk-share mechanism (GRS)	• symmetry and definition of bands of variance and sharing rates • defining the target EBITDA level and a reasonable range of deviation	• captures traffic performance, but also other areas of performance, such as OPEX and commercial revenue • provides Dublin Airport and users with protection from excessive losses or profits resulting from aspects outside of management control	• closer to 'rate of return' regulation and thus may reduce the incentive for the airport to be efficient or otherwise outperform the settlement (particularly when it is approaching the upper or lower bound) • makes the airport less accountable for operational decisions taken during the price control, as the effects are shared with users • if outperforming in one area, there may be reduced incentives to outperform in another area if this will trigger sharing
CAPEX adjustment mechanism	• definition of the deadband • how CAPEX allowances should be varied with traffic	• the application of the scheme would not involve direct adjustments to the price-cap, therefore limiting fluctuations in charges	• limited protection from traffic risk • would artificially strengthen the link between the current level of traffic and investments • may be subject to critiques from airlines, as deferred investment could be funded twice

Type of risk-share mechanism	Design considerations	Advantages	Disadvantages
OPEX pass-through	• determine which items to include • consider whether the full differential, or a proportion of the differential between forecast and outturn costs are passed through	• protects against increases in costs that are outside of the airport's control ('known unknowns')	• may impact efficiency incentives (although this risk could be mitigated by focusing on costs that are genuinely uncontrollable for the airport) • items need to be specified (and therefore known) in advance of the price control period

Source: Oxera.

Risk-sharing mechanisms can be effective regulatory tools to protect airports and users from uncertainty and significant deviations from ex ante forecasts. At the same time, such mechanisms can significantly change the incentives underpinning the regulatory regime. It is therefore important to ensure that any mechanism introduced provides the regulated entity with the incentive to efficiently manage its costs, grow traffic and foster its commercial activities.

It is also important to take several design considerations into account when setting up any mechanism. Properly calibrated deadbands and sharing rates should be implemented to ensure that the risk allocation between the regulated entity and users is aligned with the intended purpose of the mechanism. In addition, the design of the risk-share mechanism should be intuitive, transparent and easy to apply, to avoid adding an excessive level of complexity and regulatory discretion to the price control.

An important consideration is the extent to which risk-sharing mechanisms are practicable—and particularly mechanisms that result in large, immediate price rises in response to negative traffic shocks. The design of any such mechanism would therefore need careful consideration to ensure that it does not merely act to cap upside while leaving downside risk with the airport. There should also be a clear rationale for the implementation of such a mechanism, such that it addresses an issue that is not already dealt with through existing provisions (e.g. a reopener) in the current regulatory framework.

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