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IAA's En Route and Terminal Services Costs of Capital

Prepared for IAA

31 May 2019

1. Introduction

This report contains First Economics' estimates of the costs of capital for IAA's en route and terminal services businesses. It is intended to inform calculations of the allowed returns that are to be factored into IAA's RP3 charges.

The paper is structured into seven main parts:

- section 2 outlines the methodology that we have used in our work;
- section 3 assesses the risk that IAA's equity carries and puts forward estimates of betas;
- section 4 gives a figure for gearing;
- section 5 contains estimates of the two generic parameters in the cost of equity calculation – the risk-free rate and the equity-risk premium;
- section 6 provides a calculation of the cost of debt;
- section 7 considers tax; and
- section 8 brings all of the preceding inputs together into overall estimates of the costs of capital.

2. Approach

The costs of capital that we consider in this paper are forward-looking estimates of the returns that the en route and terminal services businesses need to provide in order to attract and retain investor capital. In line with the terms of reference that were given to us by IAA, and consistent with regulatory practice more generally, we have deliberately sought to estimate this cost of capital independently from IAA's current ownership arrangements so that the return on offer through charge controls is capable of supporting any reasonable and efficient investor set.

The cost of capital is a weighted average of two components: the cost of debt (K_d); and the cost of equity (K_e), where the weightings (gearing or g) reflect the relative importance of each type of financing in a firm's capital structure.

$$WACC = g \,.\, K_d + (1 - g) \,.\, K_e$$

The cost of debt is directly measurable and in the analysis that follows we reference IAA's RP2 borrowing arrangements to calculate the value of K_d. The cost of equity, by contrast, cannot be directly observed and we have instead modelled the returns that we would expect a shareholder to demand in exchange for holding shares in a stand-alone en route business and a stand-alone terminal services business. The tool that we have used in our analysis is the CAPM, which relates the cost of equity to the risk-free rate (R_f), the expected return on the market portfolio (R_m), and a business-specific measure of investors' exposure to systematic risk (beta or β_e):

$$K_e = R_f + \beta_e \,.\, (R_m - R_f)$$

The two equations together show that our costs of capital calculations are based on estimates of five parameters: g, K_d, R_f, R_m and beta. In putting specific figures against each of these inputs we have sought to draw as far as possible on primary market data. We have also taken account of recent regulatory precedent, giving particular attention to the views that Irish regulators and UK regulators have expressed in recent decisions. Inevitably, in many areas we have had ultimately to exercise a degree of judgment in order to be able to select precise numbers from the evidence we have collected, but we have tried in the analysis that follows to give a clear explanation for these judgments and to make our thinking as transparent as possible in order to assist the parties to forthcoming consultations.

3. Riskiness and Beta

We start deliberately with a section on risk profiles and betas on the basis that the analysis that follows describes the key features of the businesses whose costs of capital we are trying to estimate.

3.1 Preliminaries

Methodology

A firm's equity beta is a measure of the riskiness of a firm – or more specifically, a measure of the systematic risk that a firm presents – relative to the market portfolio. Firms that exhibit a beta of more than 1 can be considered more risky than the average stock market investment and need to pay their investors a higher-than-average return; firms with a beta of less than 1 are less risky and warrant lower returns; and firms with a beta of exactly 1 are seen by investors as being of equal risk to the market portfolio and are expected to generate a return in line with R_m.

Empirical estimates of beta are usually obtained by measuring the correlation between movements in a company's share price and movements in the value of the stock market as a whole. However, in this report we are interested in obtaining beta estimates for two unlisted businesses and cannot use market data directly. The next best alternative that we have is to collect beta estimates for companies that look to be in some sense similar and to make a judgment about the value of the en route and terminal services betas on the basis of this comparator evidence. This is an approach that has been deployed in an increasing number of periodic reviews during recent years as the number of regulated companies with a stock market listing has become very limited, and is regarded as a robust and reliable way of assessing beta in the absence of direct stock market data.

Asset beta

When comparing the betas of different firms, one has to be careful to take account of the different gearing levels that firms choose since, all other things being equal, a firm with higher gearing will present higher risk to shareholders and exhibit a higher equity beta. Unless one controls for this effect, there is a danger of confusing the risk that comes from high leverage with the underlying business risk that a firm faces by virtue of the nature of the activities it is carrying out.

This is where the concept of an asset beta proves useful. An asset beta is a hypothetical measure of the beta that a firm would have if it had no debt and were financed entirely by equity. By comparing different firms' asset betas it becomes possible to isolate the underlying systematic

risk that a company has and carry out an assessment of the relative riskiness of different businesses.

The asset beta is calculated using the following formula:

$$\beta_a = (1 - g) \cdot \beta_e + g \cdot \beta_d$$

where β_a is a firm's asset beta, g is gearing and β_d is the firm's debt beta.[1]

A firm's actual gearing is something that is easily calculated using reported debt figures and market capitalisation, but a firm's debt beta is not something that is directly observable. We have assumed in our work that β_d is a constant of 0.1 (the value that the UK Competition Commission used in its inquiries).

Confidence intervals

This provides a complete description of our methodology for estimating asset betas. The only other point we must make is that beta estimates are exactly that: estimates. Every estimate that we identify comes with a standard error and the figures that follow must be regarded as mid-points within wider confidence intervals.

3.2 Comparator analysis

Our comparator set comprises the most recent decisions about betas made by the Commission for Aviation Regulation, the Commission for Regulation of Utilities, the Commission for Communications Regulation, the UK's Civil Aviation Authority, Ofgem and Ofwat. We also consider beta estimates produced by three other air navigation service providers.

The comparator data is set out below.

Table 1: Beta estimates used in recent periodic reviews of regulated firms

	Regulator's estimate of asset beta
Electricity, gas and water network utilities	0.38 to 0.45
New entrant generation plant	0.56
Fixed line telecommunications company	0.60
Mobile telecommunications company	0.70
Dublin airport	0.60
Gatwick airport	0.56
Heathrow airport	0.50

References: CAA (2014), Estimating the cost of capital – technical appendix for the economic regulation of Heathrow and Gatwick from April 2014; Commission for Aviation Regulation (2014), Maximum level of airport charges at Dublin Airport – 2014 determination; Commission for Communications Regulation (2014), Cost of capital; SEM Committee (2015), Fixed cost of a best new entrant peaking plant, capacity requirement and annual capacity payment sum for the trading year 2016 – decision paper; Commission for Energy Regulation (2015), Decision on TSO and TAO transmission revenue for 2016 to 2020; Commission for Energy Regulation (2016), Irish Water, Second revenue control 2017-18; Commission for Energy Regulation (2017), Decision on October 2017 to September 2012 distribution revenue for Gas Networks Ireland.

[1] For those that have not come across this concept before, a debt beta is similar to the equity beta, but rather than measuring the systematic risk taken by the company's shareholders, it represents such risk presented to the company's lenders.

Figure 2: Summary of comparator analysis in table 1

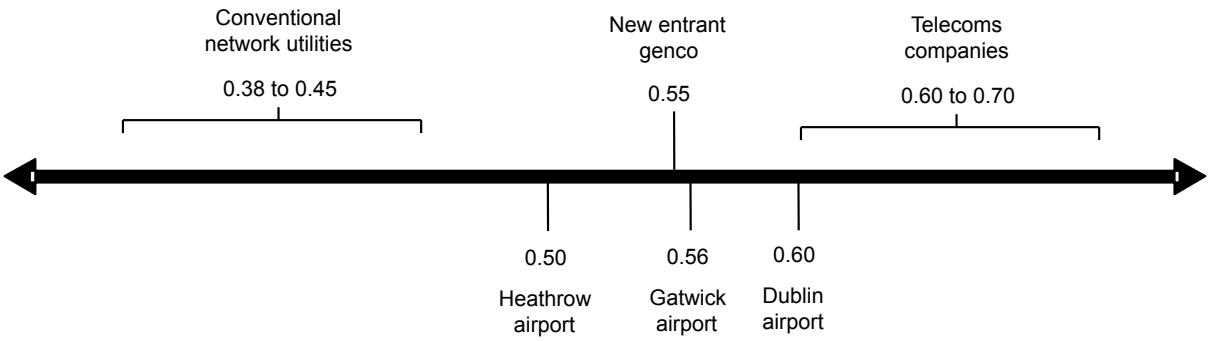


Table 3: ANSP beta estimates

	Estimate of asset beta
NERL, UK RP2	0.505
Airservices, Australia	0.55
Airways New Zealand	0.60

References: NERL (2018), RP3 business plan 2020-24; Airservices (2016), Pricing proposal 2016-21; Airways New Zealand (2016), Statement of corporate intent 2016-17 to 2018-19.

The evidence shows that conventional utility network companies have the lowest asset betas and that other regulated companies have been ascribed betas which sit at a premium to this base. This is a picture that can be found in many similar reports and should not be regarded as controversial in itself. The difficult decision that we face is not to identify the betas of comparator companies but to position IAA's en route and terminal services businesses at an appropriate point in the spectrum.

3.3 En route and terminal services betas

Approach to comparisons of riskiness

In working through this task it is useful to highlight four main determinants of the (systematic) risk that the equity in IAA bears.

- Demand variability – IAA operates in markets where demand for its services is very closely correlated to the overall volumes in the aviation sector. These volumes will in turn be sensitive to macroeconomic conditions, insofar as a downturn in the local or global economy will cause people to travel less and cause airlines to fly fewer planes, and vice versa for any upturn. The aviation sector has also shown itself to be very sensitive to other shocks, including terrorist incidents and even volcanic eruptions.
- Cost variability – IAA relies heavily on direct and indirect staff to carry out its functions. As labour becomes more expensive, whether through wages, social security costs or pension costs, IAA's costs will go up, and as labour becomes less expensive costs will go down. Similarly, on the capex side of costs, IAA is exposed to changes in the costs of IT products.

- Regulation – the two previous risk factors cannot be looked at in isolation from the important role that regulation plays in determining the way in which changes in volumes or costs translate into changes in profit. Through the design of charge control arrangements and associated incentive mechanisms the European Commission exerts a significant degree of control over the degree to which shareholders are exposed to risk – a situation that distinguishes regulated companies from unregulated companies. In particular, risk-sharing arrangements around volumes, where available, can offer shareholders protection against changes in demand, while the feed through between IAA's actual costs and prices will determine how far shareholders are exposed to cost shocks.
- Cost/revenue structure – a final consideration is the sensitivity of profit to out-/under-performance against the networks' price control assumptions. In particular, it is now widely acknowledged in regulation that companies which have small asset bases in comparison to ongoing revenues present shareholders with much greater risk than companies which have large asset bases in comparison to ongoing revenues.

The first three items on this list are fairly straightforward to understand, but the fourth merits a slightly more detailed explanation. In the worked example below, we depict two companies with identical ongoing expenditures. They differ only insofar as company A has a small regulatory asset base and company B has a large regulatory asset base. Both companies set charges so as to be able to cover their expenditure plus a return on the regulatory asset base (RAB). For the purposes of this illustration, let us assume initially that both companies seek a return of 10% per annum.

Table 4: Illustrative worked example

	Company A	**Company B**
RAB	€100m	€1,000m
Expenditure	€200m	€200m
Return on RAB @ 10%	€10m	€100m
Revenues	€210m	€300m

Now consider what happens to these companies when they experience the same percentage cost overrun or the same percentage revenue loss. Although the absolute €m loss of profit is similar in both companies, the percentage loss is far greater for company A with the small RAB than it is for the company B with the larger RAB.

Table 5: Revenues, costs and profits after a 2% cost shock

	Company A	**Company B**
RAB	€100m	€1,000m
Revenue	€210m	€300m
Expenditure	€204m	€204m
Profit	€6m	€96m
Profit as % of RAB	6%	9.6%

Table 6: Revenues, costs and profits after a 2% revenue shock

	Company A	Company B
RAB	€100m	€1,000m
Revenue	€205.8m	€294m
Expenditure	€200m	€200m
Profit	€5.8m	€90m
Profit as % of RAB	5.8%	9.4%

An exactly analogous story can be told of the effects of unexpected cost reductions and about revenue gains, insofar as a given cost or revenue shock causes a greater percentage change in profits for companies with small asset bases.

This provides important insights into the riskiness of different firms because it shows that the variability in out-turn profits is not just a function of the likelihood and scale of cost and demand shocks, but also the upfront margin that is factored into allowed revenues. Holding all other things equal, shareholders in a regulated company with a small RAB/profit relative to ongoing costs are likely to suffer proportionately more when downside shocks occur (and gain more following upside events) in comparison to shareholders in firms whose RABs/profits are large relative to ongoing costs.

This higher potential volatility in profits makes companies with high 'operational gearing' more risky in the eyes of shareholders. Consequently, a firm with a small RAB would not have the same cost of capital and would not seek the same return as a company with a large RAB. It would instead need to factor a higher cost of capital upfront into its charges.

Comparison of risk profiles

It follows that in order to understand how much risk the different shareholders in our sample of comparator firms are exposed to one has to look holistically at the potential volatility in demand and costs, take the range of outcomes that one can envisage through the sector's regulatory rules and then examine the impact on each comparator's profits. It is not possible to evaluate riskiness without taking the full chain of events into account – in particular, we would caution anyone from making judgments about a business's risk profile on the basis of perceptions of industry demand and industry cost variability alone.

Despite their similarities, the regulated companies in table 1/figure 3 are not identical in any of the above respects, as table 7 demonstrates.

Table 7: Characteristics of regulated companies

	Exposure to demand risk	Exposure to cost risk	Operational gearing
Conventional utility utilities	Low – companies typically have revenue caps, giving a fixed entitlement to collect revenues irrespective of demand	Low – costs are mainly repeated opex and capital works. Costs have high labour content, with some exposure to commodity prices and the construction cycle. Price control design exposes companies to a fixed proportion of variations in most of these costs.	Low to moderate – typical RAB-to-revenue ratios for network utilities are 4 to 6 times

Dublin airport	High – passenger volumes are highly sensitive to GDP growth and industry shocks. Dublin airport is regulated via a price cap, in which a change in volume feeds through 1-for-1 to a change in revenues.	Low to moderate – costs are mainly repeated opex and capital works. Costs have high labour content, with some exposure to commodity prices and the construction cycle and a more noticeable exposure to swings in utility and security costs. The Commission's price control design exposes the airport to variations in these costs until a price control reset after five years.	Low to moderate – RAB-to-revenue ratio of 4 times
Heathrow airport	High – passenger volumes are highly sensitive to GDP growth and industry shocks. Heathrow is regulated via a price cap, in which a change in passenger numbers feeds through 1-for-1 to a change in revenues.	Low to moderate – costs are mainly repeated opex and capital works. Costs have high labour content, with some exposure to commodity prices and the construction cycle and a more noticeable exposure to swings in utility and security costs. The CAA price control design exposes the airport to variations in these costs until a price control reset after five years.	Low – RAB-to-revenue ratio of 6 times
Gatwick airport	High – passenger volumes are highly sensitive to GDP growth and industry shocks. Gatwick is regulated via a price cap, in which a change in passenger numbers feeds through 1-for-1 to a change in revenues.	Low to moderate – costs are mainly repeated opex and capital works. Costs have high labour content, with some exposure to commodity prices and the construction cycle and a more noticeable exposure to swings in utility and security costs. The CAA price control design exposes the airport to variations in these costs until a price control reset after five years.	Low to moderate – RAB-to-revenue ratio of 4.5 times
New entrant genco	Moderate – volumes/sales are sensitive to GDP growth, although a capacity payment mechanism provides some guaranteed income	Moderate – costs comprise mainly fuel purchase costs and some labour costs, giving exposure to commodity prices. Cost recovery is via the competitive market	n/a
Telecoms companies	Moderate to high – volumes/sales are sensitive to GDP growth	Moderate – costs comprise labour, equipment, IT and spectrum costs. Cost recovery is via the competitive market.	n/a

Source: First Economics' analysis.
Note: the RAB-to-revenue metric is intended to capture the observations we made earlier about the higher riskiness of firms with small RABs/profits. A high RAB-to-revenue ratio implies that profits are fairly resilient in the face of shocks and a small RAB-to-revenue ratio implies that returns can be affected quite significantly by even small variations in costs and revenues. Our calculations of revenues include both the aeronautical revenue and non-aeronautical revenue that is included in the regulators' price control calculations.

We make the following observations about the entries in this table:

- the conventional network businesses all exhibit negligible revenue risk, relatively low cost risk, and have sizeable RABs. This largely explains why they sit at the left-hand side of the spectrum that we drew in figure 2; and
- all of the companies that sit to the right of the energy and water networks have fairly obvious characteristics that make them riskier in the eyes of investors. Exposure to volume/revenue risk, in particular, cause each of a new entrant genco, telecoms companies and airports to have a higher equity beta than the conventional network utilities.

Assessment

The position of IAA's en route and terminal services businesses depends crucially on the regulatory framework that they operate under in future.

The Charging Regulation requires that en route and terminal services charges are to be fixed in advance for each new Reference Period, and adjusted thereafter only in accordance with a set of common principles. These include the following allocations of volume and cost risk:

- volume risk is to be allocated in such a way that –
    - the ANSP takes any gain or loss of revenue if service units are within ±2% of forecast;
    - gains and losses in revenue are to be split 30% to the ANSP and 70% to the airlines after actual service units move more than 2% but less than 10% outside of forecast;
    - airlines take all of the gain or loss of revenue once service units are more than ±10% outside of forecast;
- differences between actual and forecasts costs are to be borne by the ANSP except where it has been deemed in advance that items of cost are outside of the ANSP's control

We can add two further entries to the list in table 7 as follows.

Table 8: Characteristics of regulated companies

	Exposure to demand risk	**Exposure to cost risk**	**Operational gearing**
IAA – en route	Moderate to high – service unit volumes are sensitive to GDP growth and industry shocks. The current Charging Regulation requires: - IAA to bear volume risk if service unit volumes are within ±2% of forecast - revenues gains and revenues losses to be split 30% to IAA and 70% to airlines when service unit volumes move beyond 2% but below 10% of forecast - airlines to bear volume risk beyond ±10% of forecast	Low to moderate – costs are a mixture of labour opex plus IT investments. IAA is exposed to variations in these costs until the price control reset at the end of the five-year period.	Very high – RAB-to-revenue ratio of 0.7 times at the end of RP2 reducing to 0.5 times in RP3

IAA – terminal services	Moderate to high – service unit volumes are sensitive to GDP growth and industry shocks. There is also a dependence on two main airline customers. The current Charging Regulation requires: - IAA to bear volume risk if service unit volumes are within ±2% of forecast - volume risk to be split 30% to IAA and 70% to airlines if service unit volumes are beyond 2% but below 10% of forecast - airlines to bear volume risk beyond ±10% of forecast	Moderate – costs are a mixture of labour opex plus IT investments. In RP3, IAA will be taking on a major capex project that will almost treble its RAB. IAA is exposed to variations in costs until the price control reset at the end of the five-year period.	High – RAB-to-revenue ratio of 1.3 times at the end of RP2 rising to 2 times in RP3

When we compare the entries in table 8 to the comparator set in table 7 we can observe that:

- exposure to volume risk and small RABs / high operational gearing mean that it is very clear that both the en route and terminal services businesses are more risky than conventional network utilities;
- there are offsetting factors to consider when comparing to Dublin, Heathrow, Gatwick airports. The airports are exposed to more volume risk, both by virtue of having price caps defined with reference to passenger numbers rather than service units and by taking volume risk in full without recourse to sharing arrangements. But the airports also have significantly lower operational gearing, meaning that revenue shocks, when they occur, have less of an impact on returns as a % of the RAB;
- the terminal services business's RP3 capex plan is also a material source of risk; and
- comparisons to companies operating in competitive markets are less straight-forward, but the en route and terminal services businesses very small starting asset bases mark them out as highly unusual businesses.

These observations help us to position the IAA betas.

Looking first of all at the comparison to conventional network utilities, we can say that the IAA betas should be placed at a clear distance above conventional utility betas.

Turning next to the airport betas, we have to consider how higher operational gearing, lower volume risk and the terminal services business's capex risk interact. Our analysis is that the first of these things outweighs the second, meaning that IAA has much less certainty around profit in comparison to the airport companies.

In the case of the en route business:

- even if IAA's service unit volumes stay within the first ±2% band in the RP3 volume risk-sharing scheme, IAA stands to lose or make money equivalent to 60% of the real return on

capital that IAA has indicated to us is likely to be factored into its RP3 en route charge control calculations;[2]

- by comparison, Dublin Airport would need a misforecast of passenger volumes of around 25% in order to suffer the same sort of loss or gain in profit;[3] and
- for Gatwick and Heathrow, the figures are around 25% and 30% respectively.[4]

In the case of the terminal services business:

- even if IAA's service unit volumes stay within the first ±2% band in the RP3 volume risk-sharing scheme, IAA stands to lose or make money equivalent to almost 20% of the real return that IAA has indicated to us is likely to be factored into its RP3 terminal services control calculations;[5]
- Dublin, Gatwick and Heathrow airports would have to misforecast passenger volumes by about 10% in order to suffer the same loss or gain in profit; and
- the near trebling of IAA's terminal services RAB is without parallel in the airport businesses.

IAA's small asset base and consequent thin margins mean that the en route and terminal services betas should naturally sit at the right-hand end of the spectrum that we drew in figure 3. Making point estimates is by no means straight-forward. The Commission for Aviation Regulation previously estimated the terminal services asset beta to be 0.65 and we have no reason to depart from this figure. The en route business's smaller RAB / higher operational gearing potentially means that it should have a higher beta. We therefore propose an overall asset beta range for IAA of 0.65 to 0.70.

Comparison to other ANSP beta estimates

The betas estimated by other ANSPs offers another form of cross-check on the above calculations. As table 9 shows, our estimates position IAA's betas above the betas of other ANSPs. But this is a logical picture to present given IAA's relatively small asset base as an ANSP and the consequent heightened sensitivity of profit to variations in costs and volumes.

Table 9: ANSP betas and riskiness

Company	Beta	Loss of profit caused by -2% loss of traffic
NERL, RP2	0.505	-20%
Airservices Australia	0.55	-20%
Airways New Zealand	0.60	-20%
IAA	0.65 to 0.70	-20% to -65%

[2] A 2% loss/gain of revenue for the en route business will be worth around €2.5m; this compares to a return on the RAB of around €4m.
[3] A 25% loss of airport charges revenue is worth around €50m. This compares to a return on the RAB of around €85m.
[4] At Gatwick, a 25% loss of airport charges revenue is worth around £90m. This compares to a return on the RAB of around £150m. At Heathrow, a 30% loss loss of airport charges revenue is worth around £450m. This compares to a return on the RAB of around £770m.
[5] A 2% loss/gain of revenue for the terminal services will be worth around €0.7-0.8m; this compares to a return on the RAB of €3-5m.

Finally, we note that a range of 0.65 to 0.70 would not be out of the realm of regulatory precedent, as shown by comparisons to Comreg's estimates of telecoms company betas.

We are therefore content to commend a range of 0.65 to 0.70 to IAA as a fair indicator of the riskiness of the en route and terminal services businesses, respectively.

4. Gearing

The estimate that we make of gearing affects the weightings of the cost of debt and cost of equity components of the weighted average cost of capital calculation. They are also important inputs to the calculation of the cost of debt and cost of equity themselves as, all other things being equal, a higher level of gearing will increase the risk to both debt and equity holders, causing them to demand a higher return in exchange for making capital available.

The Charging Regulation specifies that the weights given to debt and equity in the cost of capital calculation "shall be based on the proportion of financing through debt or equity". At the time of writing, IAA has zero borrowing. IAA has also told us that it does not expect to borrow for the foreseeable future. One approach that we could take in this paper, therefore, would be to ignore debt and calculate the cost of capital for a wholly equity financed company.

We prefer not to take this approach on the basis that the future is uncertain – i.e. an intention not to incur borrowings might not lead to zero borrowings in reality. Factors that could cause IAA to have a need for external financing during the next 5-6 years include the bringing forward of new capital investment, external shocks to revenues or costs, or a change in IAA's approach towards distributions and capital structure.

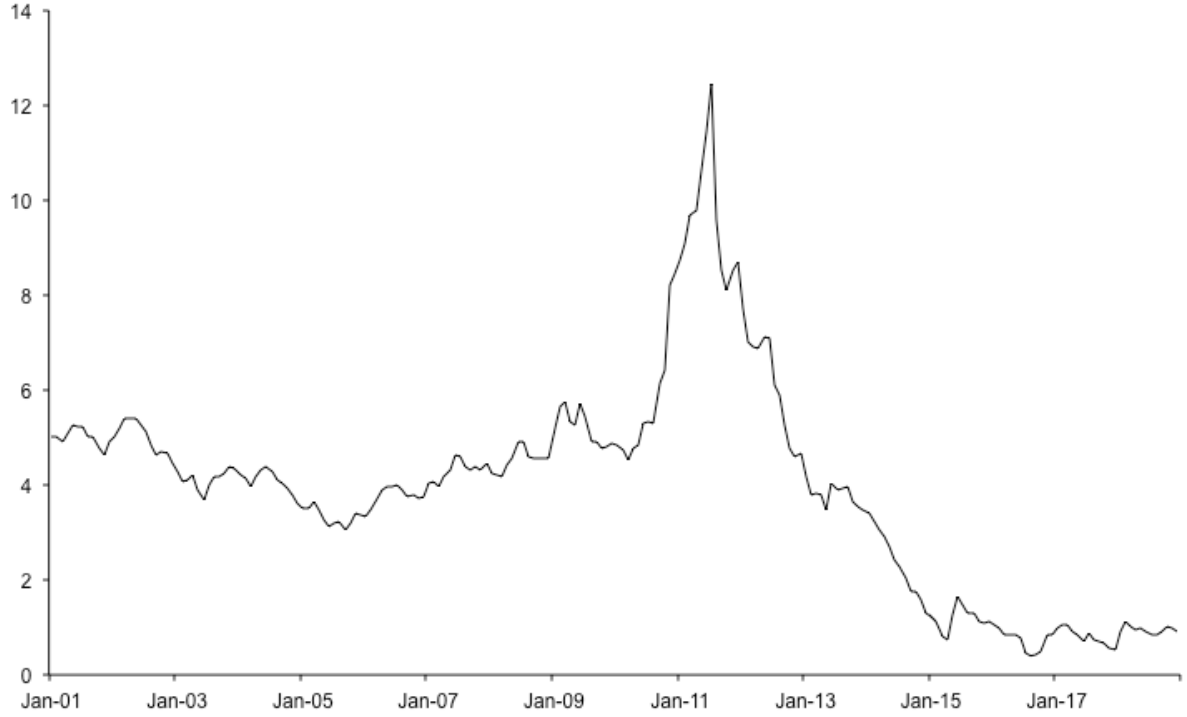
If we anticipate, as a precaution, some level of borrowing in our cost of capital calculations, we can ensure that new charge controls permit IAA to access this new debt finance as required. We therefore think it is appropriate to assume a modest level of gearing in our analysis. The figure that we choose is 10% to be consistent with our RP2 analysis.

5. Generic Cost of Equity Parameters

5.1 Risk-free rate

The approach used by regulators to assess the risk-free rate has in the past been to analyse yields on government-issued gilts. Figure 10 below plots the yield on a 10-year Irish government bond since 2001.

Figure 10: Ireland ten-year government gilt yields



Source: ECB.

The chart shows how gilt yields have been heavily affected by the financial crisis and subsequent monetary policies. Prior to late 2008, when investors first took fright at the integrity of the financial system, yields were fairly consistently between 3.5% and 5.0%. Thereafter yields rose considerably as confidence in Irish government's ability to pays it debts drained away. That confidence appears then to have returned gradually since mid-2011 and yields now lie at around 1%, broadly in line with the average risk-free rate in other eurozone economies.

When looking at this data, we think we need to allow for the possibility that current low interest rates will not persist throughout the whole of the RP3 period. The ECB's latest forecasts[6] have yields rising gradually through 2019-21, consistent with the view that the Bank will start raising interest rates. Thereafter, the outlook for the remainder of RP3 is uncertain, although most analysts see interest rates normalising to a level that sits some way below the rates that were seen prior to the financial crisis.

Recent regulatory decisions in Ireland have tended to allow for a real risk-free rate of around 2%. This is slightly below the 2.6% figure that we factored into our calculations of IAA's RP2 cost of capital. A draft determination by the Commission for Aviation Regulation for Dublin Airport's new price control, published in May 2019, allowed for a significantly lower risk-free rate of -0.14%.[7]

[6] ECB (2019), March 2019 ECB staff macroeconomic projections for the euro area.
[7] Commission for Aviation Regulation (2019), Maximum level of airport charges at Dublin Airport 2020-2024: draft determination.

Table 11: Real risk-free rate assumptions in relevant regulatory reviews

Decision	Risk-free rate assumption	Year
CAR – Dublin airport	1.5%	2014
Comreg – telecoms companies	2.1%	2014
SEM Committee – new entrant genco	2.0%	2015
CER – ESB and Eirgrid	1.9%	2015
CER – Irish Water	2.0%	2016
CER – Gas Networks Ireland	1.9%	2017
CAR – Dublin Airport (draft determination)	-0.14%	2019

Given the fall in yields that there has been since 2014, we think it is appropriate to align to recent Irish regulatory precedent and so use a range of 0% to 2.0% in our calculations. This allows for some increase in current gilt yields but not to the level typically seen prior to 2008.

5.2 Expected market return

The final input into CAPM is the expected market return (R_m). Some cost of capital studies arrive at a value for R_m directly Others come at R_m indirectly by estimating the equity risk premium (ERP) – i.e. the additional return that shareholders can earn over the risk-free rate – and adding the ERP to the forecast risk-free rate..

The ERP figures used in recent regulatory decisions are summarised in the table below. This body of precedent contains a fairly narrow range for the equity-risk premium from 4.5% to 5.0%.

Table 12: Equity-risk premium assumptions in recent regulatory reviews

Decision	Equity-risk premium assumption	Year
CAR – Dublin airport	5.0%	2014
Comreg – telecoms companies	5.0%	2014
SEM Committee – new entrant genco	4.5%	2015
CER – ESB and Eirgrid	4.75%	2015
CER – Irish Water	4.75%	2016
CER – Gas Networks Ireland	4.75%	2017

Combined with a risk-free rate of 2.0%, the implied range for the expected market return is 6.5% to 7.0%. We note that this range is consistent with the returns that investors have historically taken from stock market investments in Ireland and elsewhere.

Table 13: Historical stock market returns, 1900-2016

Country	Annual return (arithmetic average)
World	6.5%
Europe	6.0%
UK	7.3%
US	8.4%
Ireland	7.0%

Source: Credit Suisse Global Investment Returns Yearbook 2017.

A 6.5% to 7.0% range is also consistent with the Commission for Aviation Regulation's draft proposals for Dublin Airport's new price cap and with advice published recently by the UK Regulators Network:[8]

> We recommend that regulators should continue to base their estimate of the expected market return on long-run historic averages, taking into account both UK and international evidence … We suggest a range of 6-7% …

We use a range for R_m of 6.5% to 7.0% in our calculations. This gives recognition to evidence that stock market returns in Ireland have been slightly above the world average, suggesting that investors in Irish companies face slightly more country risk than investors in other places.

6. Cost of Debt

The Charging Regulation specifies that the allowed cost of debt should be "equal to the average interest rates on debts of the air navigation services provider". IAA does not currently have any borrowing. However, its RP2 credit facilities had the following costs:

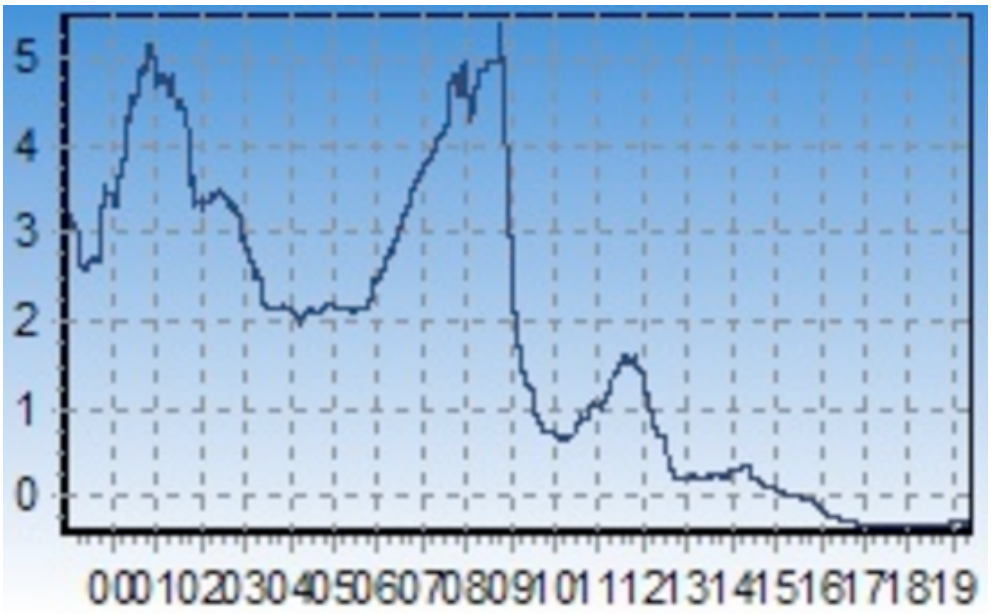
- facility 1, €15m – EURIBOR plus 2.9%; and
- facility 2, €15m – EURIBOR plus 1.85%.

Both facilities required an upfront arrangement fee of 0.5% of €15m (i.e. €75,000) plus annual commitment fees of 40% of the stated margins. Facility 2 also had annual utilisation fees of 0.1% for borrowing of up to €5m, 0.5% for borrowing of between €5m and €10m and 0.65% for borrowing of more than €10m.

In our RP2 paper, we calculated IAA's all-in real cost of debt to be 3.5%. Since 2014, EURIBOR has fallen by around 100 basis points and now stands below zero.

[8] Wright, Burns, Mason and Pickford (2018), Estimating the cost of capital for implementation of price controls by UK regulators.

Figure 14: Historical values of 12-month EURIBOR



Source: www.euribor-rates.eu.

Most forecasters still expect interest rates to start to move up as the ECB ends its programme of quantitative easing and begins to normalise interest rates. Predicting exactly where rates will settle during the periods covered by the RP3 charge controls is not an exact science. However, we consider that it is prudent to reduce our RP2 cost of debt by 100 basis points, consistent with the reduction that there has been in EURIBOR. Our RP3 cost of debt is therefore 2.5%.

7. Tax

The prevailing corporation tax rate in Ireland is 12.5%. Because our costs of capital are pre-tax costs of capital, we need to uplift our CAPM cost of equity calculations by this amount if we are to ensure that charge controls cover return shareholders their full cost of equity after the payment of tax on profits.

8. Overall Cost of Capital Calculation and Conclusions

Table 15 combines our individual component estimates into a range for the overall pre-tax cost of capital.

Table 15: Proposed range for the IAA costs of capital

	Low	High
Gearing, g	0.1	0.1
Cost of debt, K_d (%)	2.5%	2.5%
Risk-free rate, R_f (%)	0%	2.0%
Expected market return, R_m (%)	6.5%	7.0%
Asset beta, β_a	0.65	0.70
Equity beta, β_e	0.71	0.77
Post-tax cost of equity (%)	4.62%	5.83%
Tax (%)	12.5%	12.5%
Pre-tax cost of equity, K_e (%)	5.28%	6.67%
Pre-tax WACC (%)	5.0%	6.3%

Our estimated range is 5.0% to 6.3%.

This range is below the 6.7% costs of capital that we gave IAA in 2014, reflecting the fall that there has been in interest rates over the last four years.

We are happy that the evidence outlined in the paper supports the figures that we are proposing. We therefore commend them to IAA.

Annex

The costs of capital in the main body of the paper are presented in real, CPI-stripped terms.

The International Monetary Fund's forecasts for CPI inflation during RP3 is given in table A1 below.

Table A1: IMF forecast of Irish CPI inflation

	2020	2021	2022	2023	2024
CPI inflation	1.5%	1.7%	1.9%	2.0%	2.0%

Source: IMF (2019), World economic outlook, April 2019.

The conversion from our real 5.0% to 6.3% real range to a nominal range is given in the table below.[9]

Table A2: First Economics' nominal cost of capital range

Year	Low	High
2020	6.70%	7.98%
2021	6.93%	8.21%
2022	7.15%	8.44%
2023	7.27%	8.55%
2024	7.27%	8.55%

[9] We convert the real risk-free rate and the real cost of debt into nominal values using the Fisher equation, and then proceed to calculate the cost of capital in accordance with the formulae in sections 2 and 3 in the main body of the paper.