AIRLINES FOR EUROPE

The Cost and Profitability of European Airports
How Effective is Regulation under the Airport Charges Directive?

Final Report

August 2017

York Aviation

Contents

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Executive Summary

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Context

The Study was commissioned by A4E to examine the costs and profitability at the Top 30 European Airports in order to inform consideration of the effectiveness of the Airport Charges Directive in redressing the imbalance in profitability between airlines and airports and in ensuring the provision of airport services across Europe is cost efficient. We were asked to examine:

- the profitability of the Top 20-30 airports in the EU and EFTA over the last five years;
- the relationship between efficiency and profitability;
- the impact of the till used (Single/Hybrid/Dual) on each airport's profitability;
- how the allowed cost of capital (i.e. the Weighted Average Cost of Capital or WACC) has impacted on airports' profitability;
- the impact of the privatisation of airports/concession agreements on profitability;
- how infrastructure investments are being financed and planned and the impact of credit rating on financing.

Key Findings:

Finding A: There remains considerable lack of transparency around the basis for setting airport charges and, where Dual or Hybrid Tills are in force, there should be greater transparency of the allocation of costs between the tills. Greater transparency should be followed up by better regulatory oversight and, where necessary, intervention.

- We set out to assemble financial information for the Top 30 Airports but this proved challenging as many airport companies report only at Group level, which often includes other airports and other businesses. It was often difficult to distinguish costs and revenues at the level specific to the setting of airport charges, particularly where airports apply a Dual or Hybrid Till. Reporting by Independent Supervisory Authorities (ISAs) is inconsistent.

- In many cases, it was not possible to obtain information about the returns made on an airport's Regulated Asset Base (RAB).

- We identified that a key issue in understanding the basis of airport charges was the allocation of costs and revenues between the Tills. This was seldom clear and, in many cases, it was not evident that ISAs were providing appropriate regulatory oversight in this area.

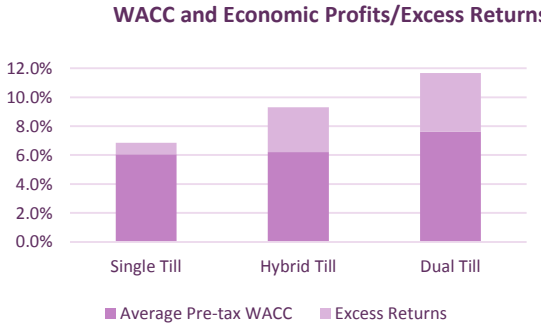
Key Findings (cont'd)

Finding B: The Weighted Average Cost of Capital (WACC) should be set at the level appropriate to the till adopted and properly reflect the risks of the aeronautical business.

- Our analysis identified significant variations in the WACCs being applied in relation to airport charges. In some cases, where the WACCs have been set by ISAs, they tend to be lower, but where the airport sets its own WACC and, particularly where a 'Dual Till' is in force, the WACCs tend to be significantly higher reflecting higher risks outside of the regulated business.

- In some cases, the WACC is effectively pre-determined within concession or privatisation agreements. In the case of 'Dual Till' airports, the higher WACCs are often driven by the higher risks within the commercial business, frequently including investments unconnected with the main airport, which should not be the case. Where these WACCs are applied to the setting of airport charges, this may not reflect the true cost of capital for the airport operation on its own.

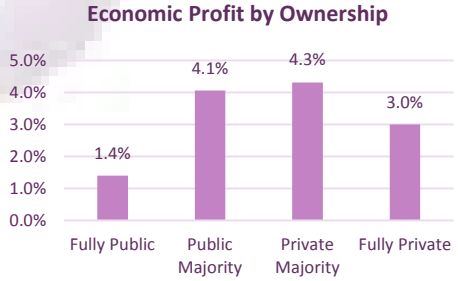
- Not only do 'Dual Till' airports tend to be allowed higher WACCs, but their overall economic profits are greater (i.e. their return on capital employed is greater than the WACC), indicating higher returns to shareholders in excess of the WACC, which may itself have been set too high relative to the aeronautical till in the first place. We cannot be certain that these profits are not earned, at least in part, at the expense of airport users and represent excess returns over and above those that would be expected in a fully competitive market.



Finding C: The pre-determination of key parameters of the WACC or other key regulatory variables during concession or privatisation processes, whilst being transparent, is not likely to lead to cost efficiency.

- The privatisation process, or the letting of concessions, can result in pre-determined parameters which limit the scope of the ISA to set appropriate values for the WACC or for efficiency targets.

- We found that returns tend to be highest at airports that are partly privatised; the main reasons for this might be that fully privatised airports are more likely to be subject to greater regulatory oversight and fully publically owned airports may still be part of wider networks, which serve to moderate overall returns at Group level;



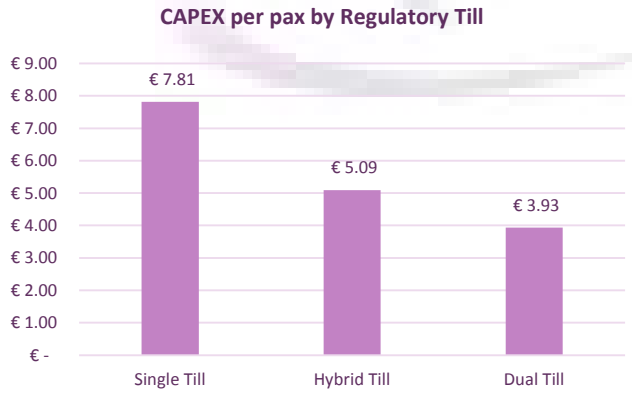
Key Findings (cont'd)

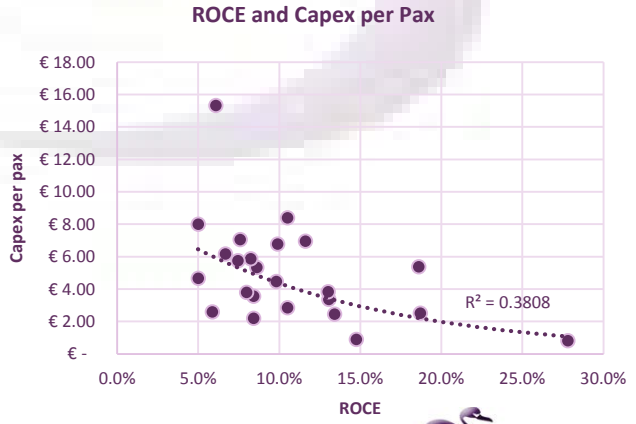
Finding D: Airports can make excessive returns under a Dual Till system, whereas the Single Till systems tends to moderate excessive profits.

- Generally, airport companies make greater returns overall where a Dual Till is in force, as commercial revenues are not used to underpin the cost of core aviation activities; the Single Till mechanism and full economic regulation are more effective in restraining returns;
- As noted in Finding C, Dual Till airports tend to be achieve returns on capital employed greater than the WACC and these represent supernormal returns to shareholders, which would be competed away over time in a fully competitive market.

Finding E: Capital investment is an important driver of returns and it is important that it is efficiently incurred and properly allocated to the Till in force.

- Regardless of the till in forces, there is also a danger that regulated airports may overinvest so as to increase the size of their RAB. Whilst our analysis tends to suggest returns are lower at regulated Single Till airports, these airports do tend to spend more on capex, often resulting in the accusation of 'gold plating' to drive higher returns. This spending increases the asset base, resulting in lower apparent returns at ROCE level but higher EBITDA and EBITDA margins. Across our sample of airports, higher capex leads to lower reported returns. This highlights the importance of proper scrutiny to ensure that capex investment is efficient and meets the needs of users.
- Funding of capex is also important: investors and lenders may take comfort in regulatory settlements that provide some guarantee of returns, but this would be expected to translate into lower WACCs being applied (better credit ratings/lower cost of debt). It is not clear, however, that this is, in effect, the case.





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Key Recommendations

We make the following recommendations in relation to our key findings:

A: Lack of Transparency: we recommend the publication of separate accounts for the regulated part of the business, with a clear definition of how costs (including the RAB and operating costs) are apportioned between the regulated and non-regulated tills. Greater transparency should be followed up by greater regulatory oversight where necessary.

B: WACC Parameter Setting: we recommend that ISAs should make transparent the calculations of an appropriate WACC estimate relevant to the regulated part of the business at each airport and ensure that this is used to determine charges.

C: Pre-determination of a Fixed WACC: we recommend that ISAs should regularly review the components of the WACC or other factors that appear to be 'pre-determined' in legislation or in long-term concession agreements (i.e. not fixing them in legislation or concessions) to ensure that they reflect the actual performance of the business.

D: Types of Till – we recommend that the appropriateness of the form of till (Dual, Hybrid, or Single Till) be regularly reviewed by ISAs, as well as how the Till is applied in terms of the allocation of costs and assets.

E: Capex Oversight: we recommend that ISAs should regularly review, in conjunction with users, the relevance and accuracy of airports' proposed capital expenditure programmes, and how they are financed.

We make the following recommendations in relation to the Airport Charges Directive:

The Airport Charges Directive should require the Independent Supervisory Authority (ISA) in each Member State to be much more proactive in its oversight of airport charges and profitability, and to take action where it is appropriate. This may take the form of:

- **market power assessments;**
- **the review of pre-determined elements of the regulatory settlement;**
- **transparent consultation over the approach to infrastructure funding;**
- **the introduction of more specific regulatory measures.**

1) Background to the Study

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Background to the Study

The European Commission's 2015 Aviation Strategy for Europe has as its fundamental aim to ensure the competitiveness of the European aviation sector so that the aviation sector continues to play its part in supporting economic growth, jobs, trade and mobility in Europe within the context of an increasingly competitive global environment. In the Staff Working Document, published alongside the Strategy, the Commission noted that "*there is a profitability gap of 19 percentage points between globally leading airport groups and airline groups: In 2013, operating margins of top 100 airport groups were on average 23% compared to 4% for top 150 airlines.*"

This finding underpins the clear statement in the Aviation Strategy that *"The availability of highly performing, competitive airport services, including runways, passenger terminals and ground handling, is critical for the competitiveness of the EU aviation sector and the service quality experience of passengers".* With that in mind, the Strategy emphasises the important role of the Thessaloniki Forum of Airport Regulators in ensuring, in the first instance, better implementation of the 2009 Airport Charges Directive, including:

- the use of market power assessments as a means of determining the optimal regulatory approach;
- the transparency of airport charges; and
- effective airline-airport consultation.

The European Commission has long recognised that ensuring the cost effective and efficient provision of airport services is an essential part of the aviation value chain aimed at securing the competitiveness of the sector. Hence, the ACD has as its objective to ensure that common principles apply to the setting of airport charges at the busiest airports in each Member State and/or those airports handling over 5 million passengers per annum. These principles are:

- Non-discrimination;
- Consultation and Remedy, including the requirement for an Independent Regulator; and,
- Transparency

Alongside the provision for there to be an Independent Supervisory Authority (ISA) appointed in each Member State to resolve disagreements as to the level of airport charges, there are provisions that allow individual Member States to determine whether airports are subject to effective competition and, if warranted following such consideration or otherwise required by national law, for the ISA to set the charges or the maximum level of such charges.

The Commission indicated that it would then assess the extent to which the Airport Charges Directive may need to be reviewed. Such an evaluation commenced in late 2016. In order to inform the review of the effectiveness of the Airport Charges Directive (ACD), York Aviation (YAL) was commissioned by A4E in April 2017 to examine the costs and profitability of European airports. The aim of the Study was to identify the extent to which the implementation of the provisions of the ACD has impacted on airport profitability and addressed the imbalance in profitability between airports and airlines. Further details of the Study Scope are provided at Appendix A.

2) Forms of Regulatory Oversight in Europe

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Forms of regulatory oversight in Europe

The current ACD does not stipulate the way in which regulation should be applied, but merely makes provision for there to be a mandatory process whereby the ISA may be involved in setting or approving the level of charges or in resolving disputes. It is left to the discretion of Member States to determine whether they consider greater regulatory intervention, including the setting of formal price caps, is justified. There is, therefore, no single model of how airport charges are controlled or monitored across European airports. In practice, stark differences exist in the extent of regulation applied. This may be justified in terms of the level of market power exerted by any individual airport but, in many cases, it would appear that ISAs have, in the main, not made any explicit assessment of the extent of each airport's market power so as to determine what form of regulatory oversight would be proportionate.

Of the 30 airports considered, 3 are not formally price regulated at all (Manchester, Stansted, and Prague – in the case of the first two, these were removed from regulation following detailed market power assessments by the ISA). We have attempted to categorise the remaining airports by the 'intensity' of regulatory oversight to which they are subject. These categories are not intended to be rigid and, in some cases, the categorisation we have applied is subjective and could be arguable. The intensity of regulation does not necessarily equate to its effectiveness. However, this broad analysis enables us to look for any relationships that might exist between the intensity of regulatory intervention and the financial performance or efficiency of the airports. The categories we have used are:

- **Economic Regulation** – where the ISA tends to lead the process of *ex-ante* regulatory reviews and undertakes extensive scrutiny and public consultation with the airport and with users. This might involve (inter alia) a review of the airport's market power, a review from first principles of the airport's charges in line with statutory objectives, and publication of extensive documentation for consultation along with regulatory accounts during the period of the review. We have placed only 2 airports (Heathrow and Dublin) in this category;
- **Medium Oversight** - where *ex-ante* approval to the level of airport charges by the regulator is required (i.e. where the ISA has to approve the charges before they are implemented), but often there is little scrutiny with the regulator simply deferring to pre-existing legislation or concession agreements as to how airport charges should be set (e.g. the type of till applied) or the values of certain parameters (e.g. relating to the calculation of the WACC) or simply 'rubber stamping' the charges proposed by the airport. There tends to be less publicly available documentation as to how the level of airport charges has been calculated in this 'medium' form of oversight, as well as lack of clarity as to the extent of regulatory scrutiny in practice. We have placed 10 airports in this category;
- **Minimal Oversight** – where the framework for setting charges is characterised by first seeking commercial agreement between the airport and its users (with the ISA either not being involved at all or taking a limited 'observer' role) and either approving the charges *ex-post* or, in the event of failure to agree, intervening to arbitrate. A total of 15 airports fall into this category.

We do not take a view in this report about the most appropriate form of regulation for each airport, although we have used these categories in our analysis to examine how well regulatory oversight for each airport might be working in practice. Our categorisation of the airports is set out in Appendix D.

Key components of regulation affecting airport charges

We set out, on this and the next page, some key components of regulation, where economic regulation is more formally applied. It is important to understand how these components of a regulatory settlement can directly affect the charges that users pay. This also serves to emphasise the need for proper regulatory oversight and transparency.

The Type of 'Till' applied

- As noted earlier, the ACD does not specify whether airport charges should be set having regard to the full range of activities at the airport (the Single Till), or by reference to costs and revenues associated with aeronautical activities alone (Dual Till). However, the lack of transparency over how the costs and revenues of the regulated area of the business are allocated can have important consequences for the level of airport charges. The Dual Till can also incentivise airports to over-allocate costs and assets to the regulated till, which can result in low apparent profitability on the regulated till, whilst allowing higher profits from other activities outside of regulation.

The Regulatory Asset Base

- Price caps are commonly set by reference to a series of regulatory 'building blocks', which includes the identification of the airport's Regulated Asset Base (RAB) or those assets which are taken into account in regulatory decisions.

- The amount that an airport is allowed by a regulator to earn as yield on the RAB, as well as the scale of the RAB relative to passenger throughput, influences the amount it is permitted to recover through airport charges. In other words, the higher the RAB or the rate of return on the return on the RAB, the higher the airport charges. Hence, excessive allowance for investment costs can allow greater returns to be earned.

The Weighted Average Cost of Capital (WACC)

- The level at which the WACC is set by the regulator (or another entity) has a significant influence on the resulting level of allowed revenues and, consequently, airport charges. If the WACC is set too high then the airport's shareholders will be over-rewarded and customers will pay more than they should. However, if the WACC is set too low, the airport may face financing difficulties and may not be able to adequately invest.

Key components of regulation (cont'd)

Operating Costs and Efficiency

- Regulated airports are also allowed to cover operating costs, as long as these are efficient. Determining airport efficiency levels (which has also to take into account the quality of service provided) should be an important part of regulatory oversight. Under a Dual Till approach, an airport may be incentivised to maximise the costs that are allocated to the regulated till, in order to drive higher allowed revenues through airport charges, whilst maximising revenues outside of the till so as to improve returns overall.

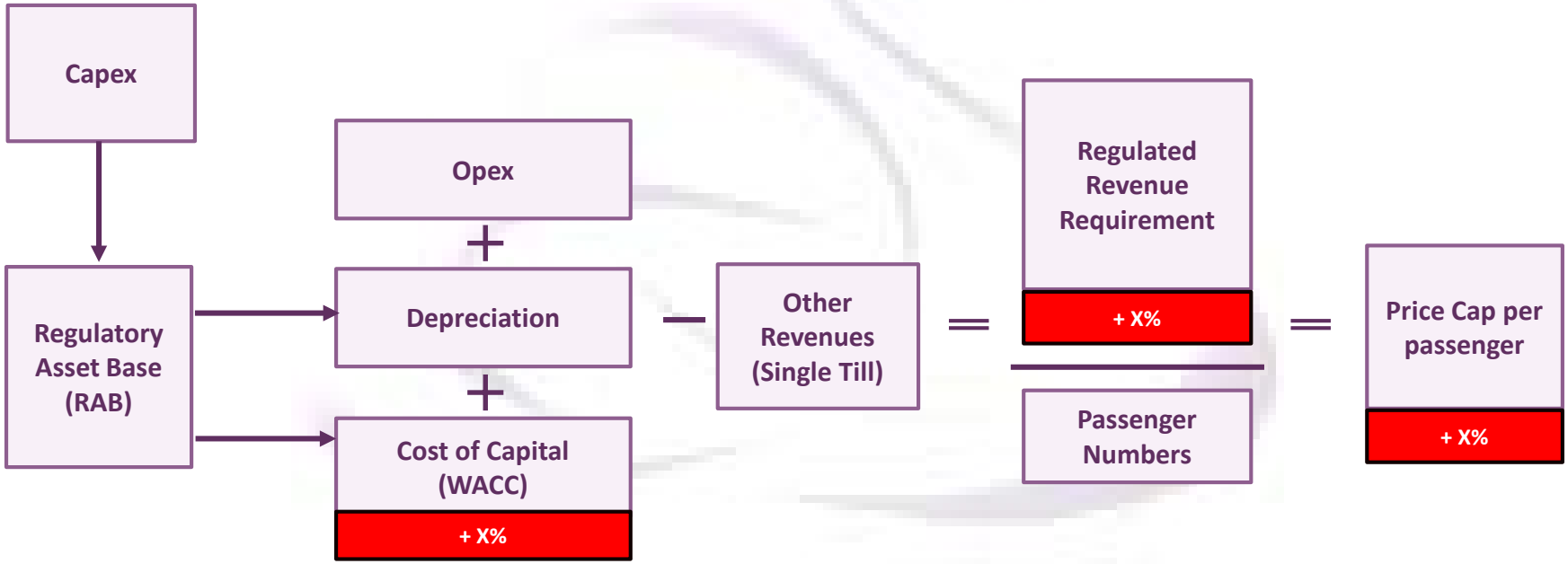
Capital Expenditure and Efficiency

- The need for airports to invest sometimes very large sums of money in infrastructure to meet demand inevitably raises the question of how such projects are financed and the implications for airport charges. A critical starting point is engagement with users and discussion as to the level of infrastructure required to meet demand. Another contentious issue is whether infrastructure should be 'pre-funded' by charges levied on users before new infrastructure is made available or at what point users should pay for facilities that are 'under construction' or not yet in use. There is no guarantee, for example, that current users will always benefit from future capacity making it inappropriate for them to bear the burden of costs.

- Capital investment also needs to be efficient. An airport could be incentivised to over-invest in both quantity and quality terms, relative to what users require, because if the investment is capitalised in the RAB, the airport can earn greater returns during the regulatory period. This is sometimes referred to as 'gold plating'. Conversely, if a regulator agrees a level of investment to be included in the RAB on which returns can then be earned through airport charges, an airport could then be incentivised to reduce investment costs and deliver less than was agreed, whilst retaining the higher airport charges. Exactly what is included in the RAB, and what is 'rolled forward' from one regulatory period to another, is often a matter of dispute.

The impact of increased cost of capital on airport charges

The ACD does not prescribe the form of regulation or, indeed, whether economic regulation should be applied at all. However, where economic regulation is in place, a common form is the setting of a price cap by reference to a series of regulatory 'building blocks', which includes the identification of the regulated asset base (RAB). The airport is allowed a yield on the RAB (at the rate of its cost of capital - WACC) and is allowed a return of the RAB through depreciation. It is also allowed to cover its operating costs (so long as these are efficient). Each of the building blocks has an effect on the price the user pays and each should be carefully assessed by the regulator. However, if elements of the building blocks are fixed in legislation or concession agreements, such as the parameters of the WACC, there is a danger that airport charges might not properly be related to costs and fair returns. In the diagram below, we show the regulatory building blocks and how an increase in cost of capital flows (in red) directly through to increased airport charges.



+ X%

The X% reflects the difference between the higher WACC as a result of pre-determination of input variables, higher input assumptions, mis-calculations and errors, compared with what the cost of capital should be (without artificial adjustments to the calculations). **By way of illustration, a 2% increase in the WACC (from 6% to 8%) at a hypothetical airport with a RAB of €800m, Opex of €400 million, depreciation of €175 million and other revenues of €250 million, and with 30 million passengers per year, would result in a price cap €0.53 (4%) higher than it should otherwise be.**

Regulatory incentives

Under the building blocks approach to setting price caps, an airport is incentivised to control its costs because, if opex is less than that agreed in the regulatory settlement, it is able to increase and retain profit during the regulatory period. This acts as a short term incentive but can also act as a disincentive over the longer term as the cost savings are 'locked in' to subsequent regulatory settlements (we return to opex efficiency and profitability later in this report). There is also a danger in reducing opex that service quality suffers, so service quality targets are often incorporated into regulatory settlements so as to incentivise an airport to maintain or improve on defined service standards, with penalties in the form of reimbursements to users in the event that service quality targets are not maintained.

Under a Dual Till approach, an airport may be incentivised to maximise the costs that are allocated to the regulated till, in order to drive higher allowed revenues through airport charges, whilst maximising revenues outside of the till so as to improve returns overall. We explore this further in later analysis. Airports that are not formally price regulated tend to default to a Single Till approach to the calculation of airport charges in order to incentivise growth by using non-aeronautical revenues to help to keep charges at a competitive level .

The building blocks approach to setting price caps can also create perverse incentives. For example, an airport could be incentivised to over-invest in both quantity and quality terms, relative to what users require, because if the investment is capitalised in the Regulatory Asset Base (RAB), the airport can earn greater returns during the regulatory period. This is sometimes referred to as 'gold plating'. Conversely, if a regulator agrees a level of investment to be included in the RAB on which returns can then be earned through airport charges, an airport could then be incentivised to reduce investment costs and deliver less than was agreed. Exactly what is included in the RAB, and what is 'rolled forward' from one regulatory period to another, is often a matter of dispute.

AENA

The Airport Regulation Document for AENA (the 'DORA') notes at paragraph 3.6.1. that the form of regulation used introduces incentives for operators to improve their efficiency by allowing opex savings to be retained. This is in contrast with a 'recovery of costs incurred' model in which the operator is allowed to recover costs 'ex post', thus removing incentives to improve efficiency. Table 3.4. of the DORA also sets out quality of service indicators and incentives/penalties system for airports in the network.

Source: Airport Regulation Document for AENA (the 'DORA')

Dublin

Dublin Airport opened a second terminal (T2) in 2010, which airline users claimed was over-specified relative to passenger throughput and user needs. There was also an overspend on the construction budget. The regulator (the Commission for Aviation Regulation) had to decide on the level of expenditure that would be allowed into the RAB as this would in turn affect the level of airport charges. This required the regulator to make a judgment about the efficiency of the additional costs incurred.

Source: Irish Commission for Aviation Regulation (CAR)

3) Transparency of Key Components of the Charges

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How the WACC is determined is often unclear

Where airports are regulated, the WACC is clearly an important parameter, although its importance, in large part, depends on the definition and scale of the RAB. In particular, as made clear in the previous section, it is important that, if a WACC is going to be applied in setting the level of airport charges that it is specifically relevant to the regulated part of the business (the 'Till') and not the wider company or group, which may include other businesses with a higher risk profile, leading to a higher WACC for the business as a whole compared to the lower risk aeronautical business.

The Thessaloniki Forum on Airport Charges was set up to advise the European Commission on the implementation of the Airport Charges Directive and to promote best practice in the economic regulation of airports. Recommendations on the setting and estimation of the WACC were formulated by the WACC Working Group and published in December 2016, taking into consideration the views of representatives of the airport and airline communities, although it should be noted that these are not binding and cannot, in any case, be implemented where legislation or concession agreements pre-determine WACC parameters.

The Forum has also made *"Recommendations on Consultation and Transparency"*, in which its states in relation to the WACC (at paragraph 27): *"Details on the estimation and setting of individual parameters should be provided and not just the overall cost of capital. Justification should be provided for the values of the parameters and the methodologies used. The value of the parameters that should be provided include, but are not limited to, the cost of equity, the risk free rate, the equity market risk premium, the equity beta, the cost of debt, the corporate tax and the capital structure or gearing."*

There appears to be, in several cases, little transparency or regulatory oversight of the of the way in which the WACC is set and we consider this issue in more detail on the next page.

London Heathrow

Heathrow is regulated on a quinquennial basis by the UK CAA. Over several reviews, various papers on the setting of the WACC have been published by the regulator and by independent consultants. In relation to the current quinquennium, which runs from April 2014 to December 2018, the CAA commissioned a report from PwC ('Estimating the cost of capital for designated airports', Oct 2013) and also published a 90 page technical appendix (CAP 1115) to its final proposals, setting out in detail how it had arrived at the estimated WACC value for the Regulated Till at Heathrow.

Source: UK CAA

Brussels

Under the Royal Decree of June 2004, Brussels Airport's charges are intended to be agreed with users, with the provision for the regulator to intervene in the event of a complaint. This was the case in 2015 when the charges for 2016-2021 were consulted on. The complaint focussed on a number of issues, including how the market risk premium factor in the WACC had been calculated, which the regulator rejected, and a change to the tax calculation, which was accepted, which resulted in a reduction in charges being levied.

Source: Decision of 3 Nov 2015, Regulatory Service for Railway Transport and for Brussels Airport Operations

ANA SA (Lisbon)

ANA (owned by VINCI Airports) holds the 50 year concession responsible for the management of 10 airports in Portugal including the Lisbon Group (Lisbon, Porto, Faro and Beja Civil Terminal). The Regulated Charges Consultation Dossier 2017 contains a section on the calculation of a WACC, although this has no relevance in the setting of airport charges at Lisbon Airport since charges are determined on a non-cost-based formula.

Source: Regulated Charges Consultation 2017 Dossier, Vinci Airports

How the WACC is estimated should be made more transparent

There is a high degree of technical expertise required in estimating the WACC. The capital asset pricing model is the most commonly used approach, but the inputs to this have to be carefully assessed. In some cases, the methodology and inputs to the calculations are independently assessed in a very transparent way, but this is not so in all cases. In some cases, the WACC is routinely determined by the airport itself, with little transparency or regulatory oversight and often relates to the entire business or Group. Some of the issues that can arise in determining an appropriate WACC include:

- where an airport sets a WACC for the business as a whole, this will not be appropriate for the till used to set airport charges;
- the WACC has to be appropriate to different tills and different risk profiles between regulated and non-regulated assets as this will impact on charges and the reasonableness of returns;
- in some cases, the weighting of the debt and equity components is not necessarily reflective of an airport's actual capital structure;
- A further issue is the calculation of pre-tax and post-tax values (for consistency, we have use pre-tax values and, where the pre-tax WACC is not available in published documents, we have calculated a pre-tax WACC based on the best information available to us);
- The WACC is an 'estimate' and cannot predict future changes to economic conditions and so should be regularly updated.

Clearly, there could always be some dispute about the way in which the WACC is determined. However, the key issues seem to be the lack of transparency as to how this is done, the fact that some elements of the WACC seem to be pre-determined in law or concession agreements, and the lack of regulatory scrutiny.

Frankfurt

Fraport's 2016 Annual Report notes that it has set and regularly reviewed its WACC in the light of the changing economic environment, but that the WACC relates to "the value-oriented control of the Fraport Group" rather than for the purposes of setting airport charges. In the fiscal year 2016, this WACC was set at 8.6% pre-tax. However, the report also notes that: "For the fiscal year 2017, for the first time, a WACC specifically defined by the regulating bodies has been applied and used exclusively for the purposes of calculating the airport charges." This new WACC has been set at 6.7% pre-tax.

Source: Fraport 2016 Annual Report (p34)

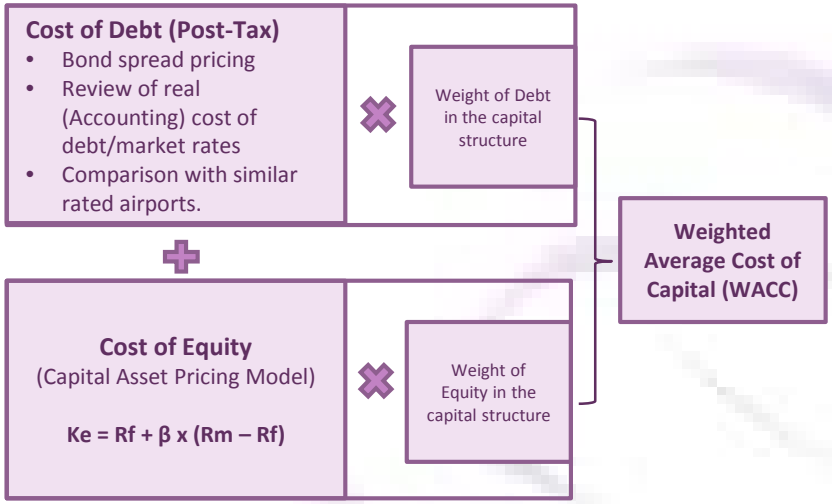
Zurich

The Swiss Ordinance on Airport Charges entered into force in 2012. Zurich Airport sets its own WACC. The ordinance defines a formula to calculate the WACC, but the determination of the individual values of the parameters of the WACC are left open to the Airport to determine. After consultations between the Airport and the airlines failed in 2013, and in accordance with procedure, the ISA was asked to make a determination, but directed that the charges remain unchanged. The airlines challenged this decision in the courts, which arbitrated and determined a WACC in the range 5.8% to 5.9%. Agreement between the Airport and its users on charges has subsequently been reached.

Source: Swiss Ordinance on Airport Charges, 2012 & Board of Airlines Representatives in Switzerland v Flughafen Zürich AG (June 25 2015, A-7097/2013).

How inputs to the WACC can be overstated

In some cases, there are components of the WACC that appear to be overstated. We illustrate three examples where the cost of equity and cost of debt inputs are not entirely transparent and may have been overstated to yield a higher WACC, which in turn inflates the allowed return on the RAB and could result in higher airport charges. This demonstrates the need for the methodology and inputs to the calculation of the WACC to be fully transparent and amended as necessary based on a set of inputs appropriate to each airport.



Aeroporti di Roma

Cost of Debt: *AdR has used the weighted average cost of current debt & new debt. However, the debt was previously adjusted downwards to allow for a 'minimum liquidity reserve' of €100m, increasing the estimated cost of debt based on assumed net debt, despite having adequate cash to cover this reserve. The cost of debt should reflect the real cost of debt a company is paying for its loans, irrespective of the cash it has.*

Additional Cost of Debt: *A further 0.3% has been added to the cost of debt, labelled as "administrative costs of opening new credit lines". It is unclear why the WACC should be adjusted to reflect how the company chooses to raise debt.*

Beta Calculation: *a 0.3% premium was added to the beta was derived from a set of comparator airports which were all calculated with the same denominator of STOXX Europe 600 Index. The calculation excludes country-specific volatilities, which could result in lower betas if each airport was considered within a more appropriate national context.*

Re-adjustment of Risk Free Rate: *The WACC agreement disregards the current Risk Free Rates as "depressive effects of Quantitative Easing" in Europe. However, the adjustment has not fully reflected the economic forecasts produced by ECB/Central banks/IMF/World Bank on the future 10yr yields.*

Also, in a recent publication, the Italian Transport Regulatory Authority has provided for incremental WACC factors and changed the risk free rate (previously set at 3.9%) to accord with the 12 month average

Sources: AdR WACC Agreement (ENAC website), AdR Annual Report 2016, ART (Italian Transport Regulation Authority) 'Modello 1 di Regolazione dei Diritti Aeroportuali', July 2017, paras 8.8.2 and 8.9.2.

Finavia

Cost of Debt: *The 2017 Charges Consultation Document shows the cost of debt as 3% but due to Finavia's interest rate hedging activities, the average interest rate on loans was 1.87% (2016 Financial Statements). Adjusting this input alone would reduce the post-tax WACC from 6.3% to 5.8%.*

Additional Risk Premium: *The cost of equity includes an "additional risk premium" of 3.5%, applied with a weight of 0.5 increases the WACC by 1.75%. However, no justification is given for this increase in perceived risk despite the Thessaloniki Forum stating that the ISA should control the relevancy of any additional premium that does not directly derive from the equations making up the WACC.*

Source: Finavia Charges Consultation for 2017, Finavia 2016 Annual Report.

Aeroports de Paris (AdP)

Cost of Debt: *In its consultation report, AdP used a cost of debt figure of 4.35%. We have identified from the 2016 Annual Reports that the majority of the fixed interest debt (bonds) cost under 3% (weighted average).*

Transparency & Other Indicators*: Although AdP has not disclosed its methodology for its final WACC calculation, there are several inputs that seem to be inaccurate, like the Risk Free Rate (RFR), which is yielding under 1% since 2016 compared with the assumed RFR of 2.68% in the consultation. Regulators should have greater regard to the efficiency of the WACC & the allowable return.*

Source: AdP Public Consultation, AdP Annual Report 2016

Legislation or concession agreements can pre-determine the WACC

In its paper of December 2016, the Thessaloniki Forum states (page 2) that:

"The WACC borne by airport managing bodies is a component of the overall cost structure related to the facilities and services provided by an airport managing body. As such, when not embedded in national legislation or when the national legislation has not entitled the ISA to set ex-ante criteria for the definition of the WACC, the ISAs of the Member States should be required to take a view on it."

It is interesting to note that the Forum appears to acknowledge that, in some cases, national legislation may exist which entitles the regulator to use pre-determined criteria in its estimation of the value of the WACC.

This is, for example, the case in the Concession Agreements in place at Aeroporti di Roma (AdR), Athens, and Amsterdam (see text boxes opposite). AdR also happens to have the highest ROCE across its business than other all other airports in the analysis.

This pre-determination of parameters of the WACC does not allow for proper discussion and debate with users about the parameters used to determine the WACC and, thus, the regulatory settlement in relation to airport charges.

Concession Agreements can also set out and pre-determine other parameters relevant to the regulatory determination, such as opex efficiency. This is the case with the Concession Agreement at Rome, for example, which sets out pre-determined opex efficiency elasticities (see the notes to Article 32).

Aeroporti di Roma

Aeroporti di Roma (ADR) has an 'Economic Regulation Agreement' with the Italian Regulator (L'Ente Nazionale per l'Aviazione Civile or ENAC) as part of the Concession Agreement to 2044. It is based on a dual till, RAB-based Price Cap. However, elements of the WACC are set out in the Concession Agreement itself (Articles 39(3), 40(3), 40(6), and 43). In particular, the Concession Agreement determines that certain strategic investments can benefit from an 'incremental' WACC. For the current sub-period, the investments eligible for an incremental WACC represent 12.8% of the RAB. Article 40 (6) of the ENAC Convention and Program Agreement for AdR, states that the regulator is allowed, at its discretion, to readjust the risk parameter (beta) to also reflect risks borne by AdR that are not borne by comparator airports, such as traffic risk, carrier risk, economic risk, etc. As a result of this addition, the asset beta for AdR is now 0.3% higher resulting in an increase in the cost of equity and contributing to a higher WACC.

Source: ENAC Economic Regulation Agreement

Athens

Article 14 of Law 2338/1995, the 'Airport Development (Concession) Agreement', sets the rules for defining the charges levied on users of the Airport in respect of the facilities and services provided at the Airport. This states that the Company is entitled to determine, at its discretion, the level of airport charges in order to achieve a maximum return of 15% per annum on the capital allocated to air activities. However, this allowable rate of return is not based on a WACC calculation, but on the return on the aviation activities' capital (share capital indexed annually by inflation) as per Article 14.8.6 of the Concession Agreement.

Source: Article 14 Law 2338/1995 (the Airport Concession Agreement)

Amsterdam Schiphol

The new Dutch Operating Decree, effective from 2019, has set the Equity Market Risk Premium (EMRP) at 5% (up from the current 4%), citing a report produced by Boot and Ligterink claiming that a market risk premium would capture the long term risks. The result of fixing certain inputs would overstate the WACC in the event of the EMRP being lower than 5%, as the cost of equity would be higher than it should be.

Source: Besluit van 18 April 2017, houdende regels betreffende de exploitatie van de luchthaven Schiphol

The ACD's requirement for consultation/transparency is not being fully met

Article 6 of the ACD provides for a compulsory procedure for regular consultation between airports and users with respect to the operation of the system of airport charges and the level of airport charges, as well as the quality of service provided. Article 11 requires the appointment of an ISA to ensure this happens effectively and to resolve any disputes. The ACD also specifies further detail about the level of consultation expected and the recourse to the ISA in the event of failure to agree. Article 7 concerns transparency and the provision of airport users with *"information on the components serving as a basis for determining the system or the level of all charges levied at the airport."*

Airlines report, however, that user consultation is often inadequate or even redundant and does not address the asymmetry of information between airport and the user.

In some cases (e.g. AENA, ANA), documents are available detailing how the regulatory settlement has been arrived at, although, in other cases (e.g. AdR, and ANA), pre-existing Concession Agreements can influence or pre-determine these regulatory settlements. In a few cases (e.g. Heathrow and Dublin), the level of transparency is ostensibly good, with full regulatory accounts published and detailed background documentation available on the regulators' websites although, even in these cases, users have raised questions in relation to the transparency of what assets are included in the RAB for example. In other cases (e.g. Athens, Brussels), the level of information about the way in which regulatory oversight is applied is very poor, with little supporting documentation available.

Overall, then, despite the provision of the ACD, users are not provided with sufficient information to enable them to judge whether they are paying appropriately for the cost efficient provision of the services they require.

Dublin

The ISA is the Commission for Aviation Regulation (CAR) which is responsible for the regulation of airport charges at Dublin Airport under the terms of the Irish Aviation Regulation Act 2001. The CAR publishes extensive information on its website about the regulatory process, including an annual report, and its determinations, including regulatory accounts for the Airport. Even then, there have been different views as to the treatment of key parameters leading to appeal processes being instigated.

Source: Commission for Aviation Regulation (CAR)

Athens

Very little information is available relating to how airport charges are set at Athens Airport. The Airport Concession Agreement sets some rules for defining the charges, under which the operator is entitled to determine, at its discretion, the level of airport charges that will achieve a maximum return of 15% per annum (this allowable return is not based on WACC, but an arbitrary return on the aviation activities' capital). However, there is no transparency as to how this figure has been calculated and no evidence of regulatory oversight.

Source: Article 14 Law 2338/1995 (the Airport Concession Agreement)

Brussels

The complaint made to the Regulator in 2015 over the proposed charges for 2016-2021 focussed on several issues, including the transparency of information provided. For example, the complainants alleged that the Airport was only able to show a few 'screenshots' related to the WACC calculation, without being able to explain the underlying methodology. However, the Regulator, in its Decision, was of the opinion that it was acceptable for the Airport to show some screenshots, as no other background information was available

Source: Decision of 3 Nov 2015, page 35, Regulatory Service for Railway Transport and for Brussels Airport Operations

4) Measuring Profitability and Returns

York Aviation

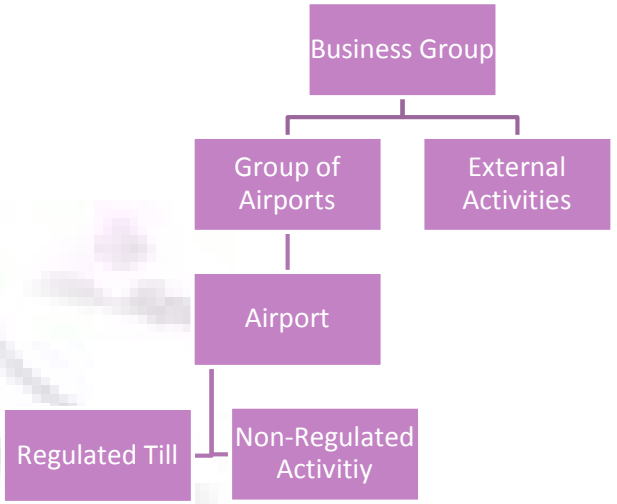
Measuring profitability and returns

Measures such as Earnings Before Interest, Tax, Depreciation, and Amortisation (EBITDA) and associated margins give a snapshot indication of the levels of profitability of a business. Used in isolation, however, they do not shed light on whether such profits are excessive and may not be an accurate reflection of whether returns exceed a competitive level or not. Moreover, it can be difficult to derive a suitable benchmark in these terms for what constitutes a 'normal' level of profitability, above which profits may be deemed to be excessive. Nevertheless, we provide graphs of EBITDA, EBITDA margin (as well as EBIT and EBIT Margin), EBITDA per passenger, and EBITDA growth over the last 5 years in Appendix E and note that 9 airports or airport groups have achieved EBITDA growth per passenger in excess of 5% CAGR over the most recent five year period. The average EBITDA margin of our sample of airports was 46%, which is significantly higher than the 23% margin of the top 100 airports referred to by the Commission in connection with its 2015 Aviation Strategy (see page 9 of this report).

Regulators, therefore, tend to focus on returns to an airport business relative to its cost of capital. **If returns are substantially in excess of the cost of capital, this could be indicative of a situation in which market power is being exploited.** Our analysis identifies such returns in excess of cost of capital as 'economic profit' or 'supernormal' profit (which we explain in more detail later).

In all cases, we have been able to identify the Return on Capital Employed (ROCE) across the whole of the airport (or airport group) business. This measure, therefore, shows the returns being earned on all of an airport's activities, including those parts of the business that are not concerned with aeronautical revenue generation.

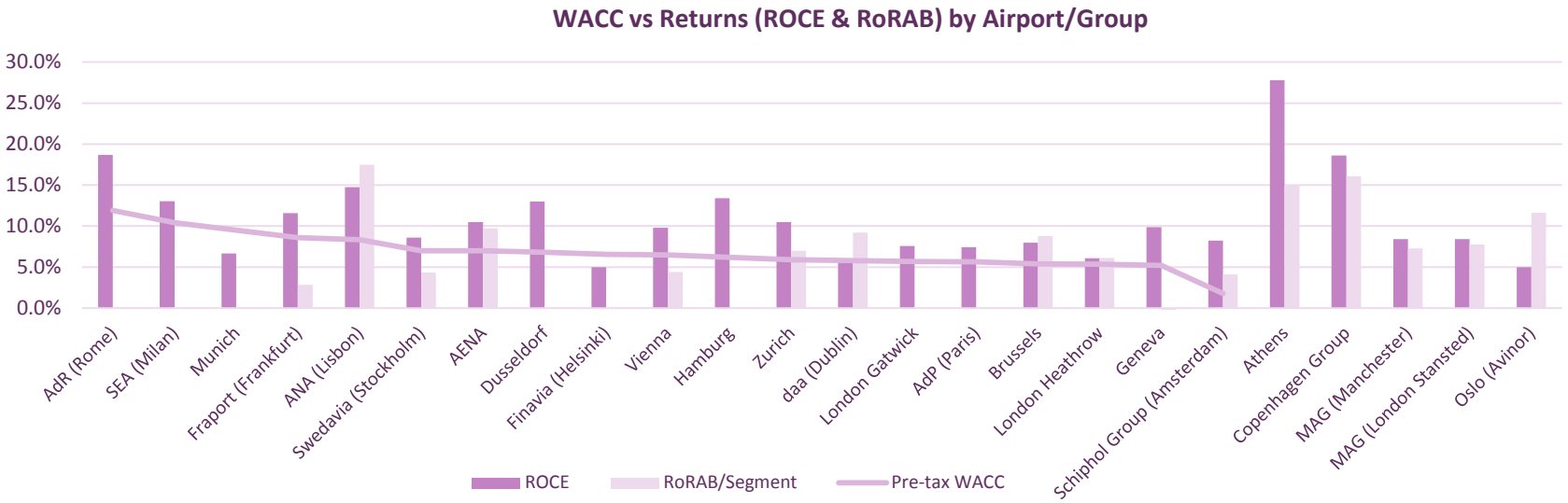
Appendix C sets out what information we have been able to obtain for each airport or airport group.



Information about the returns earned by airports at the level of the regulated till, however, is only available in the few cases where the form of economic regulation requires the publication of 'regulatory accounts' that identify the Return on the Regulatory Asset Base (RoRAB). In cases where there are no formal regulatory accounts published, we have not been able to obtain precise information as to the composition of the till used for setting airport charges. But where airports are understood to be using a Dual Till approach, we have taken returns on the aviation segment to be equivalent to the returns at the regulated (till) level and, if not, we have looked at returns on the assets of the individual airport. In some cases, we only have information across a group of airports combined and, in a few cases, only for a combined Parent or Business Group level.

The difficulty in identifying consistent information across all of the airports serves to highlight and emphasise the lack of transparency referred to earlier in this report.

Many airports earn returns in excess of the WACC



Note: The ROCE for Brussels relates to 2014 not 2015 and may not be strictly comparable. The WACC for AENA, Swedavia and Dusseldorf are for the 2017 period as no previous public information/data on the cost of capital was available.

Of the 24 Airport Groups sampled, the WACC was not available for 5 Airports (around 21%). Although the ROCE was available for all the airports, they are primarily at group level, as capital employed is usually allocated to the entire business rather than business segments. RoRAB data was not available for 20 Airports/Groups (around 83% of the total). We estimated the RoRABs for 12 (50% of the total). The chart above compares the pre-tac WACC with the Return on Capital Employed (ROCE) on the business as a whole for each airport or group. The chart also shows the return on the regulatory asset base (RoRAB) where this is available (from regulatory accounts for Heathrow and Dublin, or calculated by comparing the aviation return on the aviation assets where reported).

As can be seen, there is significant variation in apparent performance. Generally, returns on the RAB are much closer to the WACC than the overall returns being made by the airport operators and, in some cases, airports may appear to be earning below their WACC at the aeronautical till level. As we have noted earlier, this is likely to be because the WACC, in these cases, has not been set appropriately to the aeronautical till and is, therefore, not an accurate target for appropriate returns or for the setting of airport charges. On the other hand, a number of airports are making returns well in excess of their WACC. In respect to the ROCE, 16 of the 19 Airport/Groups with WACCs (around 84% or two-thirds of the entire sample) generate what could be called 'supernormal' returns (ROCE being above the WACC). Airports where no WACC value is available (e.g. Athens and Copenhagen) are earning well in excess of the average WACC values shown in the table on the right.

	Mean	Median	Maximum	Minimum
WACC	6.8%	6.5%	11.9%	1.8%
ROCE	10.7%	9.2%	27.8%	5.0%

Airports making returns in excess of the WACC may require greater regulatory oversight

Where airports are making significantly greater returns overall compared to the WACC, but with lower returns to RAB, this may simply indicate some mis-specification of the tills. In some cases (e.g. Heathrow), the returns appear to be broadly consistent with the WACC, which *could* indicate that economic regulation under a Single Till is effective, whereas at Athens, Amsterdam, Frankfurt and Vienna, for example, the ROCE on the whole business is significantly greater than the regulatory WACC (or in the case of Athens the returns cap specified in the regulation), which shows that **these airports are making profits outside the regulatory till and *could* suggest a requirement for greater regulation or re-specification of the till**. We explore this further on later in this report.

In a small number of cases, returns on the RAB appear higher than the returns for the overall business. This may reflect inclusion of other activities in the overall ROCE, such as the operation of smaller, less profitable, or loss-making airports in the group (e.g. Avinor or daa).

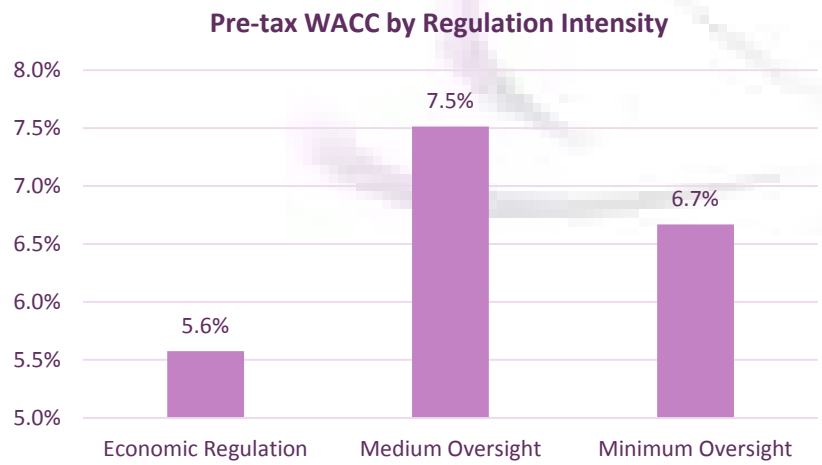
However, care should also be taken in the interpretation of this data because these discrepancies could also result from other factors such as efficiency gains, short term innovation, or other external economic factors.

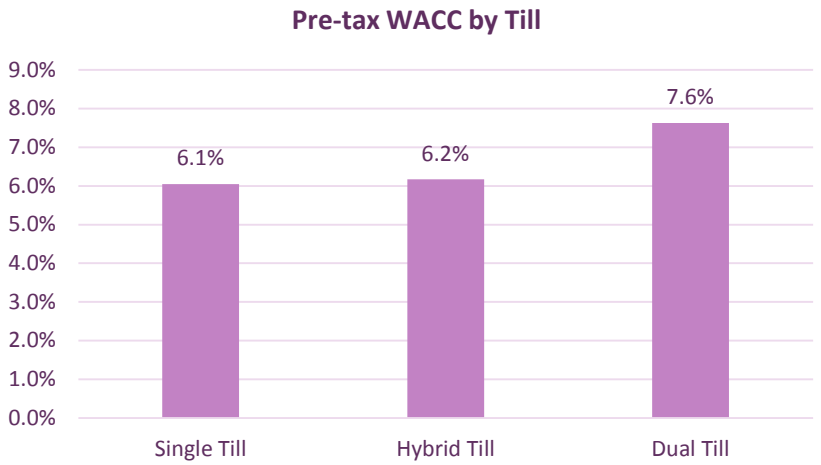
Similarly, lower returns to the RAB may also reflect a high level of RAB and 'gold plating of investment or inefficient operations.

The WACC tends to be lower at Single Till airports and where there is greater regulatory scrutiny

The chart, below left, shows the average pre-tax WACC across the three levels of regulatory intensity. Generally, where proactive regulation is in place, this allows for reasonable and secure annual revenues and, hence, the lower risk for investors is reflected in a lower WACC. However, this should apply equally to the regulated (aeronautical) part of the activity at all airports, including those with minimal oversight. Minimal regulatory oversight does not necessarily reflect a systematic view having been taken that the airports in question are open to greater competition following a market power assessment, with the exception of London Gatwick (Manchester and Stansted have similarly been subject to market power assessments and are no longer specifically subject to scrutiny by the ISA unless a complaint is made). This highlights the extent to which there may be inadequate consideration of the appropriate level of the WACC for the purpose of setting airport charges by the majority of ISAs.

The chart, below right, shows the average pre-tax WACC applied to the three types of regulatory till. Again, the percentage differences are actually relatively low, but the average WACC tends to be lower at Single Till airports than Dual or Hybrid Till airports as, in the former cases, it seeks to reflect the specific risks of the aeronautical business. In the other cases, the higher WACCs may reflect the perceived greater risks in the non-aeronautical till. Use of these higher WACCs, set at the level of the whole business or airport group, for the purpose of determining airport charges can result in airport users (airlines and passengers) paying higher charges than necessary simply to reflect the risks associated with activities from which they will not necessarily benefit. This is one of the key factors driving the perception of inequality in the returns earned by airport owners compared to the returns earned by the airlines.





Returns vary across different segments of the airport business

In a limited number of cases, it is possible to isolate the returns at different levels of the business. In the examples on this page, we show the returns achieved by business segment and the proportion of the companies' assets allocated to the relevant segment. Note that the reporting of the segments is not consistent across all of the airports and whilst we have assumed, for the purpose of our analysis, that the aviation segment is equivalent to the regulated segment at Dual Till airports, this may not necessarily be the case.

A particular complication arises in considering the reasonableness of the returns, as they are often considered in the context of the WACC for the whole business, which may be set at a higher level to reflect riskier non-regulated segments of the business and require higher returns.

The low returns achieved in the aviation segment may be a fair reflection of the limited risk to which that part of the business is exposed. This needs to be taken into account in the process of setting airport charges rather than an expectation that an airport should automatically attain its group level WACC equally across all segments of the business. We discuss this issue further later in this report.

To the extent that airports are focussing investment away from the aeronautical or regulated part of the business, it is important for users that any flows of revenue are transparent, to ensure that users are not, in practice, funding activities from which they gain no benefit.

Amsterdam

Aviation	*1.5% return on 40% of assets*
Consumer Products and Services	*51% return on 6% of assets*
Real Estate	*6.6% return on 35% of assets*
Alliances & Partnerships	*3.1% return on 19% of assets*

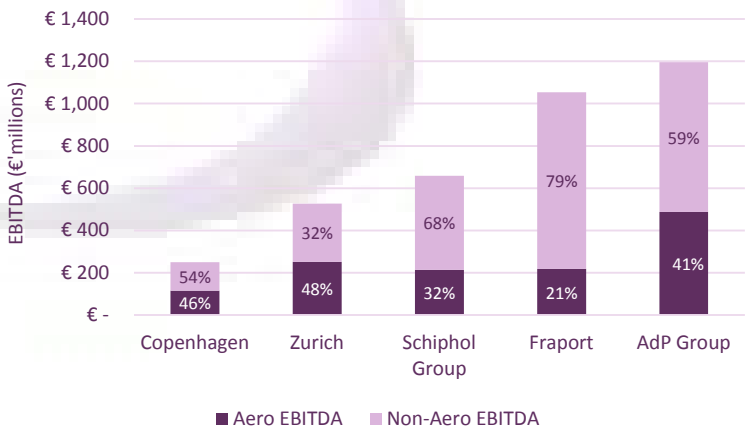
Source: Annual Report 2016

Vienna

Airport (Aviation)	*4.4% return on 61% of assets*
Handling	*44.6% return on 2% of assets*
Retail & Properties	*21% return m 15% of assets*
Malta Airport	*9.5% return on 16% of assets*
Other Segments	*11.5% return on 5% of assets*

Source: Annual Report 2016

Key Airports: EBITDA Composition



Full Economic Regulation and the Single Till are more effective in restraining returns

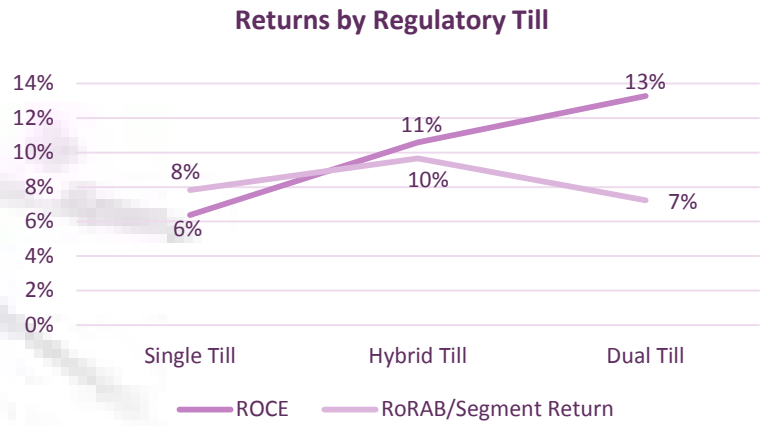
The charts opposite show the average Rate of Return on Capital Employed (ROCE) and RoRAB (segmental returns) averaged across airports or airport groups under the different forms of regulation, by regulatory till and regulatory intensity.

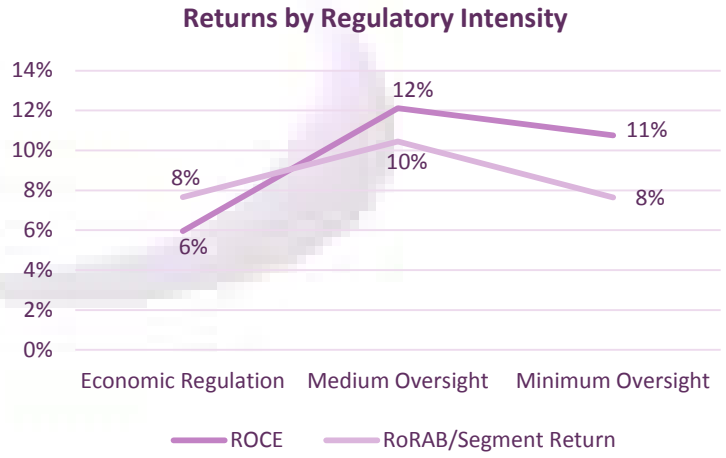
It is evident that, on average, lower overall returns are attained by those airports or airport companies where the main airport is subject to economic regulation under a Single Till, roughly 6% or less than half that achieved by Dual Till airports. Returns at Hybrid Till airports lie in the middle of the range, reflecting the extent to which some of the returns earned from commercial activities are used to moderate the charges levied within the aeronautical till.

However, the RoRAB/Segment returns are somewhat flat across the range of Tills. This could be due to the lack of availability of data as mentioned previously; of the 4 airports that reported a return on the RAB, 2 are Single Till Airports and the other 2 are Hybrid Till. Hence, the RoRABs for the Dual Till airports are all proxy estimates and may not be precisely reflective of the returns on the regulated activities.

Similar trends can be seen in the graph by regulatory intensity. Where full economic regulation is in force, airports usually make relatively lower returns compared with Medium and Minimum oversight.

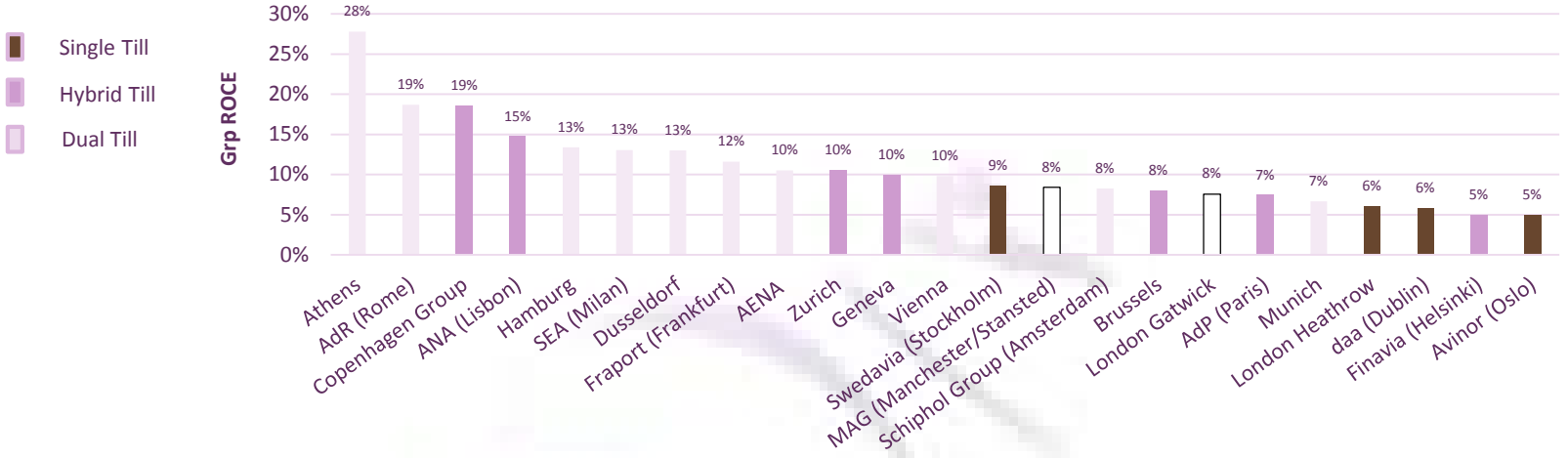
This analysis suggests that the Single Till mechanism and full economic regulation are more effective in restraining returns, but the analysis is, again, hampered by the lack of transparent data relating to the regulated part of the business in many cases.



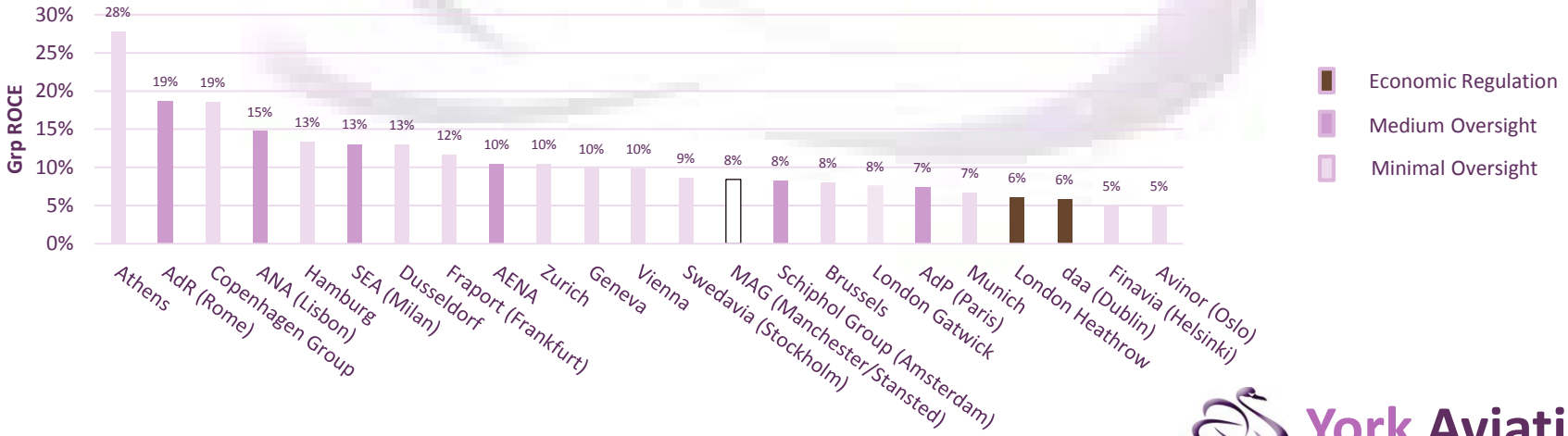


York Aviation

Full Economic Regulation and the Single Till are more effective in restraining returns (2)



The chart above shows the ROCE by till type in force (noting that the ROCE is based on the whole business). Thus airports with a high degree of activity outside the till will tend to show higher rates of return than those where there is less activity outside of the till. Generally, airport companies make greater returns overall where a Dual Till is in force as commercial revenues are not used to underpin the cost of core aviation activities. The chart below shows the ROCE by form of regulation. This confirms the pattern seen on the previous page which suggests, on the margin, that those airports which are subject to Medium regulatory oversight and/or operated under a Dual Till earn higher returns than those which are more heavily regulated or no longer regulated as deemed not to have substantial market power.



Setting appropriate till boundaries and allocating costs correctly is critical

Generally, the returns by segment illustrated on the previous page would tend to suggest that returns are lowest in the aviation (regulated) segment of the business. However, this may simply be the result of the way in which costs have been allocated between tills. Without a rigorous and transparent process of cost allocation, it is not possible to be certain that the assets have been appropriately divided between those within the aviation till and those outside. The cost allocation process is normally undertaken by airports themselves and may not always be verified by the ISA. Lower returns in the aviation segment, where a Dual or Hybrid Till is in force, may be a direct consequence of how the till has been specified rather than a reflection of charges being below the level necessary to enable an airport to attain a reasonable return on efficient assets from its aeronautical activities.

From the airlines' perspective, where revenues are earned directly from passengers using a particular airport, the benefit of such revenues should be used to keep direct charges to airlines (and passengers) to an efficient level rather than being used to invest in other non-related and potentially higher risk activities. This would tend to argue for a Single rather than a Dual Till approach. Increasingly, regulators are favouring the Single Till approach (see case study boxes opposite and below).

French Regulatory Authority

"The Authority considers that it is important that all activities resulting from airport activity contribute to the overall economy of the business. A 'Single Till' for all activities automatically returns to the airport activity the results of commercial activities. It believes this approach is the simplest and avoids a significant cost for operator and regulator in defining and controlling the allocation of assets and expenses.

Source: Avis n° 1704-A1 du 6 juillet 2017 (translated)
L'Autorité de supervision indépendante des redevances aéroportuaires

AENA

"In response to airline pressure, we expect continued scrutiny of cost allocation to lead to downward pressure on tariffs: Pressure is mounting on airports' cost allocation between their regulated and unregulated business. The CNMC has challenged EUR350m of costs that AENA included in its aviation business, while AdP voluntarily moved EUR200m of previously regulated cost to the non-regulated business to avoid similar discussions. We expect this trend to intensify, with pressure on pricing increases across the sector."

Source: Credit Suisse, 18 January 2017

Copenhagen

In July 2017, the Danish Government announced a new Aviation Strategy which includes, among other initiatives, regulatory adjustments at Copenhagen Airport. The Government has proposed a change to the 'commercial cross-subsidy' (the boundary of the Hybrid Till) so that the contribution from commercial revenues would increase from 30% up to 50% for the period from April 2019, moving to 40-50% for later tariff periods.

Source: Copenhagen Airport Press Release, 5 July 2017

AENA

The Competition and Markets Authority in Spain recommended a reallocation of €70 million in costs to the non-aeronautical till and noted that the till allocation proposed by AENA resulted in a substantially higher level of profitability than other comparable European airports.

Source: Criteria for Separation of Aeronautical and Commercial Activities at AENA, Comisión Nacional de los Mercados y la Competencia, April 2015

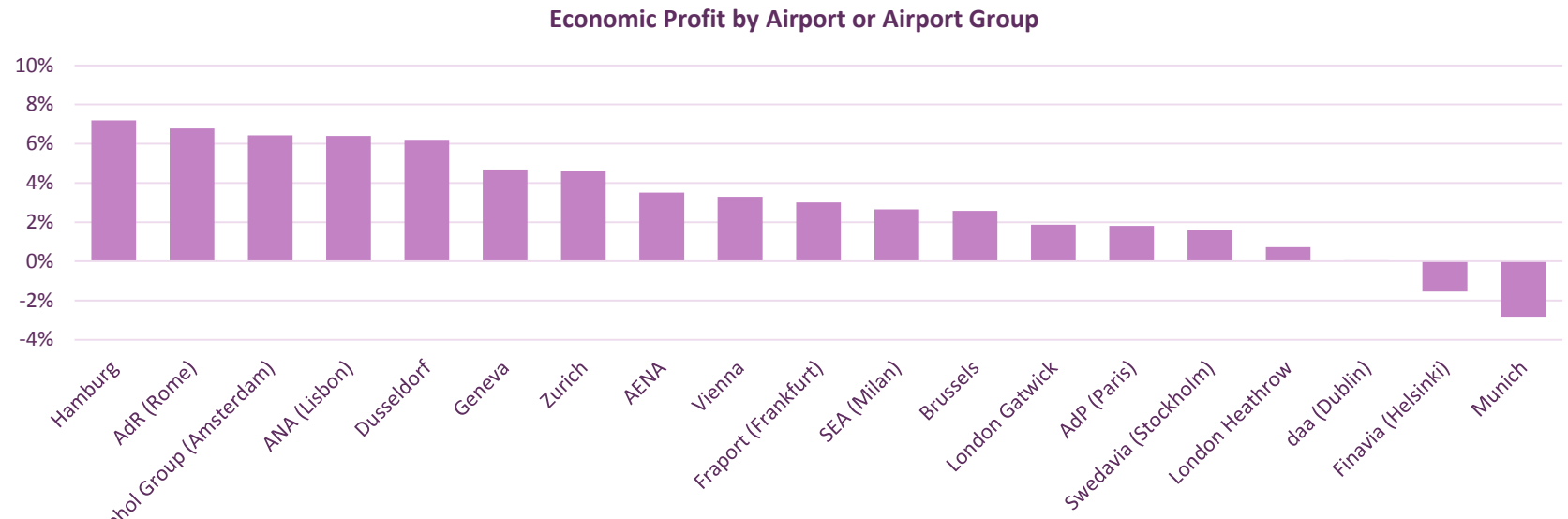
UK CAA

"The use of a single till approach to calculate price control revenue… costs, should lead to a reduction in the level of airport charges compared to other approaches."

Source: Consultation on…the regulatory framework to support capacity expansion at Heathrow (CAP 1541), Executive Summary, para 14, June 2017

‘Economic Profit’ is an indicator of ‘supernormal’ or excess profit

Economic Profit is a different measure of profitability from accounting profit as it takes into account ‘implicit’ costs as well as ‘explicit’ costs to the business. The implicit costs are opportunity costs of returns that could have been earned if capital had been invested elsewhere. In other words, the economic profit is the accounting profit (ROCE) less the WACC, where this is known. In ideal terms, it should be possible to compare the return in the regulated or aeronautical part of the business (RoRAB) with the relevant WACC. However, for the reasons noted earlier, **we have little confidence in the process by which the WACC has been set in the majority of cases, not least as, in many cases, it is simply not transparently disclosed.** Hence, this comparison would be meaningless and potentially compounded by issues relating to cost allocation and the estimate of returns. Where economic profit is positive, it could be defined as **‘supernormal profit’** earned above its cost of capital, when expressed as the returns an airport makes on its assets over and above the WACC that has been set (multiplied by the capital invested). This could be an indication of monopoly power, although it could also be the result of the business efficiency gains that add value for investors but that should also be shared with users. In a fully competitive market, any ‘supernormal profits’ would be expected to be competed away over the medium term. It should also be noted that due to the fact that ROCE’s are reported at a group level, the end ROCE might not reflect the true returns of the individual Airport where required and this partly explains why an economic loss is been shown at Helsinki Airport as it only reflects the ROCE for the entire Finavia Group, which includes air traffic control and a number of smaller airports.

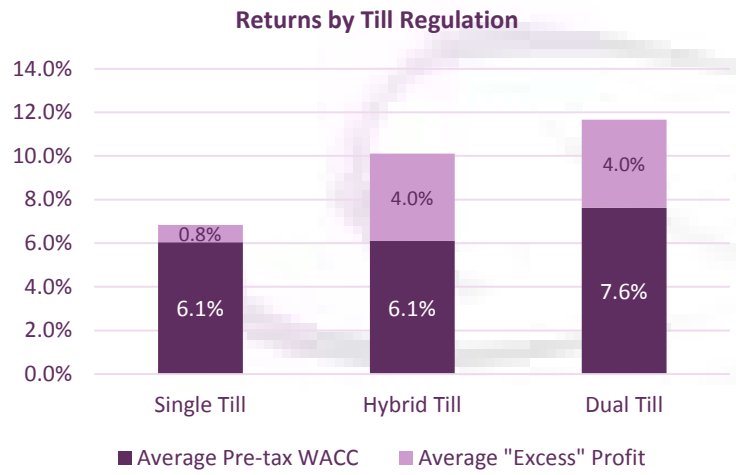


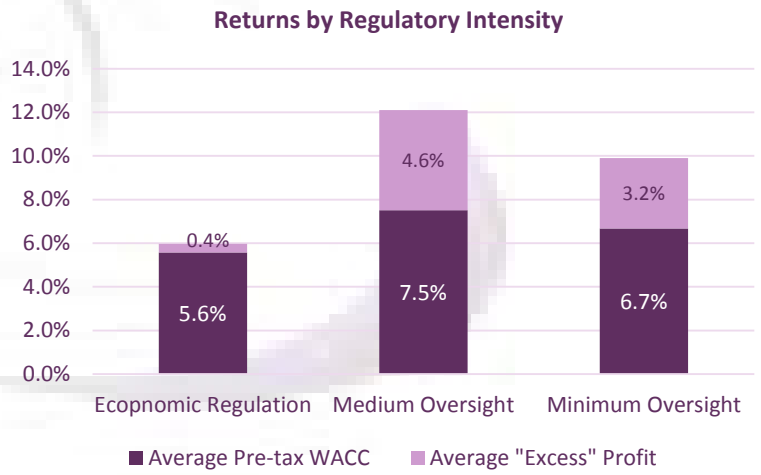
Note: the WACC used for Munich has been unchanged since at least 2012, as any change would not have an effect on the charges development, due to the provisions in fee cap contract in place until 2020. However, the WACC for other airports in Germany are regularly updated and have been reducing since 2012. This suggests that the WACC for Munich in this comparison, although relevant for the current period, is out of date and, more importantly, higher than its peers.

Economic regulation under a Single Till leads to better regulatory outcomes

The chart, below left, shows the relationship between the average economic profit ("Excess returns") for the whole airport business/group (expressed as a percentage) under each of the Single, Hybrid, and Dual Tills. Although the percentages differences are relatively small, it is evident that economic profits tend to be greater at airports where a Dual or Hybrid Till applies. Whilst this could be interpreted as suggesting that such airports are able to be more commercially innovative, it may simply reflect the lack of any mechanism for users to benefit from such innovation. In other words, **given the uncertainty regarding how costs are allocated between tills, we cannot be certain that these profits are not earned, at least in part, at the expense of airport users.**

In terms of regulatory intensity, shown in the chart on the right, economic profits are greatest at those in the 'Medium Oversight' category, which suggests that full economic regulation does moderate profitability. Economic profits are lower on average at those airports with minimal regulatory oversight, but this may simply reflect larger groups, such as Avinor, Finavia and Swedavia, where there are a large number of small airports with lower profitability which would not in any event qualify for more detailed regulation under the ACD.

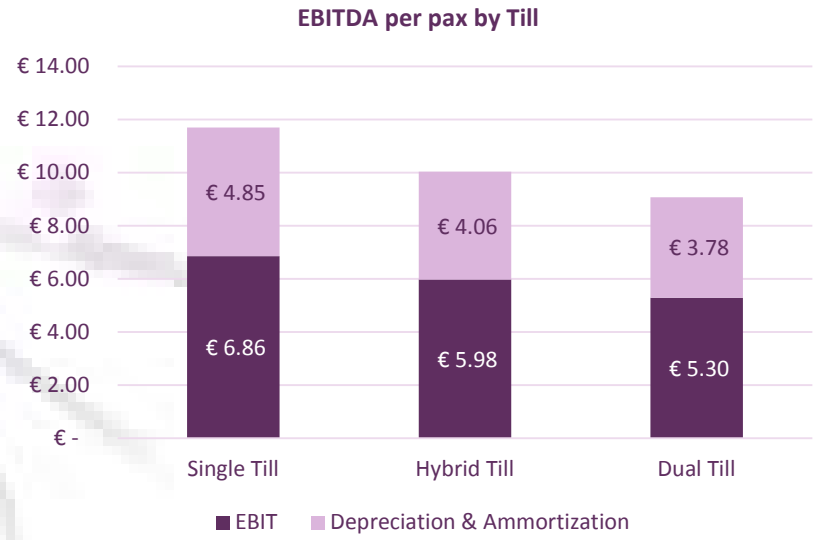


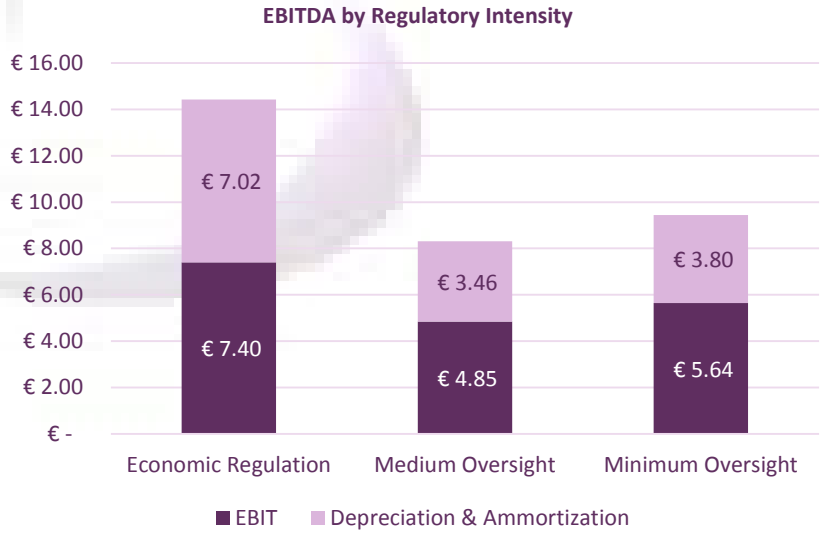


Is there a relationship between EBITDA and the form of regulation?

The chart, below left, shows the relationship between the average Earnings Before Interest and Tax and Depreciation (EBITDA) per passenger at airports where a Single, Hybrid or Dual Till is applied. Somewhat paradoxically, Single Till airports have the highest average EBITDA per pax, but this is driven largely by the high returns at London Heathrow. The same factor influences the pattern by category of regulatory intensity. We have separately identified the depreciation component of EBITDA so as to isolate EBIT returns, before the effect of depreciation. The higher depreciation seen as single till airports is a reflection of the high levels of capital investment which may, in turn, be the reason why these airport regulated under a Single Till. A similar pattern emerges in relation to regulatory intensity, although here there is a difference between airports subject to minimal oversight which make greater returns than those where there is a medium level of scrutiny.

These high EBITDA returns do not necessarily flow through to higher overall returns (at the ROCE level) because of the level of investment at these airports – possibly the reason why they have been subject to more intensive regulatory scrutiny in the first instance. Higher RABs and higher levels of depreciation result in lower actual returns on capital employed. To a large extent, this reinforces the need for proper scrutiny by the ISA of the efficiency of capital investment and the establishment of appropriate depreciation profiles that properly reflect the assets actually in use within the regulated till at each airport, including ensuring that airports are not able to bolster their returns through claiming depreciation on assets no longer in use or allocated outside of the regulated business.





York Aviation

5) The Impact of Ownership and Concession Agreements

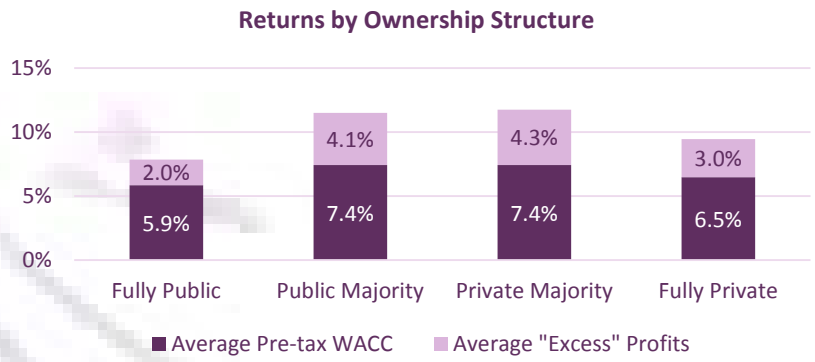
York Aviation

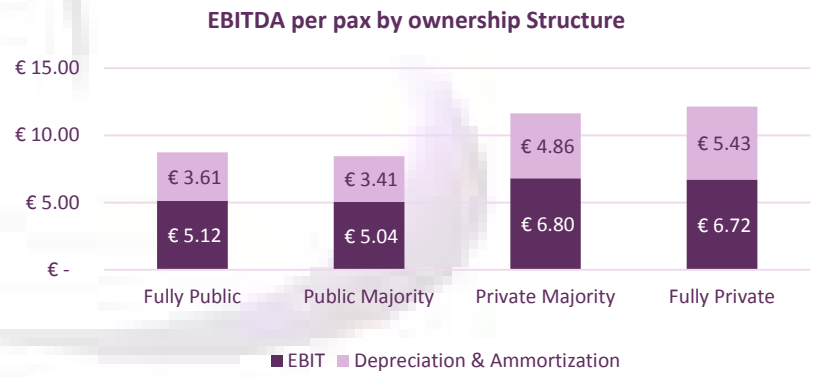
Privatised airports may need more regulatory scrutiny

The ownership structure of the airports under consideration is outlined in Appendix D. We have not been able to track back changes in profitability to the time when any individual airport was privatised. However, we have examined the relationship between ownership type and various measures of profitability. Only a few airports in the Top 30 are operated as concessions, so we have not separately identified them, but classified them appropriately as 'private' or 'private majority'.

Although the varying mix of ownership (public majority and private majority) makes it difficult to draw definitive conclusions about how ownership affects returns, it does appear that fully private airports make greater returns than fully public airports. This is perhaps unsurprising, but does serve to underline **the need for privatised airports to be subject to appropriate regulatory scrutiny to ensure that returns are not excessive at airports with market power.**

In general, privately owned airports achieve higher EBITDA per passenger, possibly reflecting lower operating costs. Other other metrics would suggest that these profits are being re-invested to a high degree. It should be noted that London Heathrow exerts a strong influence on the 'Fully Private' category, where Single Till economic regulation moderates returns but still allows for relatively high EBITDA.





Privatisation and concession agreements can lead to regulatory concerns

ACI EUROPE reports that over 40% of European airports now have at least some private shareholding ('The Ownership of Europe's Airports 2016') and that close to 75% of European traffic is handled at these airports. This drive towards private involvement in airport management and investment has taken place mainly at the larger airports and there continues to be a significant level of public involvement at smaller regional airports, which are often significantly less profitable and many are unprofitable.

There are a number of models of ownership and the extent to which private capital is involved can vary significantly. In some cases, privatisation has involved a 'concession' model, where the concession agreement term can be quite lengthy (20 to 50 years) to allow for significant investments and for the operator to make returns on these investments. This makes it important that airport concessions are carefully regulated to ensure that investment returns are proportionate. The privatisation process will clearly aim to attract the best value offers, which will to some degree be dependent on the level of certainty or otherwise around the likely intensity of future regulation. This has led to regulatory arrangements and, to some degree, specific regulatory parameters, being written into concession contracts or legislation accompanying the privatisation. Although it may be desirable, on the one hand, to create long term certainty over economic regulation in these cases, if the parameters of regulation are pre-determined in legislation or in long term concession agreements, this reduces the opportunity to review regulatory arrangements and parameters in cases where this might be necessary, such as changes in an airport's market power.

There is some risk of conflict, therefore, between proper regulatory scrutiny and pre-commitments made during the process of privatisation or the letting of concessions. Indeed, the higher returns being made by partially privatised airports (on the previous page) could be seen as a means to make it attractive for the private sector to invest.

ANA SA (Portuguese Airports)

The Portuguese airports privatisation was concluded in 2013 and involves a 50 year concession contract. The regulatory arrangements, as set out in the accompanying legislation (Decree Law nº 254/2012) and concession contract, include benchmark tests, service quality measures and transparency requirements. However, the initial regulatory period is lengthy (10 years) and although regulation involves a price cap, it does not take into account costs or asset base returns and so is not a 'building blocks' approach. The concession agreement also includes a capitalised 'concession right' amortised over the period of the concession and classed as intangible assets, recoverable through airport charges. ANA's ROCE is around twice its WACC (see slide 27), but the regulator has no influence over this, being only required to follow the price cap formula set out in the concession agreement.

Source: Portuguese Decree Law nº 254/2012

Aeroporti di Roma

The privatisation of AdR began in 1997 by putting 45% of the share capital on the market with both a public offering and private placement. Privatization was completed in 2000, with the divestment of shares held by the state. AdR is run as a concession with an Agreement to 2044 which sets out (in the notes to Article 32, page 36, 37, and 38) a number of pre-determined values relating to the WACC, but also as to how the annual variation in opex should be calculated, based on a pre-determined formulae. As with ANA there is also a figure in the accounts for the 'concession right' classed as intangible assets.

Source: ENAC and ADR Concession Agreement

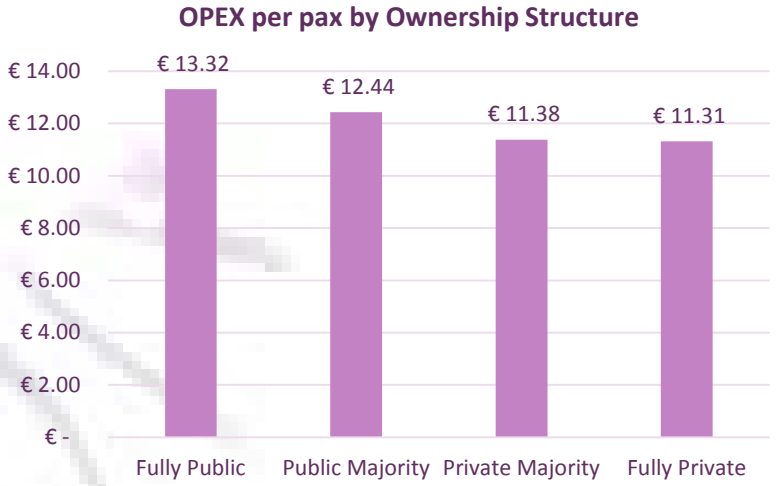
Ownership and Efficiency

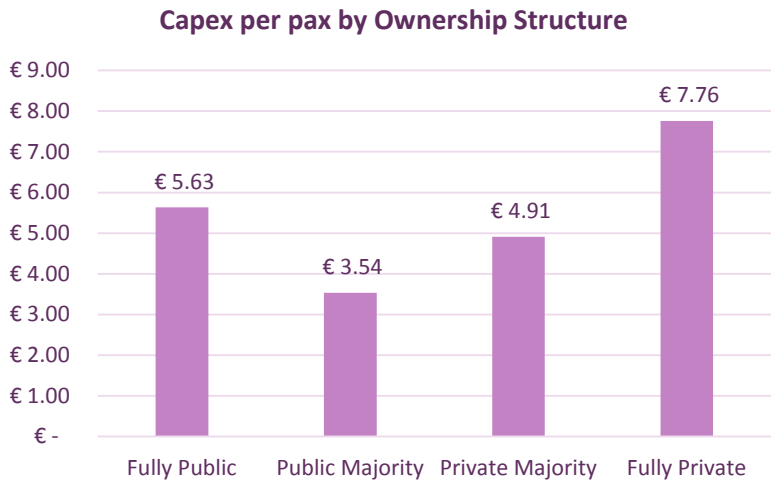
There is some indication that publicly owned airports are more expensive on a per passenger basis than privately owned airports in terms of operational costs (excluding depreciation) on a per passenger basis. This would tend to suggest that private sector airports are more efficient in terms of operating expenditure and have, as we have seen earlier, higher EBIT and EBITDA margins.

In terms of capital expenditure per passenger (here we have shown, where data allows, only capex that is related to airport investment), privately owned airports appear to be investing most, although this is driven by expenditure at Heathrow to a large extent. It does not follow that such capital investment is necessarily efficient and required by users as, in a fully regulated environment, higher capex can be used to generate higher returns as we explain later.

There are also a number of scale factors which could skew these results as the incremental costs of handling additional passengers may be less at larger airports than those with more limited infrastructure. As before, it should be noted that London Heathrow exerts a strong influence on the 'Fully Private' category.

Overall, it is difficult to draw definitive conclusions regarding opex or capex efficiency and the link to profitability. There are likely to be airport specific factors at play, which would require individual scrutiny to enable any conclusions to be drawn as to whether individual airports are operating or investing efficiently or not.





6) Measuring Efficiency and the Impact on Profitability

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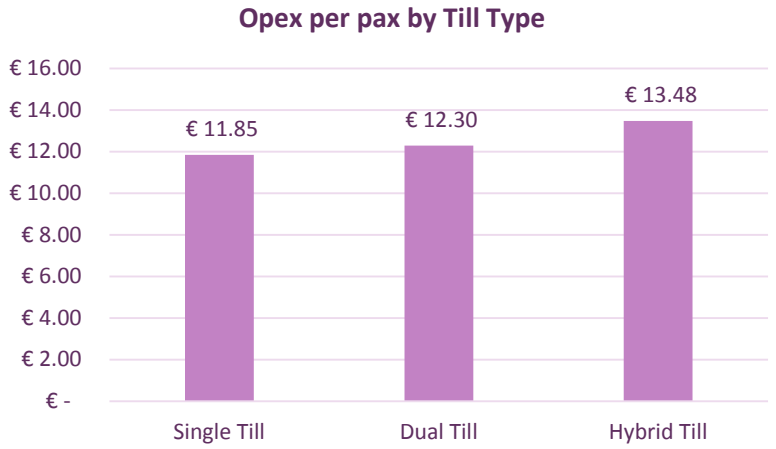
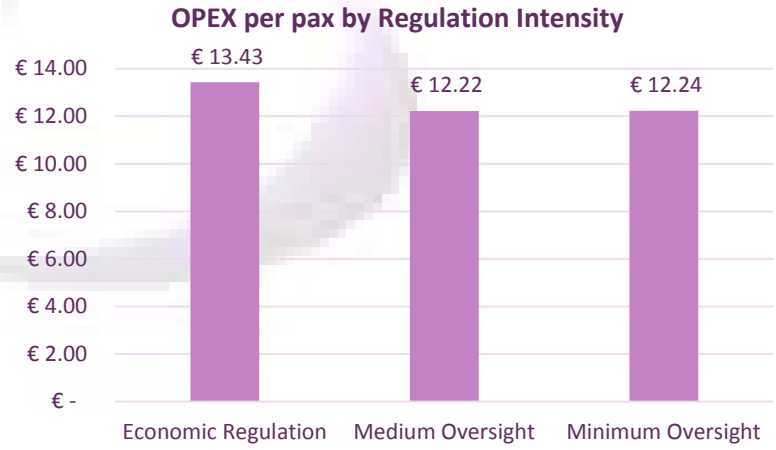
Opex per pax (excl. depreciation) tends to be lower at Single Till airports

We now set out to examine measures of efficiency and how this relates to profitability and to the form of regulatory oversight.

In the first instance, we have averaged opex per passenger (at airport level where available or at group level) over 5 years in order to smoothen short term trends and, in this analysis, we have excluded depreciation (we have considered the effect of depreciation on the next page). On this basis, as shown the chart to the right and above, Dual and Hybrid Till airports tend to have higher opex per passenger than those operated on a Single Till basis. **This may relate to the costs associated with those activities outside of the regulated till, as we have not always been able to distinguish between costs by till, and may not be a reflection of the cost of delivering the aeronautical part of the business as data does not allow us to isolate the operating costs associated solely with the aeronautical part of the business in most cases**.

There is little clear relationship between the extent of regulatory scrutiny and the level of opex per passenger (chart on the lower right).





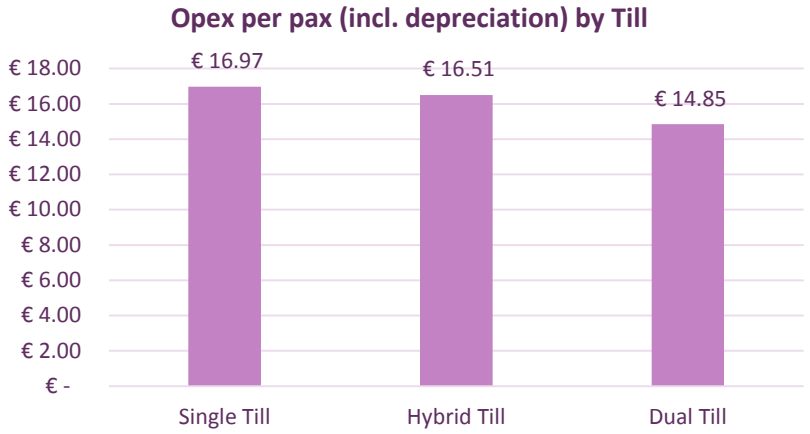
Opex Comparability

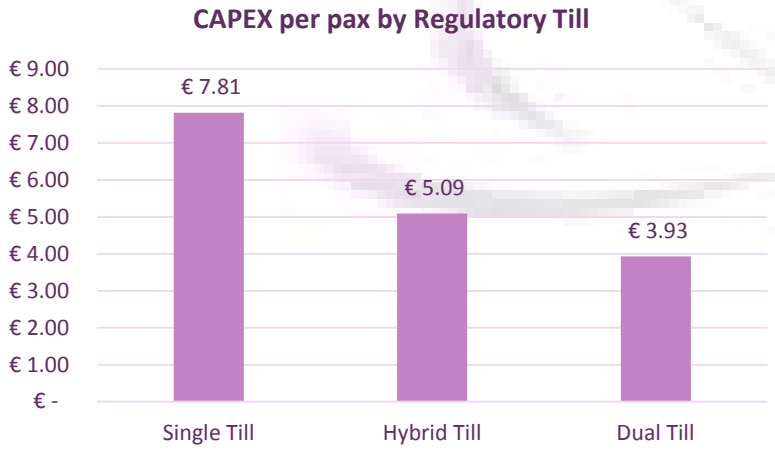
We acknowledge the potential problems with the comparability of opex efficiency measures between airports. For example, the German airports tend to provide ground handling services direct to their users, either exclusively or in competition with third parties. This can blur the picture in terms of making opex comparisons with other airports where operational services are not provided directly as internal labour costs. It is important that such costs are separately identified and reported alongside revenues from ground handling as required by the Ground Handling Directive. It is not clear that such separate reporting is consistently undertaken so this can make comparing between airports difficult depending on how operational staff are assigned to different segments of the business and the extent to which data is available at the business segment level.

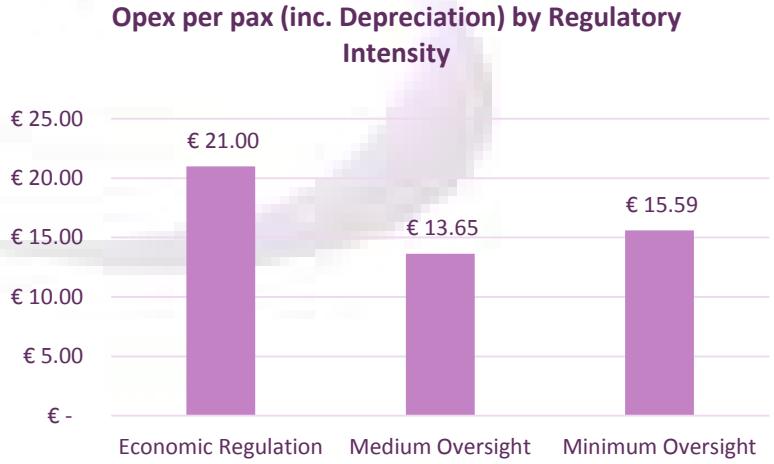
Opex per pax (incl. depreciation) tends to be higher at Single Till airports, which may indicate higher investment levels

Depreciation could have an effect on the analysis of efficiency shown on the previous page, in which it was excluded. Depreciation is a relevant component of opex when considering the overall returns made by an airport business. Adding in depreciation gives some indication of the extent to which investment has been efficient in the context of the operation overall.

We have, therefore, included depreciation in this analysis of opex per pax and this shows that, on this basis, Single Till airports now have the highest opex per pax (in contrast to the analysis on the previous page) which could be indicative of higher levels of investment. This is also suggested in the chart below left which shows that Single Till airports have the highest capex per pax, once again driven by Heathrow.







Capex and Profitability

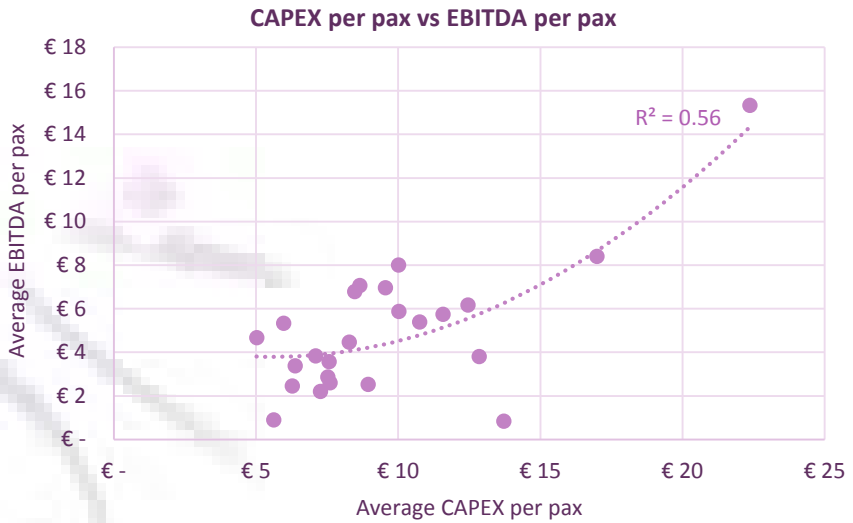
In the charts opposite we compare EBITDA per pax with CAPEX per pax and ROCE with CAPEX per pax.

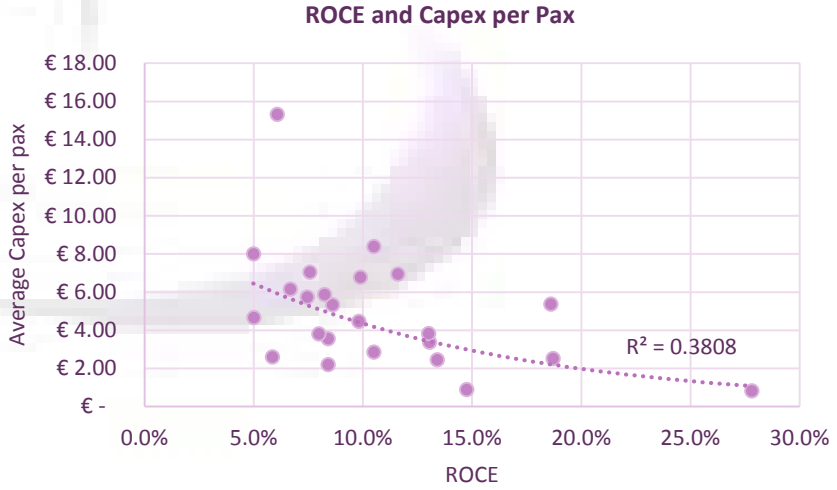
The relationship is somewhat stronger in relation to EBITDA than ROCE. On the one hand, the positive relationship between CAPEX per pax and EBITDA per pax may indicate that higher CAPEX feeds into the RAB and thus contributes to increased returns. At the same time, to finance investments, the amount of debt and equity (i.e. the capital employed) is increased to fund these investments. This, combined with the depreciation on the increasing asset base, reduces the ROCE as shown in the second graph.

This illustrates the incentive on airports to drive up investment, sometimes called 'gold plating', to allow higher profits to be earned, but within a regulatory framework where overall returns appear to be moderated. 'Dual Till' airports could also over invest in infrastructure to exploit the potential for increased (unregulated) commercial revenues.

It should be noted that this incentive only arises under more formal price cap regulation rather than the looser *ex-post* type regimes. So, whilst on many of our measures, more intensive regulation would appear to be beneficial in terms of moderating returns, it may give rise to an incentive to increase investment, which may or may not be efficient or strictly required by users.

This highlights the importance of proper scrutiny of capital investment, on the part of the ISAs.





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7) Funding Investment

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How are infrastructure investments being financed and planned? Are airports able to finance their infrastructure plans?

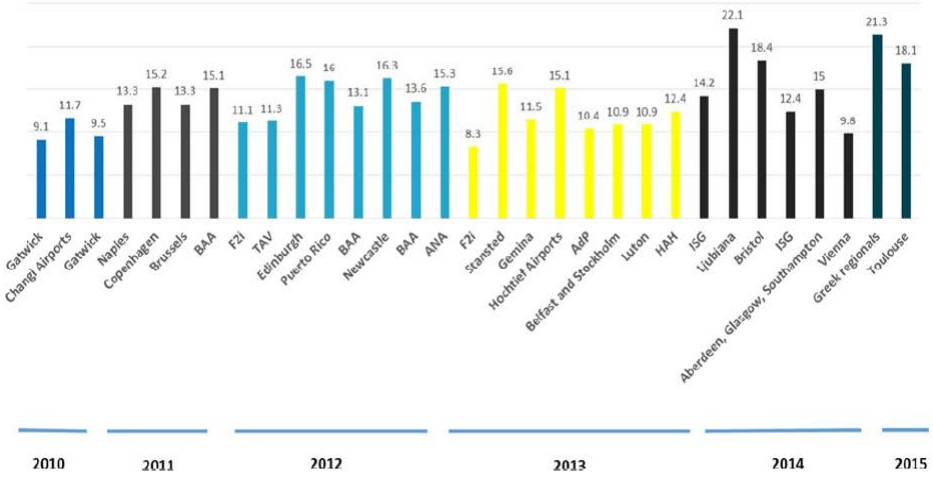
The need for airports to invest sometimes very large sums of money in infrastructure to meet demand inevitably raises the question of how such projects are financed and the implications for airport charges. One of the most contentious issues is pre-funding and whether or at what point users should pay for facilities that are 'under construction' or not yet in use. There is no guarantee, for example, that current users will always benefit from future capacity.

Approaches to this question vary across Europe. Steer Davies Gleave, in their review for the EU Commission of the Airport Charges Directive (September 2013), set out (in Table 3.16 of their report) the different practices in various European countries. In most cases, some form of pre-financing of infrastructure seems to be in place, but some restrictions occasionally apply (e.g. in France and Belgium) and, in the cases of the Netherlands and Portugal, the practice is actually prohibited by legislation.

A detailed examination of issues relating to infrastructure financing are beyond the scope of this study and are, in any case, far from being 'black and white', as there are various options that could be considered such as improved engagement with users over infrastructure plans, the use of capital investment 'triggers', or changing depreciation profiles (something we understand happens at Dublin and Amsterdam).

It is clear that the issue of infrastructure funding is highly contentious and needs to be properly considered on a case by case basis, with the opportunity for al interested parties to make their case, with appropriate transparency. This is clearly something that should be within the scope of responsibility of an Independent Supervisory Authority (ISA) or regulator. An example of a regulator openly consulting on this issue can be found in the UK. In June 2014, the UK CAA issued a public Discussion Paper on the regulatory treatment of issues associated with airport capacity expansion (CAP 1195). Similar consultations have also taken place regarding the treatment of investment at Dublin Airport but it is less clear that there is an equivalent level of scrutiny by other ISAs.

EBITDA multiples for airport transactions in recent years are typically around the mid to high teen level, suggesting relatively strong financial positions. The graph on the right includes a number of airports within our own sample group.



Source: RDC Aviation

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How are infrastructure investments being financed and planned? Have credit ratings improved as a result of concession agreements?

From the public information available, it is difficult to establish on a consistent basis across all of the airports exactly how infrastructure investments are being planned and financed. However, the ability of airport operators to obtain favourable financing terms will depend in large part on the assessment of credit rating agencies, such as Moody's, Standards & Poor's, and Fitch. In terms of how an airport concession agreement can influence these, we have looked at the case of Aeroporti di Roma (AdR), where a new Concession Agreement to 2044 was introduced in 2013 , which incorporated a number of agreed principles including:

- the dual till regulatory system (with income from non-aeronautical activity being retained entirely with the airport operator);
- a real pre-tax WACC of 11.9% for the period 2013 to 2016,
- the real pre-tax WACC estimated to increase from 2017 by 1% – 2,5% p.a. on allowances written into the concession agreement on 'incremental returns' for 'strategic capex' worth 5,4 billion Euro (source: Investor Presentation February 6 2013);

Factors such as these being written into the concession agreement may have resulted in favourable credit ratings. For example, Fitch rated AdR as BBB+ (exp) with 'Stable' outlook and commented: *"The tariff framework is better than in other major European airports, with a price-cap system operating within a dual-till system (upside on non-aeronautical revenues is not given back to airlines through rebates on aeronautical tariffs). The contract signed with the central government provides revenue visibility (tariffs tracking inflation and ongoing capex) and offers higher protection against downside than most peers, through possible partial tariff adjustments in case of traffic losses."* (AdR Press Release 27 Nov 2013). Moody's issued a rating of Baa3 'Stable' and commented *"More fundamentally, the assigned rating reflects (1) ADR's long-term concession to operate the Rome airport system; (2) the increased transparency of the tariff-setting framework, although its robustness remains untested; (3) the company's fairly good traffic performance despite more challenging macroeconomic conditions, particularly in Italy; (4) ADR's material exposure to Alitalia; and (5) the financial requirements associated with ADR's sizeable investment plan and the execution risk stemming from the implementation of such a complex capex programme.* (Ibid)

Whilst it is difficult to relate the credit ratings assigned in this case entirely to the existence of the Concession Agreement at AdR, it is clear that the provisions 'written into' the concession agreement with regards to regulation, have influenced the ratings. It is likely that other airports' credit ratings will similarly be influenced by whether the regulatory settlements if deemed favourable or not. In practice, this should be reflected in the WACC to the extent that it impacts on the cost of debt.

In respect to privatisation of state owned airports, one key example is AENA, the Spanish Airport Operator. Since its privatisation in 2012, the Airport has enjoyed significant growth in profits (EBIT per pax growth of around 145% CAGR between 2011 and 2015). The most recent credit report by Fitch has upgraded the Long Term rating from BBB+ to A, which is above the sovereign rating of BBB+ and the financial position of the organisation is such that the majority of the cashflows for CAPEX can be easily funded through its cashflows and hence financing needs are minimal. For an Airport with a credit rating above that of the government, the perceived risk should also be lower, which questions the WACC being at of 6.98%, which is partly set at a premium to returns on Spanish Treasury Bonds.

In general, airports have little difficulty in raising bond finance at favourable interest rates.

8) Conclusions and Recommendations

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General Conclusions

Our analysis of airport profitability in Europe, across the top 30 airports and to which the Airport Charges Directive (ACD) applies, has revealed **that there is no consistent approach across airports or between ISAs in terms of ensuring that information relevant to how charges are set** at individual airports is made transparently available. Our analysis shows wide variations in the reporting of financial performance and in the documents underpinning agreements to and/or the regulation of airport charges. In many cases, information is only available across broader groups of airports or at the level of the overall business, making it difficult for airlines to understand how the charges that they pay are related to the costs and revenues earned at any individual airports.

In many cases, airport companies regulated under the **Dual or Hybrid Till model make materially greater returns** than those operating on a Single Till basis. In almost all of these cases, returns are greater outside of the regulatory or aeronautical till than within it. However, this may simply be the result of how costs and assets have been apportioned between tills, rather than underlying profitability, but the basis of this is seldom clear. In these cases, higher WACCs may well be ascribed to the business as a whole, reflecting the greater level of risk to which these commercial and, often, external investments are exposed. **Use of these higher company or group level WACCs for the aviation till on its own at these larger more mature airports would appear inappropriate, with the risk that charges to users are set at a higher level than they should be.**

A number of 'models' of regulation exist at the top 30 airports in Europe ranging from minimal regulatory oversight, where commercial agreements are struck with users, to full economic regulation, where detailed consultation and documentation exists (as we detail in Appendix D). This may be appropriate, as different models may work for different airports. However, our analysis in this report does suggest that **some airports may not be regulated as effectively as they could be,** not least as in many cases there is little documentation and the role of the ISA is not clear.

In general, our analysis would suggest that **those airports which are fully economically regulated and/or operated on a Single Till basis are less likely to make excessive economic profits** than those airports subject to minimal regulatory oversight, albeit our sample of fully regulated airports is small. This may suggest that where formal *ex-ante* price cap economic regulation is in force, it is effectively controlling excess profitability better than minimal regulatory oversight. **However**, our analysis also shows that **these airports tend to invest more heavily**, which highlights the importance of their being subject to detailed scrutiny to ensure that investment is efficient at these airports.

A key finding from our analysis is the **importance of a transparent approach to defining the till to be regulated coupled with effective oversight of airport charges.** Our analysis has identified some potential anomalies in terms of the allocation of assets between tills and in the appropriateness of the WACC applied to the regulated/aeronautical part of the business where it has been derived at the overall business/group level and reflects higher levels of risk outside of the core aviation business or at smaller airports.

Key Findings and Recommendations

It follows from our analysis that there is scope for regulatory scrutiny to be significantly improved to achieve more effective and proportionate regulation of airport charges. Our key findings and recommendations are:

Finding A: There remains considerable lack of transparency around the basis for setting airport charges and, where Dual or Hybrid Tills are in force, there should be greater transparency of the allocation of costs between the Tills. Greater transparency should be followed up by better regulatory oversight and, where necessary, intervention. **We recommend the publication of separate accounts for the regulated part of the business, with a clear definition of how costs (including the RAB and operating costs) are apportioned between the regulated and non-regulated tills. Greater transparency should be followed up by greater regulatory oversight where necessary.**

Finding B: The Weighted Average Cost of Capital (WACC) should be set at the level appropriate to the till (Single/ Dual or Hybrid)adopted and properly reflect the risks of the aeronautical business. **We recommend that ISAs should make transparent the calculations of an appropriate WACC estimate relevant to the regulated part of the business at each airport and ensure that this is used to determine charges.**

Finding C: The pre-determination of key parameters of the WACC or other key regulatory variables during concession or privatisation processes, whilst being transparent, is not likely to lead to cost efficiency. **We recommend that ISAs should regularly review the components of the WACC or other factors that appear to be 'pre-determined' in legislation or in long-term concession agreements (i.e. not fixing them in legislation or concessions) to ensure that they reflect the actual performance of the business.**

Finding D: Airports can make excessive returns under a Dual Till system, whereas the Single Till systems tends to moderate excessive profits. **We recommend that the appropriateness of the form of till (Dual, Hybrid, or Single Till) be regularly reviewed by ISAs, as well as how the till is applied in terms of the allocation of costs and assets.**

F**inding E**: Capital investment is an important driver of returns and it is important that it is efficiently incurred and properly allocated to the till in force. **We recommend that ISAs should regularly review, in conjunction with users, the relevance and accuracy of airports' proposed capital expenditure programmes, and how they are financed.**

Conclusions relating to the Airport Charges Directive

Our analysis would tend to suggest that the current Airport Charges Directive may be insufficiently effective in specifying how regulatory scrutiny of airport charges should work in Europe.

The 2013 SDG Report on the Airport Charges Directive contained recommendations for improved transparency (Recommendation 24) and that ISAs should be more proactive in ensuring that all parties fulfil their consultation requirements for provision of information (Recommendation 30). The analysis is this report suggests that there is still some way to go before these recommendations are met. Although it may not be appropriate for the Directive to be excessively prescriptive, as different models of regulation may well be appropriate at different airports and commercial agreements on charges do appear to work in many cases, we would recommend that:.

The Airport Charges Directive should require the Independent Supervisory Authority (ISA) in each Member State to be much more proactive in its oversight of airport charges and profitability, and to take action where it is appropriate. This may take the form of:

- **market power assessments;**
- **the review of pre-determined elements of the regulatory settlement;**
- **transparent consultation over the approach to infrastructure funding;**
- **the introduction of more specific regulatory measures.**

In almost all cases we have reviewed in this report, the relevant ISA should make its activities, consultations, and assessments much more transparent to users and ultimately to the general public, as the end user of air transport services, and to whom the ISA should have a specific statutory responsibility.

Appendices

York Aviation

Appendix A – Scope of Work

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Study scope

The terms of reference for the study asked for:

- examination of the profitability of the Top 20-30 airports in the EU and EFTA over the last 5 years;
- an assessment of the relationship between efficiency and profitability;
- an assessment of the impact of the till used (Single/Dual/Hybrid) on each airport's profitability;
- an overview of how the allowed cost of capital (i.e. the Weighted Average Cost of Capital or WACC) has impacted on airports' profitability;
- examination of the impact of the privatisation of airports/concession agreements on profitability; and,
- examination of how infrastructure investments are being financed and planned and the impact of credit rating on financing.

We identified the Top 30 airports[1] based on data from ACI EUROPE for 2016. The list of airports considered is set out in the next section. These airports account for 66% of all passengers in the EU/EFTA area in 2016 at airports with greater than 1 million passengers per annum. Assembling relevant data from the airports has been challenging and is, itself, indicative of a lack of consistent transparency of information. We provide further details on this in Appendix C. In this report, we have considered the effectiveness of the ACD in achieving its key objective of ensuring a common approach to the setting of airport charges within a transparent framework which ensures that users can understand the basis upon which charges are set and the services which they relate to. We have analysed the available data in multiple ways but have concentrated mainly on presenting data that shows meaningful relationships. We consider the effectiveness of the ACD under a number of headings:

- Forms of Airport Regulatory Oversight;
- Transparency of Key Components of the Charges;
- Measuring Profitability and Returns;
- The Impact of Airport Ownership and Concession Agreements;
- Measuring Efficiency and the Impact on Profitability;
- Funding Investment;
- Conclusions.

[1]London Luton Airport is excluded from the ACI data set but handled more passengers than Prague in 2016. However, our financial data largely relates to 2015 so we have retained Prague in our list of airports, albeit no financial data is available for that airport.

Appendix B – List of Airports

List of Airports Considered

The airports for which data was sought comprised the Top 30 by passenger volume in 2016 within the EU and/or EFTA as reported by ACI EUROPE

	Airport Code	Airport	Country	Region	Passengers
1	LHR	London Heathrow	United Kingdom	EU	75,714,970
2	CDG	Paris CDG	France	EU	65,935,748
3	AMS	Amsterdam	Netherlands	EU	63,618,867
4	FRA	Frankfurt	Germany	EU	60,786,937
5	MAD	Madrid	Spain	EU	50,400,442
6	BCN	Barcelona	Spain	EU	44,131,031
7	LGW	London Gatwick	United Kingdom	EU	43,136,047
8	MUC	Munich	Germany	EU	42,261,309
9	FCO	Rome	Italy	EU	41,738,662
10	ORY	Paris Orly	France	EU	31,239,800
11	CPH	Copenhagen	Denmark	EU	28,986,494
12	DUB	Dublin	Republic of Ireland	EU	27,919,296
13	ZRH	Zurich	Switzerland	EFTA	27,621,201
14	PMI	Palma de Mallorca	Spain	EU	26,252,041
15	MAN	Manchester	United Kingdom	EU	25,702,699
16	OSL	Oslo	Norway	EFTA	25,574,607
17	ARN	Stockholm	Sweden	EU	24,722,958
18	STN	London Stansted	United Kingdom	EU	24,290,384
19	DUS	Dusseldorf	Germany	EU	23,521,919
20	VIE	Vienna	Austria	EU	23,352,016
21	LIS	Lisbon	Portugal	EU	22,449,527
22	BRU	Brussels	Belgium	EU	21,789,327
23	TXL	Berlin Tegel	Germany	EU	21,253,958
24	ATH	Athens	Greece	EU	19,995,736
25	MXP	Milan Malpensa	Italy	EU	19,411,709
26	HEL	Helsinki	Finland	EU	17,184,193
27	AGP	Malaga	Spain	EU	16,651,535
28	GVA	Geneva	Switzerland	EFTA	16,453,249
29	HAM	Hamburg	Germany	EU	16,224,030
30	PRG	Prague	Czech Republic	EU	13,070,759

Note: London Luton Airport handled 14.6 mppa in 2016 but is not reported by ACI EUROPE

Airport Groups

A number of airports on the previous page are part of larger Airport Groups and do not report individually by airport. These are:

- AENA - which owns the Spanish airports, including four of the Top 30 airports (Madrid, Barcelona, Palma, and Malaga). London Luton Airport is also reported as part of the AENA Group;
- ANA - which owns the Portuguese airports, including Lisbon, which is also part of a sub-group of ANA – "the Lisbon Group" – encompassing Lisbon Airport, Azores Airports, Madeira Airports, and Beja Civil Terminal;
- Aeroports de Paris - which owns Paris CDG and Paris ORY;
- Aeroporti di Roma - which owns Rome Fiumicino within the Top 30 and also Rome Ciampino;
- Avinor - which owns Oslo within the Top 30 and also other Norwegian airports;
- Swedavia - which owns Stockholm within the Top 30, and also other Swedish airports;
- Finavia - which owns Helsinki within the Top 30 and also other Finnish airports;
- Royal Schiphol Group - in addition to Amsterdam within the Top 30, the Schiphol Group owns and operates Rotterdam The Hague Airport and Lelystad Airport as well as holding 51% of shares in Eindhoven Airport;
- the Copenhagen Airports Group also includes the small airport of Roskilde;
- the Berlin Brandenburg Airports Group (Flughafen Berlin Brandenburg GmbH) operates Berlin Schönefeld Airport and, through a subsidiary, Berlin Tegel Airport. It is also constructing the new Berlin Brandenburg Airport adjacent to Schönefeld;
- Manchester Airport Group (MAG) owns Manchester and Stansted Airports, as well as East Midlands and Bournemouth Airports;
- Milan Malpensa is part of the SEA Group, which also owns Malpensa and Linate.
- Dublin Airport is part of daa, but separate information is available. This is also the case, to some degree for Frankfurt Airport within the Fraport Group.

Appendix C – Data Availability & Assumptions

York Aviation

Availability of Data

We have undertaken this research by drawing principally on published annual reports, regulatory accounts, and other published regulatory documents. In some cases, we have been provided with documents by A4E Members, but only where such documents are in the public domain and do not contravene any Non-Disclosure Agreements. Assembling the data across the list of airports has been challenging and this has highlighted a number of issues relevant to the extent to which there is transparency for the users at a particular airport as to how charges are set relative to the costs of operating an individual airport, accepting that some additional information may be made available to airlines on a confidential basis during the consultation process.

- 16 of our 30 airports are members of Groups, which do not all report data individually by airport (2 other airports are also part of broader groups but do present information separately for the main airport). Although the ACD does provide for common charging systems across a network of airports or those serving the same city, so long as any economic transfers between airports comply with Community law, the lack of individual airport data impedes transparency for the users at any particular airport;
- accounting standards applied at the various airports across Europe are not always consistent;
- there is frequently a lack of clarity as to how the regulatory till has been defined (see next section) and, where some airports are not subject to formal price cap regulation, the use of a Single or Dual Till as the basis of charging is not always clear;
- even where airport-specific financial accounts are available, it is not always possible to distinguish between revenues and costs allocated to the aeronautical/regulated and non-regulated till, as few airports publish separate accounts relating to the regulatory till;
- key parameters, such as the WACC, are sometimes predetermined in concession agreements or other legislative frameworks, or estimated directly by the airports themselves without adequate explanation as to their derivation and application at the time when charges are being set (see later section);
- ISAs are required under Article 11 of the ACD to publish an annual report on their activities, but not all of them appear to do so in a fully transparent manner. Furthermore, ISAs do not consistently publish information relating to the performance of the airports under their supervision, nor make transparent their reasoning in setting or approving the level of charges at individual airports.

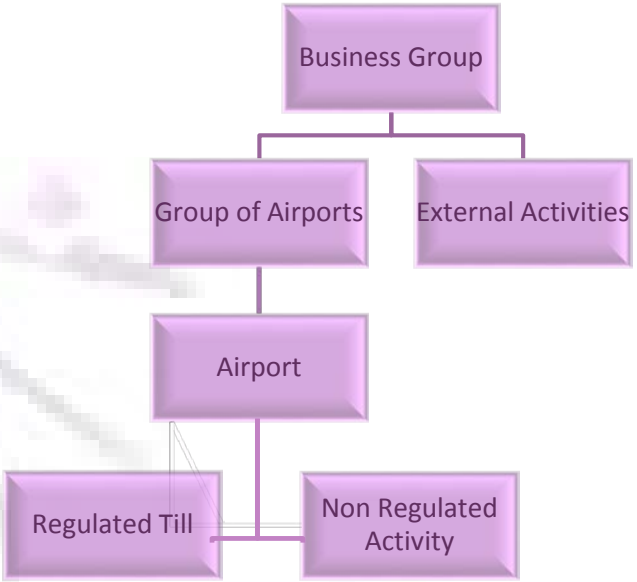
Availability of Data

We have assembled as much data as possible relating to the performance of the 30 airports or airport groups. For some airports, data relates to 2015 and for others to 2016. We have used the most recently available data in each case. We have not adjusted for different years where we compare between types of airport or type of regulatory framework, as we are seeking to understand the drivers of profitability rather than strictly compare between individual airports. We have been unable to find any financial data relating to Prague Airport, which is itself an issue of transparency.

We have used the data available to analyse trends in profitability and the relationship between key parameters to inform consideration of the effectiveness of the ACD. We use this to highlight key issues by reference to the data, but it should be emphasised that we do not set out to comment specifically on the effectiveness of the Directive at any individual airport or the validity of the charges set.

Availability of Data

Wherever possible, we have sought to identify information at the level of the individual airport. Where airports are regulated, or charges set, under a 'Dual' or 'Hybrid' till, we have sought data relating to activities inside and outside of the till, but this has not always been possible where formal regulatory accounts do not exist. In many cases, we have fallen back on accounting information relating to the aeronautical and non-aeronautical tills, although even these do not always allow for a clear distinction and separation of costs related to aeronautical or non-aeronautical activity and/or the regulatory till. In several cases, we have not been able to distinguish individual airport financial information from that relating to a wider group of airports. In other cases, we only have information at the overall group level, including for example with Finavia, the activities of the Air Navigation Service Provider. A key issue has been the extent to which it is possible to disaggregate information between the wider business, the individual airport, and the regulated activity or basis upon which charges are set (till). We set out a few examples of the varying levels of data availability in the case study boxes below.



London Heathrow

London Heathrow is regulated by the UK CAA. The CAA has a website which includes extensive documentation and analysis in connection with the regulatory process, including Regulatory Accounts for the Airport. However, even here there is no breakdown of the assets that are included in the regulatory asset base (RAB). Similar levels of detail are available for Dublin Airport.

ANA SA (Lisbon)

ANA SA publishes Group Accounts that cover all Portuguese airports, but no disaggregated financial data is available for Lisbon Airport or for the Lisbon Group of airports, although the Lisbon Group is referenced in the Regulated Charges Consultation Dossier for 2017.

Prague

We have been unable to source any publicly available financial information about Prague Airport, or the relevant ISA.

List of Airports and Availability of Data

	Airport	Airport Group	Country	Region	Pax	Key Sources of Data
1	London Heathrow		UK	EU	75,714,970	Published Regulatory Accounts (to 2016)
2	Paris (CDG)	AdP	France	EU	65,935,748	AdP Group Accounts, Economic Regulation Agreement 2016-2020
3	Amsterdam	Schiphol Group	Netherlands	EU	63,618,867	Schiphol Group Accounts (to 2016), Besluit van 18 april 2017
4	Frankfurt	Fraport	Germany	EU	60,786,937	Group Accounts (with Aviation Segments) to 2016
5	Madrid	AENA	Spain	EU	50,400,442	AENA Group Accounts to 2016, DORA (Regulation Agreement)
6	Barcelona	AENA	Spain	EU	44,131,031	AENA Group Accounts to 2016, DORA (Regulation Agreement)
7	London Gatwick		UK	EU	43,136,047	Published Regulatory Accounts up to 2014, then Annual Reports
8	Munich		Germany	EU	42,261,309	Annual Reports (to 2015)
9	Rome	AdR	Italy	EU	41,738,662	Group Accounts, Concession Agreement, Regulation Agreement,
10	Paris (ORY)	AdP	France	EU	31,239,800	AdP Group Accounts, Economic Regulation Agreement 2016-2020
11	Copenhagen	Copenhagen Group	Denmark	EU	28,986,494	Copenhagen Group Accounts
12	Dublin	daa	Rep. of Ireland	EU	27,919,296	Published Regulatory Accounts (to 2016)
13	Zurich		Switzerland	EFTA	27,621,201	Annual Report & Accounts, Urteil vom 25 Juni 2015, Recommandations du Surveillant des Prix, Dec 2015
14	Palma de Mallorca	AENA	Spain	EU	26,252,041	AENA Group Accounts to 2016, DORA (Regulation Agreement)
15	Manchester	MAG	UK	EU	25,702,699	MAG Group Accounts
16	Oslo (OSL)	Avinor	Norway	EFTA	25,574,607	Avinor Group Accounts
17	Stockholm (ARN)	Swedavia	Sweden	EU	24,722,958	Swedavia Group Accounts
18	London Stansted	MAG	UK	EU	24,290,384	MAG Group Accounts
19	Dusseldorf		Germany	EU	23,521,919	Annual Report & Accounts
20	Vienna		Austria	EU	23,352,016	Annual Report & Accounts
21	Lisbon	ANA	Portugal	EU	22,449,527	ANA Group Accounts, Regulated Charges Consultation Dossier 2017
22	Brussels		Belgium	EU	21,789,327	No Annual Reports available, Investor Presentation July 2016, Regulatory Decision of Nov 3, 2015
23	Berlin (TXL)	FBB Group	Germany	EU	21,253,958	Annual Report & Accounts (2015 only)
24	Athens		Greece	EU	19,995,736	Annual Report (2015)
25	Milan (MXP)	SEA Group	Italy	EU	19,411,709	SEA Group Accounts, Contratti di Programma ENAC - SEA S.p.A.
26	Helsinki	Finavia	Finland	EU	17,184,193	Annual Report & Accounts
27	Malaga	AENA	Spain	EU	16,651,535	AENA Group Accounts to 2016, DORA (Regulation Agreement)
28	Geneva		Switzerland	EFTA	16,453,249	Annual Report & Accounts, Recommandations du Surveillant des Prix, Dec 2015
29	Hamburg		Germany	EU	16,224,030	Annual Report & Accounts
30	Prague		Czech Republic	EU	13,070,759	No public financial information available

Comparing returns - data available for each airport

Airport	ROCE Available?	Year	Return on RAB Available?	Which alternative (to RoRAB) indicator used?	What Level does this info. Apply to?
London Heathrow	Yes	2016	Yes		Till
AdP Group	Yes	2016	No	ROCE	Business Group
Amsterdam (Schiphol Group)	Yes	2016	No	Return on Assets (Aviation Segment)	Aviation Segment
Frankfurt	Yes	2016	No	Return on Assets (Aviation Segment)	Aviation Segment
AENA Group	Yes	2016	No	Return on Assets (Airport Group excluding International)	Group of Airports
London Gatwick	Yes	2015	No	ROCE	Airport
Munich	Yes	2015	No	ROCE	Airport
Rome Fiumincio (AdR Group)	Yes	2016	No	ROCE	Group of Airports
Copenhagen	Yes	2016	No	Return on Assets (Airports)	Group of Airports
Dublin	Yes	2016	Yes		Till
Zurich	Yes	2016	Yes		Till
Manchester	Yes	2015	No	Return on Assets (Airport)	Airport
London Stansted	Yes	2015	No	Return on Assets (Airport)	Airport
Oslo (Avinor)	Yes	2016	No	Return on Assets (Oslo Airport)	Airport
Stockholm (Swedavia)	Yes	2016	No	Return on Assets (Airport Operations)	Group of Airports
Dusseldorf	Yes	2016	No	ROCE	Airport
Vienna	Yes	2016	No	Return on Assets (Aviation Segment)	Aviation Segment
Lisbon (ANA Group)	Yes	2016	No	Return on Assets (Group of Airports Segment)	Group of Airports
Brussels	Yes	2015	Yes		Airport
Berlin (FBB Group)	Yes	2015	No	ROCE	Group of Airports
Athens	Yes	2015	No	ROCE	Airport
Milan (SEA Group)	Yes	2016	No	ROCE	Business Group
Helsinki (Finavia)	Yes	2016	No	ROI (ROCE)	Business Group
Geneva	Yes	2016	No	Return on Assets (Aviation Segment)	Aviation Segment
Hamburg	Yes	2016	No	ROCE	Airport

Data and Assumptions (1)

Airport	Year	WACC	Asset Base			Income		OPEX	Additional Comments
		Airport/Group	Definition of Capital Employed	Defined RAB?	CAPEX	Aero Income	Non-Aero Income	OPEX (Group/Apt)	
London Heathrow	2016	Airport	Total Assets Less Current Liabilities (2016 Annual Report)	Defined RAB in regulatory accounts	CAPEX figure from regulatory accounts	2016 Regulatory Accounts	2016 Regulatory Accounts	2016 Regulatory Accounts	
Frankfurt	2016	Airport	Capital Employed Figure from Annual Report	No clearly defined aviation asset base – assumed segment assets.	Additions to Non-Current Assets for the Aviation Segment	Aviation Segment Revenue	Retail & Real Estate Segment Revenue	Aviation segment opex assumed (although may not include all aviation opex)	Ground Handling and External Activities excluded
Rome FCO (AdR)	2016	Group	Net Invested Capital From Annual Report	No Return on RAB available, No return on Aviation Segment Assets available	Total Investments for the group	Aeronautical Revenues from Airport Management	Non-Aeronautical Revenues from Airport Management	Group Opex	
Milan	2016	Group	Group Net Capital Employed figure used, p29, 2016 Annual Report	No	CAPEX excludesEnergy Subsidiary	Aviation Operating Revenues	Non-Aviation Operating Revenues	Airport Operating Expenses	
Munich	2015	Airport	Total Assets less Current Liabilities (2015 Annual Report)	No defined Asset Base/Segmental Performance	CAPEX from cashflow statement (investment in PPE)	Aero Revenue from financial report 2015, p95	Total Revenue Less Aeronautical Revenue	Opex for Munich Airport - no segment level info	
Brussels	2014 (Financials) 2015 (Return on RAB) both years for WACC	Airport	Capital Employed Figure from 2014 Annual Review Presentation.	Return on Regulatory Capital Employed from regulator document	Total CAPEX figure used in the 2015 Annual Investor Call Presentation	Aeronautical Revenues from slide 8 of 2015 Annual Investor Call Presentation.	Total Revenues minus Aeronautical Revenues	Used Total Operating Expenses from the 2015 Annual Investor Call Presentation	
Lisbon (ANA)	2015	Group	Group Capital Employed	Airports Segment Assets (ANA AS)	CAPEX for Airports Segment (ANA AS)	Aviation Revenue from Airports Segment (ANA AS)	Non-Aviation Income from Airports Segment (ANA AS)	Opex from Airports Segment (ANA AS)	Lisbon Group financial data not available
AdP Group	2016	Group	Group Balance Sheet: Total Assets Less Current Liabilities	Defined RAB in Annual Report	CAPEX excludes external investments and subsidiaries	Aviation Segment Revenue	Retail & Services and Real Estate Revenue	Opex less international segment Opex	
Helsinki (Finavia)	2016	Helsinki	Group Balance Sheet: Total Assets Less Current Liabilities	Aero Segment Capital Employed assumed equal to RAB	Total Investments for the Group	Aero Revenue: Revenues from Airport + Air Navigation Services	Total Revenue Less Aeronautical Revenue	Opex for Airport + Air Navigation Services	
Dusseldorf	2016	Airport	Total Assets Less Current Liabilities, 2016 Annual Report	Segmental information not available	Total CAPEX from Key Figures in the Annual Report	Aviation revenues from 2016 Annual Report	Total Revenues less Aviation Revenues	Opex as per P&L statement, minus depreciation	
Stockholm (Swedavia)	2017 WACC, 2016 ROCE, ROR & Financials	Group	Group Balance Sheet: Total Assets Less Current Liabilities	Total Assets	CAPEX for the enitre Airport	Aviation Business Revenue	Total Revenue Less Aeronautical Revenue	Total Opex	Assume majority of the real estate business to be on airport sites
AENA	2016 Financials, 2017 WACC	Group	Group Balance Sheet: Total Assets Less Current Liabilities, Annual Results Presentation 2016	Total Assets for Aero, Commercial & Real Estate	Cashflow Statement in the Results Presentation	Aero Revenues	Commercial & Real Estate Revenues	Opex by Till	International investments excluded, but not able to differentiate between airports.

Data and Assumptions (2)

Airport	Year	WACC	Asset Base			Income		OPEX	Additional Comments
		Airport/Group	Definition of Capital Employed	Defined RAB?	CAPEX	Aero Income	Non-Aero Income	OPEX (Group/Apt)	
Vienna	2016	Group	Published ROCE in 'Key Figures' of 2016 Annual Report	Aeronautical Assets assume equal to RAB	CAPEX less international investments	Airport Segment Revenue available in Key figures 2016	Commercial & Real Estate Revenues	Total Opex less international investments	International investments excluded
Hamburg	2016	Airport	Total Assets less Current Liabilities, 2016 Annual Report	Segmental performance unavailable	Total Investments in Tangible and Untangible Items	Revenues from 'Air Traffic Services'	Total revenues less revenues from traffic services, 2016 Annual Report	Opex from 2016 Report	
Zurich	2016	Airport	Return on Average Invested Capital from 2016 Annual Report	Return on Invested Capital Available in the Aviation Segment of the Regulated Business	Investment in Property, Plant & Equipment	Aviation Business Revenue	Non-Aviation Revenue (Commercial Revenue & Facilities Management)	Opex from 2016 Report	Revenue, EBITDA, Returns & Assets available at Regulated Business and Non-Regulated Business Level. International Investments excluded
Dublin	2015	Airport	Group Balance Sheet: Total Assets Less Current Liabilities	Defined RAB in the Regulatory Accounts, 2015	CAPEX figure from Regulatory Accounts, 2015	2015 Regulatory Accounts	2015 Regulatory Accounts	2015 Regulatory Accounts	
London Gatwick	2015	Airport	Total Assets Less Current Liabilities	Regulatory Accounts only up to 2014	All CAPEX is at LGW	p16 2015 Annual Report, Aeronautical Income	Subtracted Aeronautical Income from the Total Income figure	Opex from 2015 Annual Report p19	
Amsterdam (Schiphol Group)	2016	Airport	Group Balance Sheet: Total Assets Less Current Liabilities	Assumed Aviation Segment Assets as RAB	CAPEX for Group of Airports	Aviation revenues from 2016 Annual Report	Consumer Products & Services and Real Estate Revenues	Opex for Aero, Consumer Products & Services & Real Estate	Alliances and Partnerships excluded
Athens	2015	Group	ROCE published in 2015 Annual Report	15% Return on RAB assumed as charges set according to this cap on regulated activities	CAPEX from cashflows p19 of 56, Acquisition of PPE, 2015 Annual Report	p37 of 56, Air Activity Revenue number, 2015 Annual Report	Subtracted the Air Activity Revenue from Total Revenue, p37	Operating Expense from p15 of 56, 2015 Annual Report	
MAG	2015	not available	ROCE published in 2015 Annual Report, pg.12	Segment Assets assumed as RAB (for MAN & STN)	CAPEX for MAN & STN available (not by till)	Aero Revenue by Airport (MAN & STN)	Non-aero revenue by Airport (MAN & STN)	Opex by Airport (MAN & STN)	
Geneva	2016	Airport	2016 Annual Report. Total Assets Less Current Liabilities, 2016 Annual Report	Aero segment assets from 2016 Financial Report, used eero returns on aero assets	Investment Cashflow from 2016 Annual Report	Revenue from Aeronautical Operations, 2016 Annual Report	Revenue from Non-Aeronautical Operations, 2016 Annual Report	Opex by segment	
Oslo (Avinor)	2016	not available	Total Assets less current liabilities for Avinor AS, 2016 Annual Report	Oslo Airport Return on Oslo Airport Assets	Investments in PPE for Avinor AS.	Aero Revenue at Group level	Non-Aero Revenue at Group Level	Opex for Oslo	
Berlin (FBB Group)	2015	Airport	Total Assets less Current Liabilities, FBB Group, 2015 Annual Report	segmental assets not available	Payments for investments in tangible assets, FBB Group, segment CAPEX not available	2015 Annual Report. Aviation segment Sales revenues	Subtracted aviation revenues from total revenues (2015 Annual Report).	Sum cost of materials, personnel expenses and other opex in 2016 Annual Report.	
Prague	2016	not available	not available	not available	not available	not available	not available	not available	

Appendix D – Regulatory Arrangements

York Aviation

The pattern of regulatory oversight in Europe

We summarise below the level of regulatory oversight at each of our airports or Groups.

Airport or Airport Group	'Intensity' of Regulation	Type of Till	Ownership Structure
Dublin (daa)	Economic Regulation	Single	Fully Public
London Heathrow	Economic Regulation	Single	Fully Private
AdP (Paris CDG and ORY)	Medium Oversight	Hybrid	Public Majority
AENA (Madrid, Barcelona, Palma, Malaga)	Medium Oversight	Dual	Public Majority
Amsterdam (Schiphol Group)	Medium Oversight	Dual	Fully Public
Lisbon (ANA)	Medium Oversight	Hybrid	Fully Private (Concession)
Milan MXP (SEA Group)	Medium Oversight	Dual	Public Majority (Management Contract)
Rome (AdR)	Medium Oversight	Dual	Private Majority (Concession)
Athens	Minimal Oversight	Dual	Public Majority (Concession)
Berlin (FBB Group)	Minimal Oversight	Dual	Fully Public
Brussels	Minimal Oversight	Dual	Private Majority
Copenhagen Group	Minimal Oversight	Hybrid	Private Majority
Dusseldorf	Minimal Oversight	Dual	50% Public /50% Private
Frankfurt (Fraport)	Minimal Oversight	Dual	Public Majority
Hamburg	Minimal Oversight	Dual	Public Majority
Helsinki (Finavia)	Minimal Oversight	Hybrid	Fully Public
London Gatwick	Minimal Oversight	n/a	Fully Private
Munich	Minimal Oversight	Dual	Fully Public
Oslo (Avinor)	Minimal Oversight	Single	Fully Public
Stockholm (Swedavia)	Minimal Oversight	Single	Fully Public
Vienna	Minimal Oversight	Dual	Private Majority
Zurich	Minimal Oversight	Hybrid	Private Majority
Geneva	Minimal Oversight	Hybrid	Fully Public
Manchester (MAG)	None	n/a	Public Majority
Prague	None	n/a	Fully Public
London Stansted (MAG)	None	n/a	Public Majority (MAG)

Regulatory Arrangements at European Airports

Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
AdP Group (CDG and ORY)	AdP periodically signs an Economic Regulation Agreement with the DGAC (Direction Generale de l'Aviation Civile – the ISA), which sets a cap for a period of five years (most recent ERA covers 2016-2020). Commission Consultative Aéroportuaire advises the regulator and made a non-binding recommendation of a WACC lower than adopted by the regulator.	Hybrid Till - but regulatory scope excludes most commercial activity	Price Cap based on regulated asset base	Medium Oversight	State Majority, ADP: 50.6% State Owned, 8% Schiphol Group, 8% Vinci, with the rest privately owned by corporates, institutional investors and employees.
AENA (Madrid, Barcelona, Palma, Malaga)	AENA is regulated at Group level for all 46 Spanish airports by the Dirección General de Aviación Civil. Current period is 2017-2021. The DORA is the Airport Regulation Agreement and is prepared by Dirección General de Aviación Civil with support from the Spanish National Commission on Markets and Competition (CNMC), which is the ISA.	Dual Till (but moving to a Hybrid Till)	Price Cap based on regulated asset base	Medium Oversight	Partially privatized with Government retaining 51% but further privatization envisaged in the future.
Amsterdam (Schiphol Group)	Regulation involves consultations with the airlines, in accordance with the Dutch Aviation Act and under supervision of the Dutch Authority for Consumers and Markets (ACM). A new Aviation Act was passed in 2016 to come into effect in July 2017 - changes envisaged include a move to a hybrid till with mandatory non-aviation revenue contribution and an increase in the Market Risk Premium (MRP) to 5% used as part of the WACC calculation.	Dual Till (but moving to a Hybrid Till)	Price Cap based on regulated asset base	Medium Oversight	Schiphol Group is owned by the Dutch Ministry of Finance (69.77%), the municipalities of Amsterdam (20.03%) and Rotterdam (2.2%), and Aéroports de Paris (8%).

Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
Athens	Article 14 of Law 2338/1995, the 'Airport Development (Concession) Agreement', sets the rules for defining the charges under which the Concession is entitled to determine, at its discretion, the level of airport charges in order to achieve a maximum return of 15.0% per annum. The allowable return of 15% is not based on WACC, but the return on the aviation activities' capital (share capital indexed annually by inflation) However, there is little transparency as to how this has been calculated and little evidence of regulatory oversight. In the event of this figure being exceeded in 3 out of any 4 consecutive financial periods, the excess is paid to the Greek State (Annual Report 2015 page 20).	Dual Till	Price Cap based on regulated asset base	Minimal Oversight	Mostly Public: Hellenic Republic Asset Development Fund (30%), AviAlliance GmbH (26.7%), State of Greece (25%), AviAlliance Capital (13.3%), plus Others. The Airport is operated on a concession basis by AviaAlliance and Greek energy group Copelouzos.
Berlin	German Aviation Act (§19b LuftVG) requires approval by the ISA (State Transport Ministry) based upon criteria of reasonable relation between level of charges and actual cost, and efforts for efficiency must be shown by the Airport; up to the Airport to decide on dual/single till (all relevant German airports apply dual till); ISA approval always necessary if changes to charges – scope depending on whether charges have been agreed. There is a legal dispute at Berlin Tegel as to whether airlines can legally appeal against ISA decisions – ISA says not. A lawsuit is going through the courts.	Dual Till	Cost plus/Rate of Return	Minimal Oversight	Public - Federal Republic of Germany 26%, State of Berlin 37%, State of Brandenburg 37%

Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
Brussels	Royal Decree of June 21, 2004 grants an operating licence to Brussels Airport with the ISA being the 'Regulatory Service for Railway Transport and Brussels Airport Operations'. Airport charges are intended to be agreed with the users, with the provision for the ISA to intervene *ex post* in the event of a complaint, which was the case in 2015 when the charges for 2016-2021 were consulted on. The complaint focussed an a number of issues and especially the lack of transparency.	Dual Till now set in the legislation, previously Single Till	Price Cap/Rate of Return based on regulated asset base and rate of return assumptions.	Minimal Oversight	Mostly Private: Ontario Teachers Pension Plan (39%), Macquarie European Investment Funds (36%), Belgian State (25%)
Copenhagen	Charges are negotiated and agreed with airlines (an agreement is currently in place up to 2019 for charges to track Danish CPI). If no agreement, the Danish Transport, Construction and Housing Agency (DTCA) can set a revenue cap *ex post* as set out in BL 9-15 of 8 March 2011.	Hybrid Till		Minimal Oversight	Mixed - 39.2% State but majority private, including Ontario Teachers and Macquarie
Dublin	The ISA is the Commission for Aviation Regulation (CAR) which is responsible for the regulation of airport charges at Dublin Airport under the terms of the Irish Aviation Regulation Act 2001. When setting the price cap, the CAR has three statutory objectives: a) the efficient and economic development of Dublin Airport; b) the ability of the Dublin Airport Authority to operate in a financially viable manner and c) the protection of the interests of users and potential users of the airport	Single Till	Price Cap based on regulated asset base	Economic Regulation	Fully Public, State of Ireland

Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
Dusseldorf	German Aviation Act (§19b LuftVG) requires approval by the ISA (State Transport Ministry) based upon criteria of reasonable relation between level of charges and actual cost, and efforts for efficiency must be shown by the Airport; up to the Airport to decide on dual/single till (all relevant German airports apply dual till); ISA approval always necessary if changes to charges – scope depending on whether charges have been agreed.	Dual Till	Cost plus/ Rate of Return	Minimal Oversight	50% public (City of Dusseldorf) and 50% private
Frankfurt	German Aviation Act (§19b LuftVG) requires approval by the ISA (State Transport Ministry) based upon criteria of reasonable relation between level of charges and actual cost, and efforts for efficiency must be shown by the Airport; up to the Airport to decide on dual/single till (all relevant German airports apply dual till); ISA approval always necessary if changes to charges – scope depending on whether charges have been agreed.	Dual Till	Cost plus/ Rate of Return	Minimal Oversight	Owned by Fraport - mostly public: State of Hesse (31.34%), City of Frankfurt (20.01%), Deutsche Lufthansa AG (8.45%), institutional investors (37.19%)
Geneva	"Ordonnance sur les Redevances Aéroportuaires" is the relevant legislation and provides for consultation and agreement with users. In the event of failure to agree, the Office de l'Aviation Civile (OFAC) can intervene as the ISA regulator.	Hybrid Till (minimum 30% of commercial revenues)		Minimal Oversight	Fully Public, Canton of Geneva

Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
Hamburg	German Aviation Act (§19b LuftVG) requires approval by the ISA (State Transport Ministry) based upon criteria of reasonable relation between level of charges and actual cost, and efforts for efficiency must be shown by the Airport; up to the Airport to decide on dual/single till (all relevant German airports apply dual till); ISA approval always necessary if changes to charges – scope depending on whether charges have been agreed.	Dual Till	Cost plus/ Rate of Return	Minimal Oversight	City of Hamburg (51%) and AviAlliance (49%)
Helsinki	The Airport Network and Airport Charges Act came into force on 15 March 2011 to implement the European Directive (2009/12/EC) into Finnish law. The ISA role is granted to the Finnish Transport Safety Agency (Trafi). If an airport user disagrees with the Airport managing body's pricing decision as described in the Act (210/2011) the decision can be referred to the Trafi	Airport managing body can decide the extent of the till. Understood to be Hybrid but not entirely clear.		Minimal Oversight	Fully Public: Finavia & State of Finland
Lisbon (ANA Portuguese Airports)	Decree-Law no. 254/2012 relates. ANAC (Portuguese Civil Aviation Authority) is the ISA.	Hybrid Till, with airside commercial revenues taken into account.	Indexed Price Cap (i.e. not related to costs) calculated according to Annex 12 of the Concession contract – includes benchmarks.	Medium Oversight	ANA, S.A. (privately owned by VINCI Airports) has the 50 year concession to operate all Portuguese Airports.

Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
London Gatwick	The Civil Aviation Act 2012 appoints the UK Civil Aviation Authority (CAA) as the regulator (ISA), which undertakes a market power assessment prior to deciding how an airport should be regulated, if at all. Once a determination is made that an airport has significant market power, the CAA must issue a licence to levy airport charges. In the case of Gatwick, the licence includes commitments from the Airport on airport charges, service quality, and capital investment rather than a precise form of regulation	n/a	n/a	Minimal Oversight	Private. Sold to Global Infrastructure Partners in 2009.
London Heathrow	The Civil Aviation Act 2012 appoints the UK Civil Aviation Authority (CAA) as the regulator (ISA), which undertakes a market power assessment prior to deciding how an airport should be regulated, if at all. Once a determination is made that an airport has significant market power, the CAA must issue a licence to levy airport charges. In the case of Heathrow, this is a price cap on airport charges with service quality targets and financial penalties if they are not achieved.	Single Till	Price Cap based on regulated asset base	Economic Regulation	Private – Heathrow Airport Holdings is a consortium of Ferrovial S.A. (25.00%), Qatar Investment Authority (20.00%), Caisse de dépôt et placement du Québec (CDPQ) (12.62%), GIC (11.20%), Alinda Capital Partners of the US (11.18%), China Investment Corporation (10.00%) and Universities Superannuation Scheme (USS) (10.00%).
London Stansted	The UK CAA confirmed in 2014 that there is not sufficient evidence that Stansted Airport has substantial market power. The Airport is, therefore, no longer regulated, although the CAA retains a watching brief.	n/a	n/a	n/a	Mostly public, MAG: IFM Investors (35.5%), City Council of Manchester (35.5%), Greater Manchester Local authorities (29%)
Manchester	Manchester Airport was de-designated by the UK CAA for regulatory purposes from April 2009.	n/a	n/a	n/a	Majority public with 35.5% private (as above)

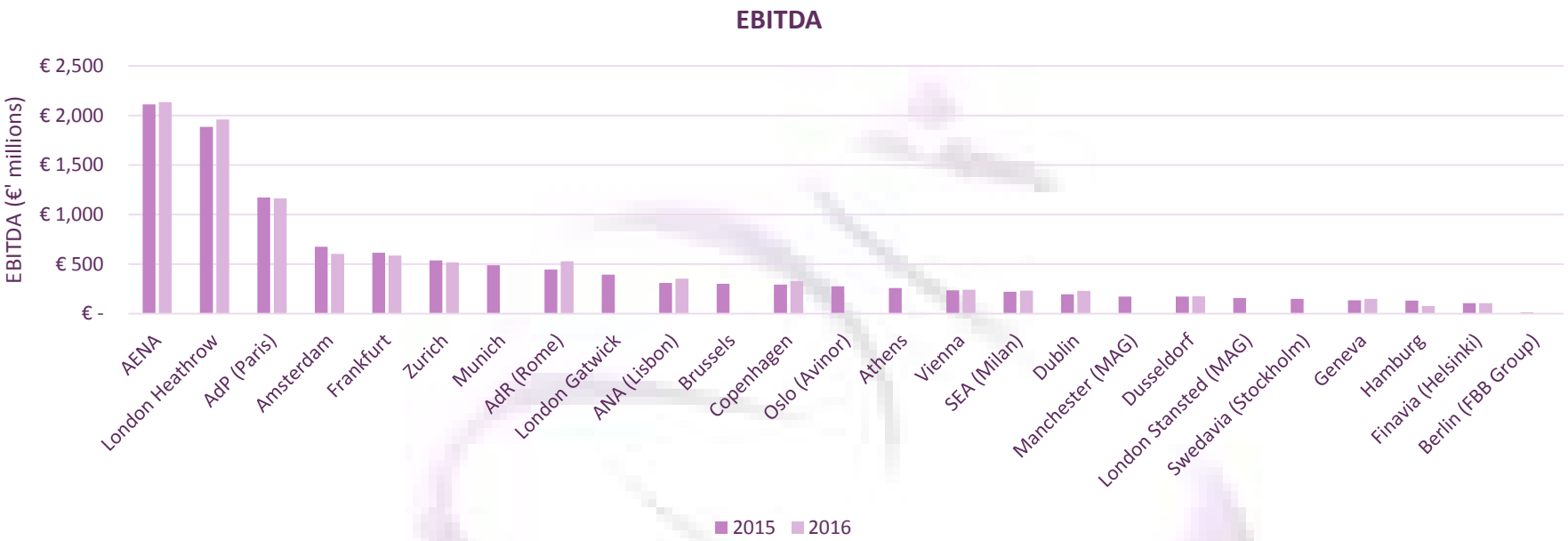
Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
Milan (MXP) – SEA Group	The Italian Regulator is L'Ente Nazionale per l'Aviazione Civile (ENAC). On Oct 30, 2015 ENAC published its final determination for the 2nd tariff period (2016-2020) of the ENAC-SEA Regulatory Agreement. Elements of the WACC are included in the Concession agreement and certain investments benefit from an incremental WACC (+1%)	Dual Till	Price Cap based on regulated asset base	Medium Oversight	SEA (Società Esercizi Aeroportuali) owns the Airport - 54.8% owned by the City of Milan, followed by 2i Aeroporti SpA with 35.7% and F2i SGR with 8.6%. The remaining 0.9% is held by other public bodies and private investors.
Munich	German Aviation Act (§19b LuftVG) requires approval by the ISA (State Transport Ministry) based upon criteria of reasonable relation between level of charges and actual cost, and efforts for efficiency must be shown by the Airport; up to the Airport to decide on dual/single till (all relevant German airports apply dual till); ISA approval always necessary if changes to charges – scope depending on whether charges have been agreed. Also at Munich, there is a multi-annual agreement with users to end of 2020 determining charges development.	Dual Till	Cost plus/ Rate of Return	Minimal Oversight	Fully Public, State of Bavaria (51%), Federal Republic of Germany (26%), City of Munich (23%)
Oslo (Avinor)	The Norwegian CAA is the ISA and Avinor issues charges proposals (after consultation with users) which are agreed with the ISA. ISA intervenes *ex post* in the event of failure to agree.	Single Till		Minimal Oversight	Fully Public, Department for Transport of Norway
Prague	No regulation	n/a	n/a	n/a	Fully Public: Ministry of Finance of Czech Republic

Airport	Regulatory Framework	Single(S) or Dual (D) Till	Form of Regulation	Intensity of Regulation	Ownership Structure
Rome Fiumicino (Aeroporti di Roma)	Aeroporti di Roma (ADR) has an 'Economic Regulation Agreement' with the Italian Regulator ((L'Ente Nazionale per l'Aviazione Civile or ENAC) as part of the Concession Agreement to 2044. Elements of the WACC are included in the Concession agreement and certain investments benefit from an incremental WACC (+1%)	Dual Till	Price Cap based on regulated asset base	Medium Oversight	Majority private (95% Atlantia SpA). Gemina SpA holds the concession to operate.
Stockholm (Swedavia)	Swedish Act on Airport Charges (2011:866) provides the framework for regulating airport charges, although in practice these seem to be set by agreement between Swedavia and its users. Arlanda's charges are set to fall by 1% in 2017.	Single Till		Minimal Oversight	100% State owned (corporatised).
Vienna	The Federal Minister of Transport, Innovation and Technology is the ISA as set out in the Aviation Act. Form is a simple price cap to be agreed between the Airport and the users. Charges have been agreed by the regulator for 2016-2020.	Dual Till	Price Cap	Minimal Oversight	Mostly Private: Airports Group Europe (29.9%), Free Float (20.1%), Wien Holding (20%), Province of lower Austria (20%), Other (10%)
Zurich	"Ordonnance sur les Redevances Aéroportuaires" is the relevant legislation and provides for consultation and agreement with users. In the event of failure to agree, the Office de l'Aviation Civile (OFAC) can intervene. This was the case at ZRH in 2013 and OFAC sided with the Airport, but was challenged in court by the airlines. Decision of the court in 2015 partly allowed the appeal and referred the matter back to OFAC. Agreement appears to have been reached in 2016 and in May 2016 OFAC approved charges to apply from Sep 2016 for 4 years.	Hybrid - Dual Till with some transfer (minimum 30%) of commercial revenues	Price Cap based on regulated asset base	Medium Oversight	38.8% public, remainder private

Appendix E – Key Indicators by Airport/Airport Group

York Aviation

Airport Profitability - EBITDA

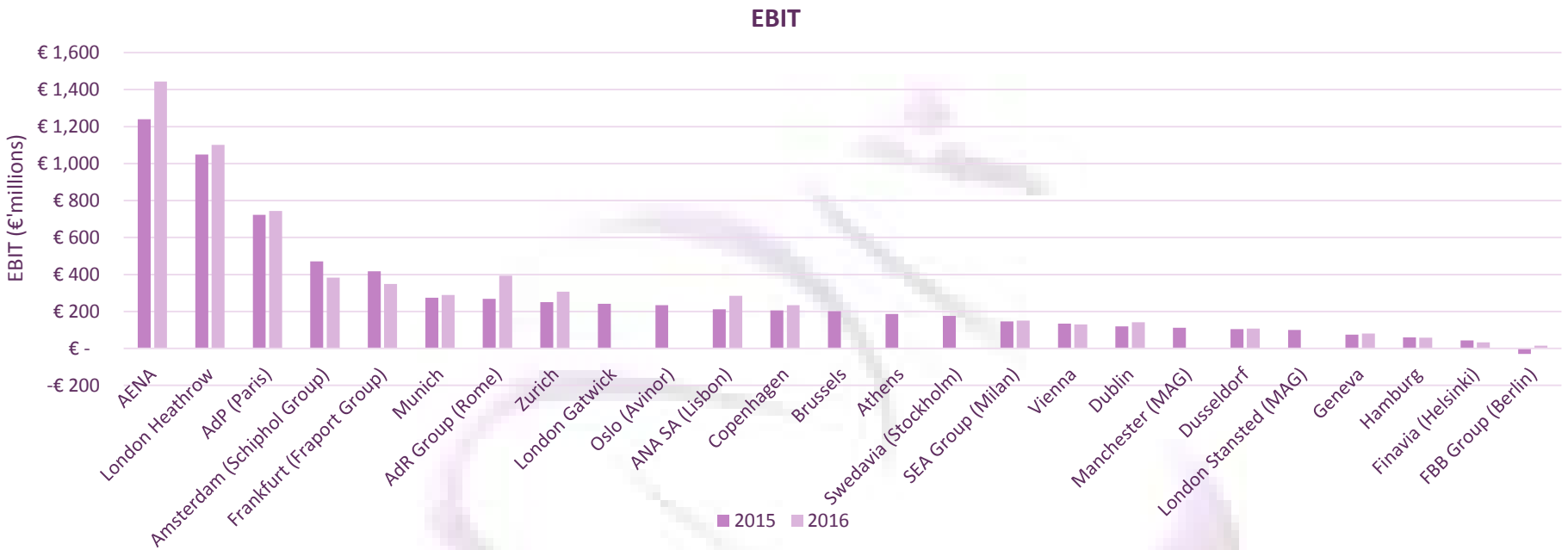


The chart above shows EBITDA for the airports or airport groups for 2015 and, where data is available, for 2016. However, these are absolute figures and do not relate earnings to the scale of the business. Hence, AENA, with its large scale ownership of all airports in Spain, has the highest EBITDA of the list of airports/airport groups. These figures demonstrate the scale of earnings of a few large airports and airport groups, but also that the majority of airports in the dataset have much lower earnings.

AdP includes both Paris CDG and Orly, both of which are in the Top 30 airports. AENA includes both Madrid and Barcelona. MAG includes both Manchester and Stansted. Otherwise, only one airport in each of the other groups features in the Top 30 and is named individually in the charts.

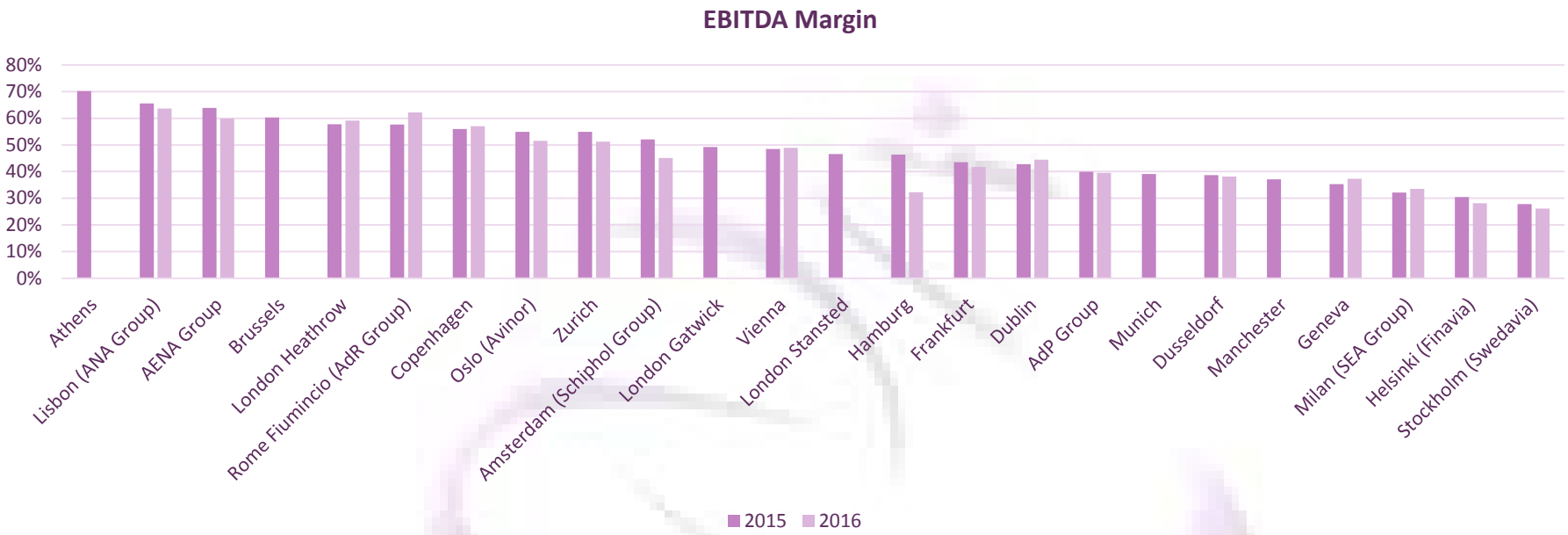
It should be noted that, throughout, we have been unable to find any financial data about Prague.

Airport Profitability - EBIT



The chart above shows EBIT for the airports or airport groups for 2015 and, where data is available, for 2016. These figures relate to the airport where segment information was clearly available. Here too, AENA tops the list with EBIT of over €1,400m, roughly around two thirds the EBITDA achieved in 2016.

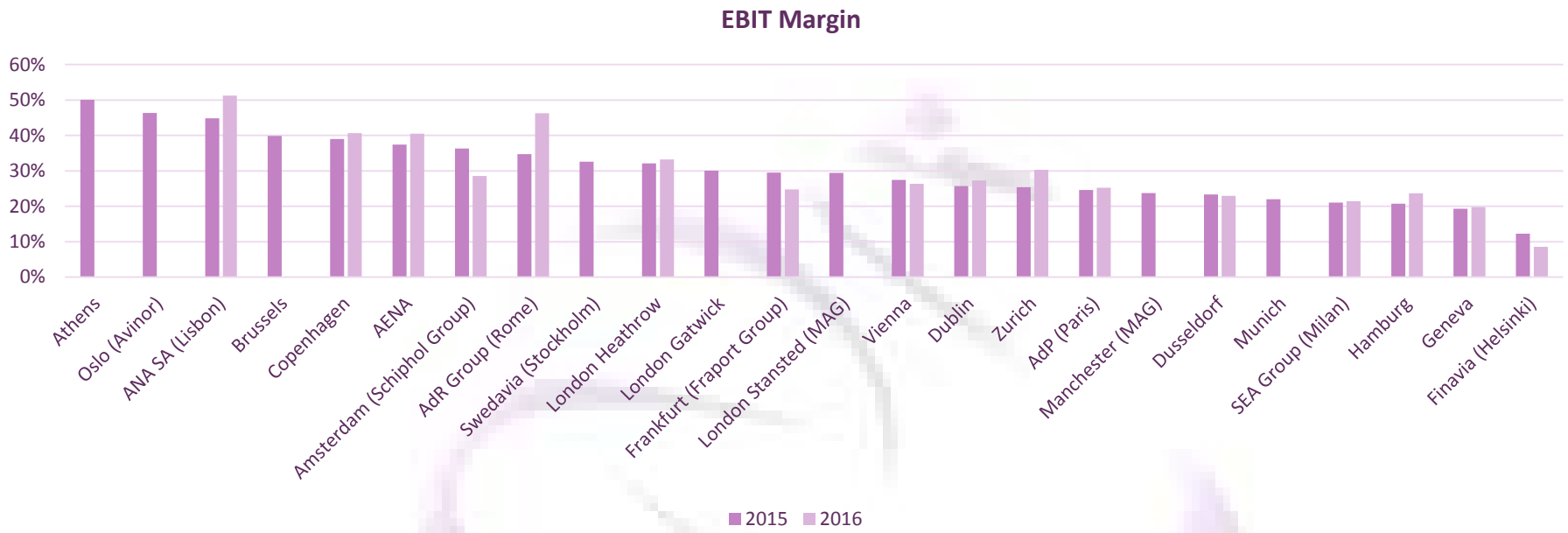
Airport Profitability – EBITDA Margin



The chart above shows EBITDA margins for the airports or airport groups for 2015. There is a reasonably wide spread within the list, with margins of between around 30% to 70%. It is also noteworthy that Athens, one of the most weakly regulated airports in the list, as we refer to in the main body of the report, has the highest EBITDA margin. Athens is run as a concession, as are Rome (AdR) and Lisbon.

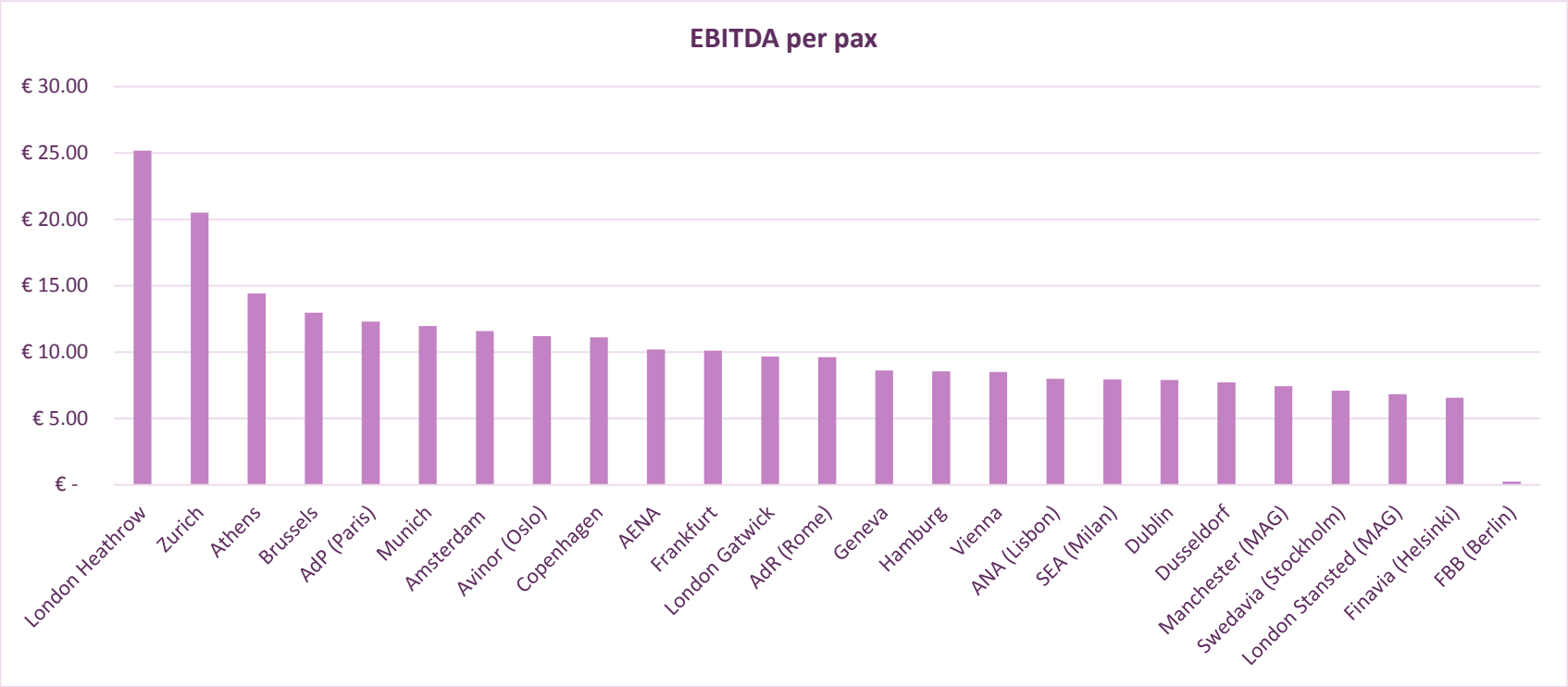
EBITDA margins, for those airports where we have data, are little changed in 2016.

Airport Profitability – EBIT Margin



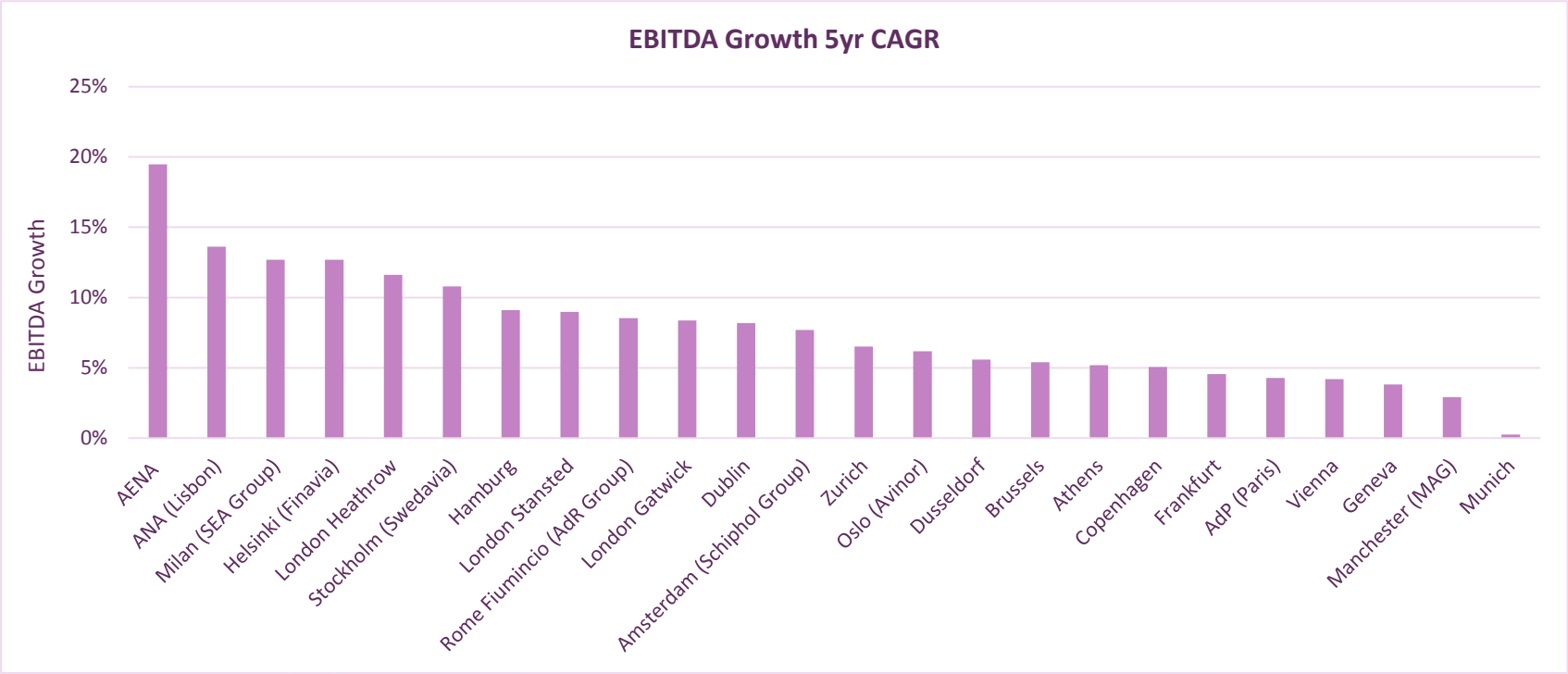
The chart above shows EBIT margins for the airports or airport groups for 2015 and where possible, 2016. There is a reasonably wide spread within the list, with margins of between around 12% to 50%. It is worth noting that Airports such as Athens, AdR & ANA that are run as concessions have the highest EBIT margins in this sample, all above 45% with Athens achieving 50% in 2015, AdR growing by 11% to 46% in 2016 and ANA rising to 51% in 2016.

Airport Profitability – EBITDA per pax



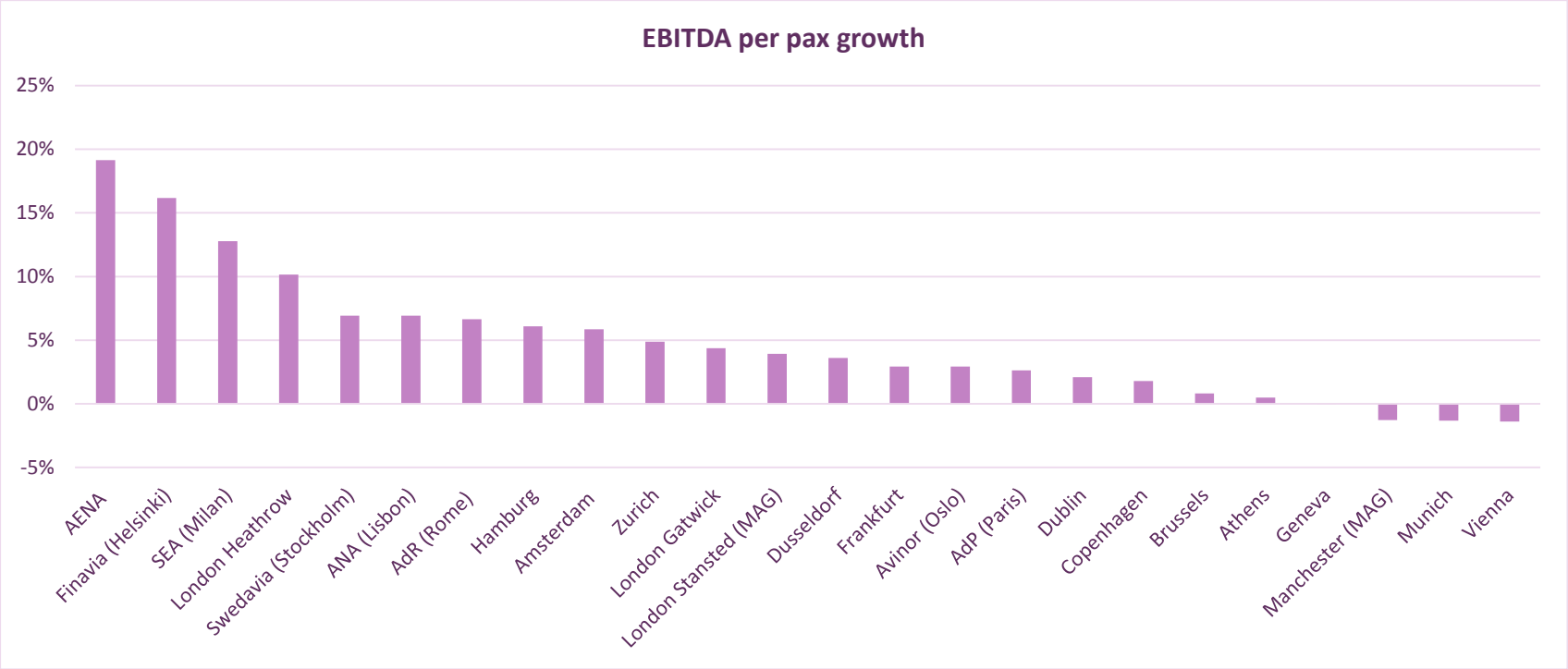
When considered in terms of EBITDA per pax, London Heathrow exhibits the highest value, even though it is one of the more heavily regulated airports (as we also refer to later in this report). Again, FBB (Berlin) trails the field in large part to high levels of expenditure on the new Berlin Brandenburg Airport.

Airport Profitability – EBITDA Growth (5yr CAGR)



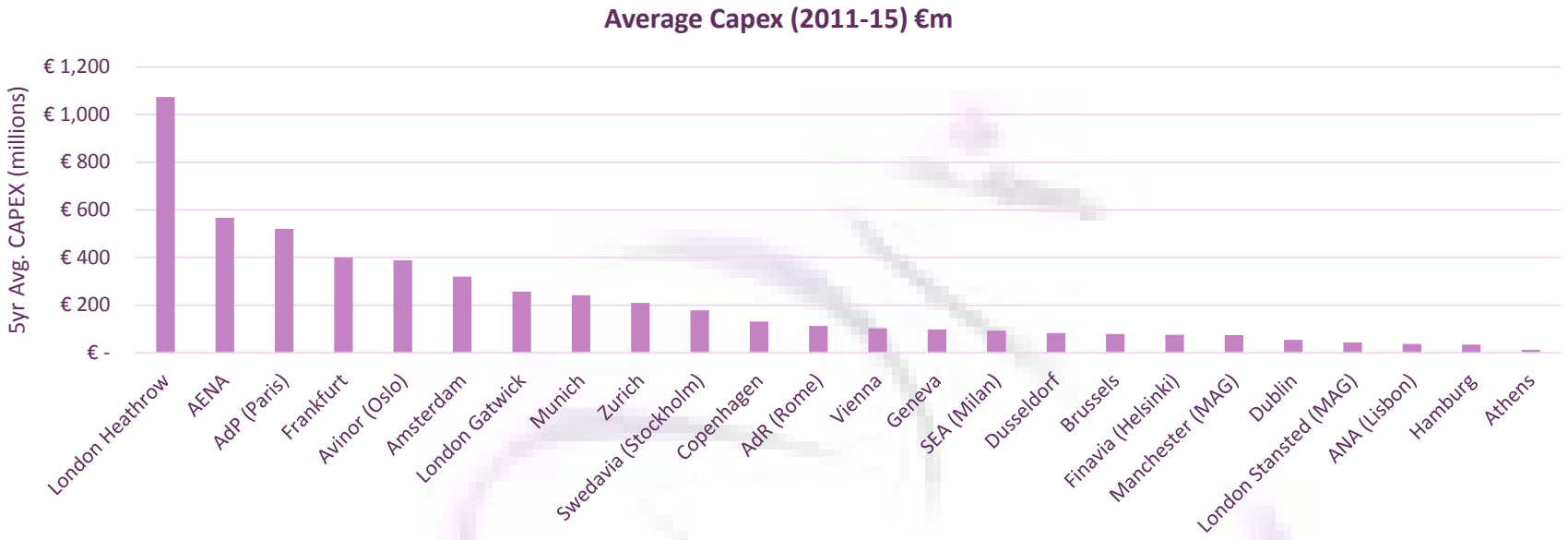
The chart above shows EBITDA growth over the most recent period for which consistent data is available (2001-2015). Over half of the airports or airport groups have achieved EBITDA growth in excess of 5% Compound Annual Growth Rate (CAGR) over the last 5 years. Again, the Berlin Airports are an exceptional case and show negative growth in this analysis and so has been excluded.

Airport Profitability – EBITDA Growth per pax (5yr CAGR)



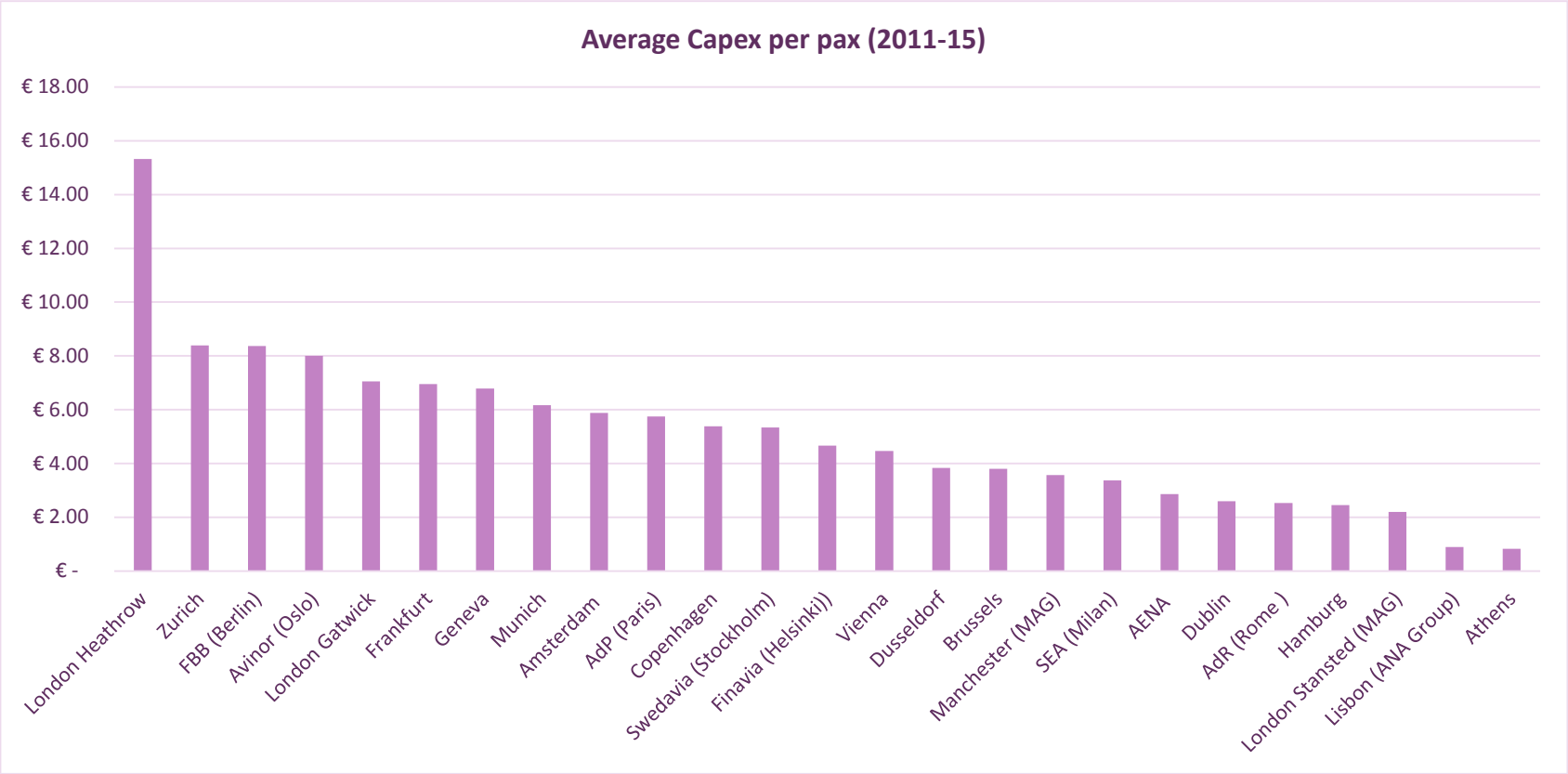
In the chart above, EBITDA growth is shown relative to passenger throughput. AENA shows the highest growth, with 8 other airports showing growth per passenger in excess of 5% CAGR over the most five year period. In this case, earnings growth may be being derived from activity other than from airport core activity. For example, although Athens showed high EBITDA growth of over 15% (previous slide), its growth per passenger is significantly less. On the other hand, AENA has the highest EBITDA growth and EBITDA per passenger growth, suggesting that its earnings growth is linked to passenger throughput rather than derived from other sources. Again, Berlin has been excluded here as an exceptional case.

Airport Investment – Capex



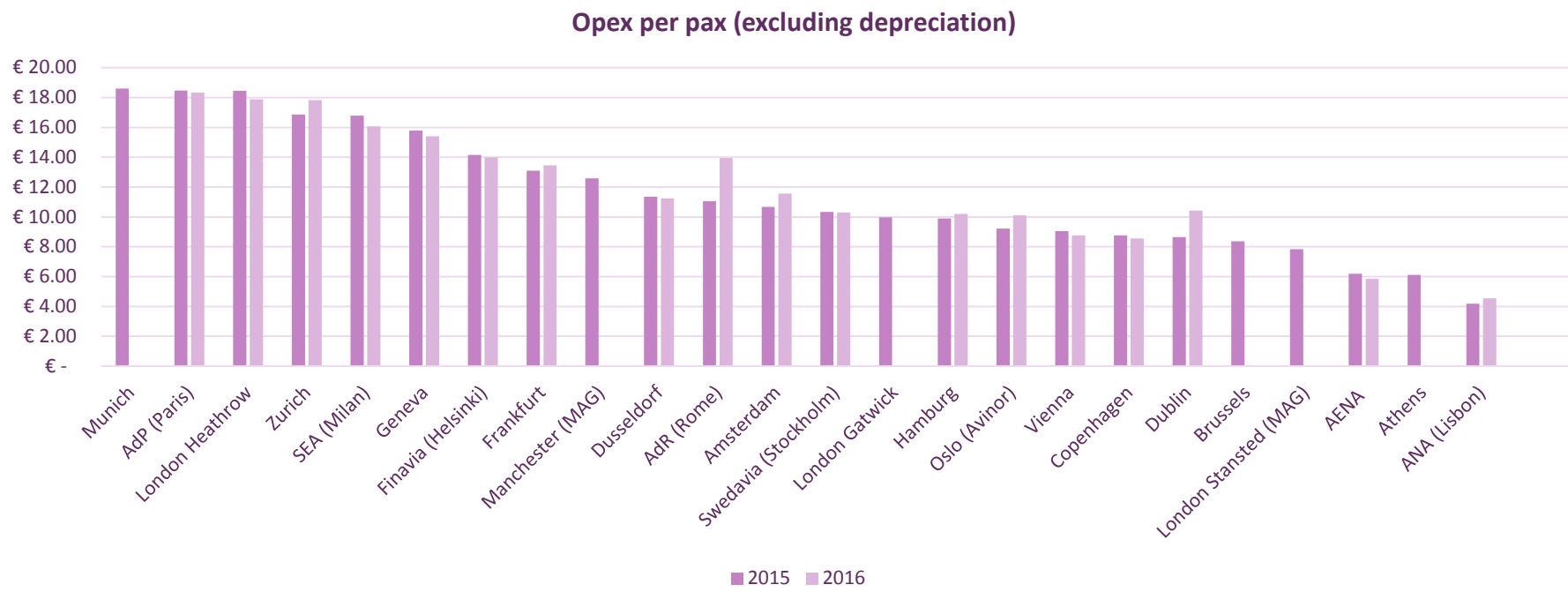
While airport margins generally appear healthy, profitability should also be seen in the context of the need for capital investment in new capacity to meet growth in demand. In terms of absolute capital expenditure, Heathrow's capital expenditure is the greatest in this dataset and Athens the lowest.

Airport Investment - Average Capex per pax (2011-2015)



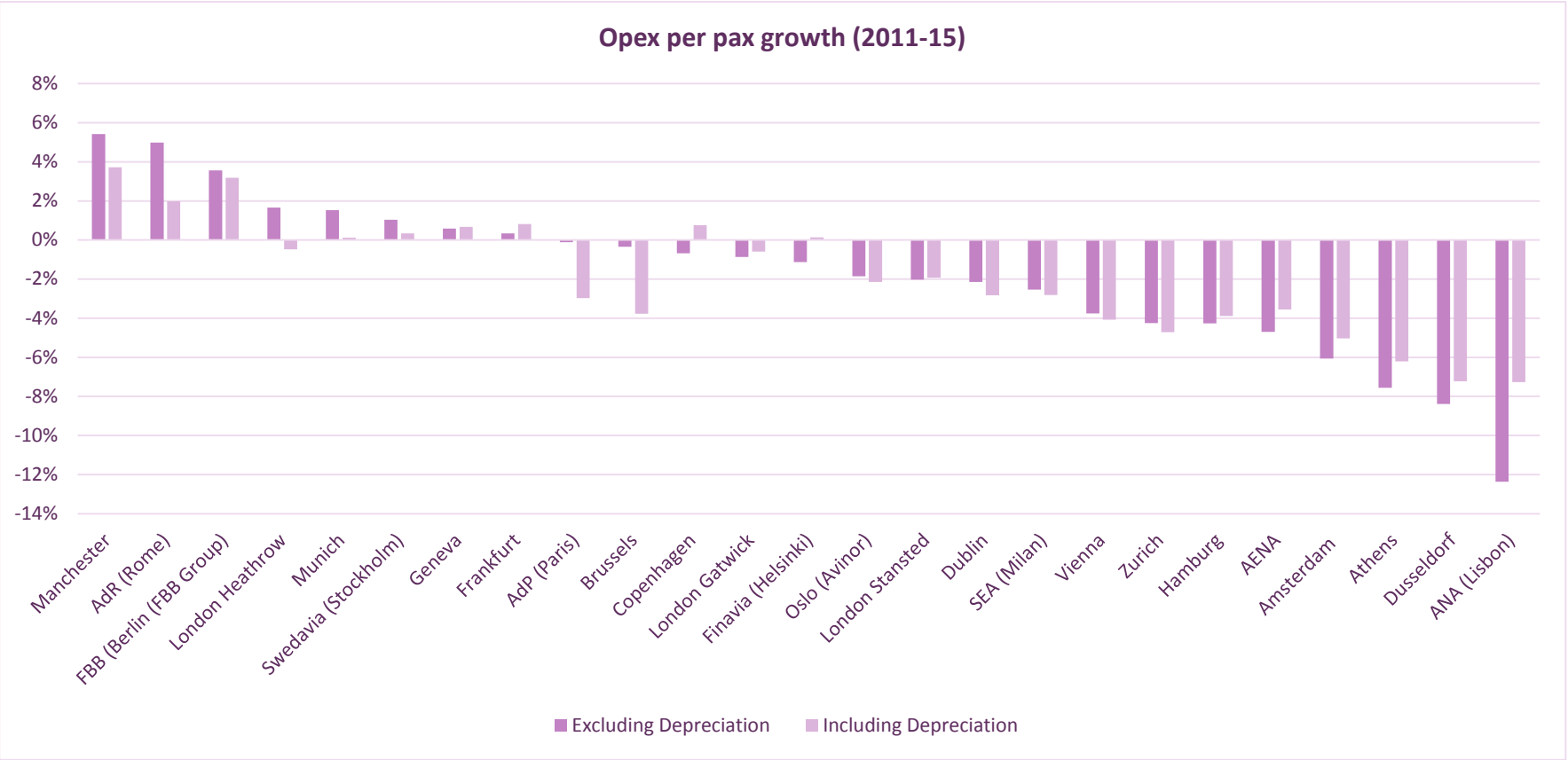
Average capital expenditure per passenger shows a broadly similar trend, with Heathrow the highest value and Athens the lowest. However, it should be noted that capex is cyclical and at any point in time some airports will be well invested and others in the midst of an investment cycle. This can make comparison problematic.

Airport Efficiency – Opex per pax (excl. depreciation)



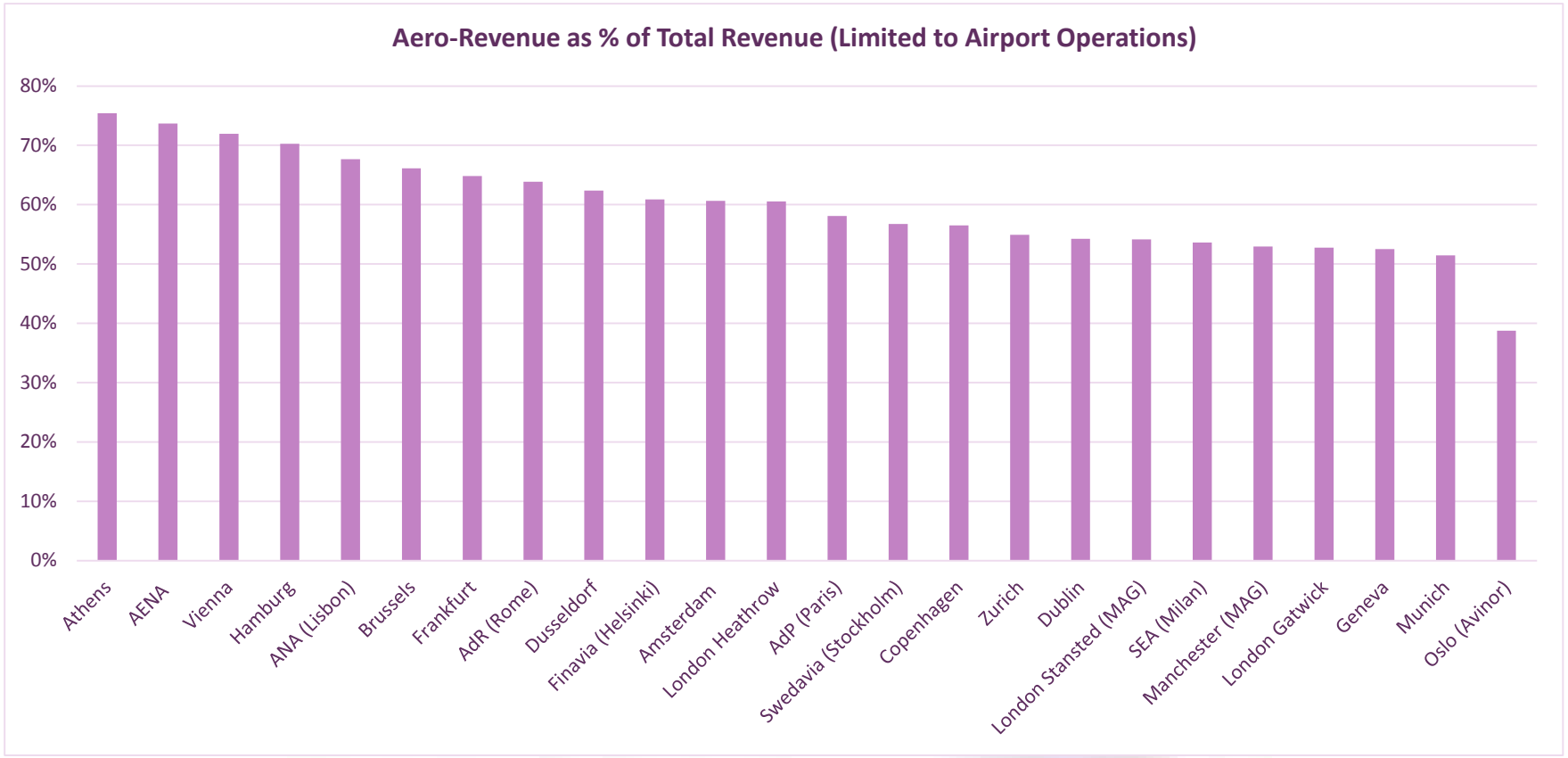
In the chart above, we have examined operational expenditure (opex) per passenger across the dataset, excluding depreciation. However, opex can vary quite significantly across different airports depending on what operational services are delivered in house by the airport operator rather than by third parties. For example, Frankfurt provide most ground handling services in house which would account for its relatively high opex per passenger, whereas other airports outsource a higher proportion of their services.

Airport Efficiency – Opex Growth (5yr CAGR)



Opex per pax growth (in terms of CAGR) over the most recent five year period shows a wide variation. However, the majority of airports or airport groups have seen a reduction in opex per pax over the period, suggesting a general trend to greater efficiency, albeit this will in part reflect economies of scale.

Aeronautical Revenues as a Proportion of Total Revenues



Dependence on aeronautical revenues varies across the set of airports from over 70% at Athens to less than 40% at Oslo. We consider in the main body of the report the extent to which this dependence is related to the form of regulation or to profitability.