International Civil Aviation Organization

CEANS-WP/9
30/4/08

WORKING PAPER

CONFERENCE ON THE ECONOMICS OF AIRPORTS AND AIR NAVIGATION SERVICES

Montréal, 15 to 20 September 2008

Agenda Item 2: Specific issues related to airport economics and management
2.2: Cost basis for charges
Agenda Item 3: Specific issues related to air navigation services economics and management
3.2: Cost basis for charges

RATE OF RETURN FOR AIRPORTS AND AIR NAVIGATION SERVICES

(Presented by the Secretariat)

SUMMARY

This paper discusses a possible method to determine a "reasonable" rate of return on assets for both airports and air navigation service providers (ANSPs). Although *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082) does not provide any details on this subject, States should have a clear definition of a reasonable rate of return for their service providers, together with a methodology to assess it. The weighted average cost of capital (WACC) is a commonly-used method to determine a reasonable rate of return for capital-intensive companies, such as airports and ANSPs. Because of the complexity and technicality of the issue, the paper concludes that ICAO should develop additional guidance on this subject.

Action by the Conference is in paragraph 4.

1. INTRODUCTION

1.1 The cost basis of airports and air navigation services for charging purposes has traditionally been established by taking into account the costs of operations and maintenance, the cost of capital and depreciation of assets, as well as a "reasonable" rate of return on assets, as noted in paragraphs 22 and 38 of *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082). The rate of return measures the profitability of an asset over a specified period and is calculated by dividing the operating surplus by the total capital.

1.2 This paper discusses a method to determine a reasonable rate of return on assets for both airports and air navigation services providers (ANSPs). The Appendix to this paper provides some technical details on the methodology described in the paper.

2. DISCUSSION

2.1 A rate of return regulation (also called cost of service or cost plus regulation) is one of the most common forms of economic oversight by States. It places a limit on the rate of return that a service provider can earn. A price cap regulation (i.e. setting maximum prices usually by a retail/consumer price index minus an incentive "x" factor) also uses estimated values of rate of return. In either case, small changes in the allowed rate of return on assets can have a significant impact on the charges levied by service providers. It is therefore important for regulators, in performing their economic oversight functions, to have a clear definition of what is a reasonable rate of return on assets for the service providers, together with a methodology to assess it.

2.2 Paragraphs 22 and 38 of Doc 9082 provide some indications on what could constitute a reasonable rate of return. For airports, a reasonable return on assets should be considered to be at a sufficient level when it secures financing on favourable terms in capital markets for the purpose of investing in new or expanded airport infrastructure and, where relevant, to remunerate adequately holders of airport equity. For air navigation services, a reasonable return on assets (before tax and cost of capital) should be considered to be at a sufficient level when it contributes towards necessary capital improvements. However, Doc 9082, as well as the *Airport Economics Manual* (Doc 9562) and the *Manual on Air Navigation Services Economics* (Doc 9161), do not provide further details[1].

2.3 A review of States' experiences and financial models identifies some practical methodologies to determine and/or assess a reasonable rate of return. Amongst them, the weighted average cost of capital (WACC) is a commonly-used approach for capital-intensive companies like airports and ANSPs that are financed through both equity and long-term debt. Under this approach, the rate of return on net assets shall not exceed the corresponding WACC. There is a general understanding that the WACC is the rate that a company needs to earn on its existing asset base in order to satisfy its investors and creditors.

2.4 In simple terms, the WACC is calculated by weighting the cost of equity and the cost of debt in proportion to their contributions to the total capital of the regulatory asset base. Key parameters in the formula for the calculation of the WACC include the risk-free yield, equity market risk premium, equity beta, expected market return, and capital ratio. Some of these parameters, however, cannot be set objectively and are subject to a range of options, in particular those concerning risk. It is common practice that a regulator determines risk-related parameters at the lower end of the range because, generally, airports and air navigation services operate in a low risk environment. Details on the WACC methodology are provided in the Appendix to this paper. A practical example is also included to illustrate the method.

2.5 States may amend the above-mentioned formula or choose other methodologies to determine a reasonable rate of return for their service providers in light of local circumstances. For example, for entities financed solely through debt, the cost of capital (and thus a reasonable rate of return) should be limited to the cost of debt, such as the prevailing government bond rate, or a weighted average rate for different classes of debt (long-term bond, short-term debt, etc). In any case, when determining a reasonable rate of return, the low financial risk of the airports (the aeronautical activities in particular) and the air navigation services entities should be taken into account.

2.6 Since the discussion on the assessment of methodologies is complex and highly technical, the development of additional guidance in Doc 9161 and Doc 9562 may be useful for States. Such guidance should describe various methodologies adopted by States (including the WACC approach),

[1] The description in the two manuals is limited to an explanation of the merits and disadvantages of a rate of return regulation and a price cap regulation.

together with practical examples. Pending a clearer picture on this subject, it would be premature to develop additional policy text in Doc 9082. The development of guidance material and the continued collection of information on the subject would, in due course, be the basis for determination whether additional policies should be developed.

3. CONCLUSIONS

3.1 From the foregoing discussion, the following conclusions may be drawn:

a) In performing their economic oversight function, States should, where necessary and in light of the local circumstances, clearly define what is a reasonable rate of return on assets for their service providers.

b) ICAO should develop additional guidance material regarding possible methodologies to assess a reasonable rate of return on assets for service providers. The development of such guidance material would, in due course, be the basis to determine whether ICAO should develop additional policies on the subject matter.

4. ACTION BY THE CONFERENCE

4.1 The Conference is invited to review and adopt the conclusions in paragraph 3.

— — — — — — — —

APPENDIX

WEIGHTED AVERAGE COST OF CAPITAL (WACC) APPROACH

1. A common approach for the determination of a reasonable rate of return on net assets, as applied for capital-intensive companies that are financed through both equity and long-term debt, is that the rate of return on net assets shall not exceed the weighted average cost of capital.

2. **Weighted average cost of capital (WACC)**

2.1 The capital funding of a company is made up of two components, namely equity and interest-bearing debt. Values of the equity and debt add up to the value of the organization. The cost of capital is composed of the cost of equity invested by the owners of an organization and the cost of debt provided to the organization by different creditors, especially financial institutions. The cost of capital depends on the respective risks attached to equity and debt and on the respective proportions of equity and debt in the total capital employed ("gearing"). Since risks attached to equity and debt that are specific to a company can be diversified away by equity and debt investors, it is just the market risk that should be taken into account.

2.2 The following internationally-used formula to calculate the WACC is based on the "Capital Asset Pricing Model" (CAPM, a model that describes the relationship between risk and expected return):

$$WACC = g \times Rm \times (1-T) + (1-g) \times (Rf + (EMRP \times Equity\ Beta))$$

where:

a) g = capital ratio or gearing concerns a fixed value of interest-bearing debts allocable to the funding of the regulatory asset base, divided by the value of the regulatory asset base. The fixed value may be higher than the actual debt percentage with which the company has currently financed all its activities. Determining a standard percentage is common practice in regulated sectors in order to achieve a cost of capital that reflects an efficient financial structure. It should be noted that the standard is only relevant to the calculation of the permitted return. The company is not obliged to bring the actual ratio in line with the above percentage. The benefit of this standard determination is that the administrative burden of allocating the debts to the regulatory asset base is avoided and supervision is consequently simplified. The company must be able to arrange its funding in such a way that the continuity of the activity will not be threatened. The guideline employed is that the company must be able to maintain an appropriate credit rating.

b) Rm = expected market return (as a percentage), equal to the cost of interest bearing debt, or the risk-free yield (see below) plus a credit spread (or market risk premium). The credit spread is directly related to the credit rating of the company as determined by independent credit rating agencies such as Bloomberg, Moody's, Standard & Poors, etc. For example, an "A" credit rating implies a 65 breakeven point credit spread.

c) Rf = risk-free yield (as a percentage), equal to the yield to maturity on government bonds with a remaining term of 10 years at the time the charges are determined. This could be used as a representative rate. The average market rates could be construed to be an average return obtained on share indices such as those provided by Morgan Stanley Capital International, Financial Times Stock Exchange, Standard & Poors, Dow Jones' Stoxx, Deutscher Aktien Index, etc.

d) T = the current statutory corporation tax rate (as a percentage).

e) EMRP = equity market risk premium (as a percentage). This is the surcharge on the risk-free yield required by equity providers for the so-called market portfolio of shares worldwide. Experts have varying opinions on the level of this surcharge. There is no unequivocal method for determining the EMRP. In some regulated sectors, an EMRP within a range of 4% to 7% is applied. Some academic studies show a lower EMRP.

f) Equity Beta = a measure of the market risk (systematic risk) of shareholders equity that can be allocated to the funding of the regulatory asset base. This is consequently a "levered" equity Beta, which is a measure of the sensitivity of the value of shareholders equity to a change in the value of the market portfolio of shares, taking the financial structure into account.

2.3 It should be noted that the parameters in this WACC formula cannot be set objectively. The parameters and, consequently, the WACC are subject to a range of values. For regulated airports and air navigation services, the regulator would examine risk of both equity and debt to ensure that the cost of capital reflects actual market risks and do not give rise to excessive cash flows or margins allowed to be retained for efficiency gains. At the same time, the cost of capital should not be set at a level that would discourage the operator from making the required investments.

2.4 The level of the parameters of the WACC and the resulting rate of return may differ according to: a) the specific regulatory framework for a provider of air navigation services or an airport (single-till/dual-till/hybrid, i.e. the appropriate return on the aeronautical activities should reflect differences in the level of risk from non-aeronautical activities); and b) ownership and organizational aspects, i.e. non-autonomous versus autonomous, public or private companies (for example, for non-autonomous airports or air navigation services entities, or for entities that are not being financed through equity, the cost of capital should be limited to the cost of debt).

3. Cost of equity

3.1 The CAPM states that a company's cost of capital is equal to the risk-free rate of return (Rf), typically the yield on a ten-year treasury bond, plus a premium to reflect the extra risk of the investment (or its Beta). The exact rate of return on equity will depend on the perception of risk on the part of equity holders. This is expressed in the following formula:

$$\text{Cost of equity} = (1-g) \times (Rf + (EMRP \times \text{Equity Beta}))$$

3.2 Normally, the market risk premium of equity (shares) or "Equity Beta" is measured by looking at how the share price has responded over a period to past market movements. However, at best, Betas are an approximation and not perfect, and organizations that are not strictly in the market (i.e. shares are not floated on the stock exchange) can only obtain approximate Betas based on similar industries or operations.

3.3 In the case of a guaranteed full cost recovery system, coupled with the State's ownership of the airport(s) or the provider of air navigation services, normally the risk premium for equity capital or equity Beta should be fairly low. A "levered" Beta lower than 1 implies a smaller than average risk and a lower risk implies a lower cost of equity.

4. Cost of debt

4.1 The cost of debt is the risk-free yield plus the credit spread (see 2.2 b) and c) above). The credit spread consists partly of a compensation of the systematic risk (debt Beta) that can be allocated to the funding of the regulatory asset base on the part of the lenders. As the credit spread is directly related to the credit rating, the debt Beta could be close to zero for organizations with a high credit rating, and in particular for low-risk entities, where the debt Beta can even be neglected. In such cases, the credit spread will be lower and the equity Beta will be higher (i.e. a higher risk for the shareholders). However, the debt Beta can be substantial for organizations with a poor credit rating.

4.2 For entities financed solely through debt, the cost of capital (and thus a reasonable rate of return) should be limited to the cost of debt. For example, the prevailing government bond rate (a 10-year treasury bond could be used as a representative rate).

4.3 Different entities may use various bonds, loans and other forms of debt, *inter alia*:

a) Long-term bond or loan financing. For outstanding bonds and fixed-rate loans up to and beyond the planning horizon (2 to 5 years), the interest rates are known and can be demonstrated. For bonds to be issued or loans to be taken on during the planning horizon, interest rates have to be forecast based on industrial bonds with a credit rating appropriate for airports and providers of air navigation services.

b) Pension reserves. Following the requirements of International Financial Reporting Standards (IFRS), long-term rates have to be forecast based on industrial bonds with good credit ratings (particularly applicable to commercialized and partly or fully privatized airports and providers of air navigation services).

c) Short-term debt. This represents debt with durations between 6 and 18 months forward. Normally, in Euro-denominated areas, it should reflect the Euribor (Euro Interbank Offered Rate) one-year forward or the actual market rate. However, in a volatile period (fluctuating inflation to growing inflation), a risk premium representing mainly the inflation risk could be added. This should represent a mid-point value of the expected retail price index trend.

4.4 Where an entity uses these different classes of debts, the rate of return on the debt part of the capital employed should be the weighted average rate for these different parts of debt. For example, if a company has all three of the above classes of debt, then the rate should be calculated as follows:

$$\text{Return on debt} = \text{interest rate on debt class a)} \times \frac{\textit{class a)}}{\textit{total debt}} + \text{interest rate on debt class b)} \times \frac{\textit{class b)}}{\textit{total debt}} + \text{etc.}$$

4.5 It is important that for reasons of transparency, responsible authorities (States, regulators and service providers) give clear explanations of how they arrived at their respective costs of capital.

Moreover, those using current cost valuations of their assets should adjust the interest rates accordingly in order to avoid double counting of the inflation effects.

5. Example

5.1 The following is an example of the calculation of WACC, based on the CAPM, for an entity with an equity market value of $400 million and a debt market value of $300 million (i.e. a 42.86% gearing), a 3% risk-free rate and an equity Beta of 1:

$$WACC = g \times Rm \times (1-T) + (1-g) \times [Rf + (EMRP \times Equity\ Beta)]$$

where:

a) g = gearing is 42.86%
b) Rm = market return is 4%
c) Rf = risk-free yield is 3%
d) T = corporation tax is 35%
e) EMRP = equity market risk premium is 4%
f) Equity Beta = 1

then:

$WACC = 5.11\%$

$$\frac{300}{300+400} \times 4\% \times (1-35\%) + (1-\frac{300}{300+400}) \times [3\% + (4\% \times 1)] = 5.11\%$$

— END —