AIRPORTS COUNCIL INTERNATIONAL

The ACI Guide to Airport Economic Regulation

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Guide to Economic Regulation

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1 Introduction

Until the 1980s, nearly all major airports were publically owned utilities operated on a cost recovery basis. However, the deregulation of the aviation industry in many parts of the world led to a radical change in the way airports were operated. Deregulation was initially largely focussed on airlines, although many countries have also divested or privatised their airports and air traffic control services. Today airports are no longer a homogenous group of public utilities, but a heterogeneous group with ownership structures ranging from state-owned to partial or full privatisation. Airports, even publicly owned airports, have become more commercialised and more profit oriented.

Concerns about the market power of some airports have led many countries, rightly or wrongly, to regulate the economic behaviour of those airports, including both pricing and service quality. Around the world, different regulatory models and approaches have been applied to airports, some of which have evolved as circumstances have changed and the understanding of market dynamics has developed.

This document is designed to be a guide on the economic regulation of airports. The purpose of the guide is to provide information to help airports understand economic regulation and the different ways such regulation might be implemented. This can be used to assist in the education of airport stakeholders on airport economic regulation. The guide also discusses the criteria for the application of regulation, recognising that regulation is not required in all circumstances.

This report provides a context to airport regulation – its history and development – and provides a guide to the terminology, theory and arguments that have shaped the policy debate around airport regulation. It covers the arguments both for and against the application of airport regulation, and describes and evaluates the various models of regulation that have been attempted or proposed. It also provides information of various technical aspects of airport regulation and summarises the regulatory experience around the world.

Finally, based on this information, the guide sets out recommendations regarding the determination of whether regulation is even necessary and, if so, the application of smart and effective regulation.

ACI on Economic Regulation of Airports

- Seek Competition Rather than Regulation
- The Need for Regulation Should be Determined on a Case-By-Case Basis
- Intelligent Regulation Should Seek Consensus Solutions
- Regulation Should Seek to be Low Cost and Un-intrusive
- Regulation Should be Dynamic and Flexible
- The Regulator Must be Independent
- Regulation Should Recognize that Airports are Incented to Expand Traffic to Maximise Commercial Revenues Rather than to Exploit Any Available Market Power
- If Rigid Price Controls are Applied, the Format Should be Price Cap

2. The History and Characteristics of Economic Regulation

This chapter provides a history of economic regulation – how and why it came about, and what it tries to achieve (and where it has fallen short). It also discusses the evidence and arguments around the need for regulation in the airport sector and the costs associated with such regulation.

2.1 Defining Economic Regulation

This report addresses economic regulation of airports. Economic regulation focuses largely on the prices charged by the airport operator, but can also include quality of service and entry into the industry (i.e., whether a new airport company can develop and operate an airport). In some regimes (e.g., Australia), access to airport facilities is also a component of economic regulation.

Economic regulation excludes other types of regulation, including:

- Safety regulation;
- Environmental regulation;
- Labour laws and regulation; and.
- Regulation of financial instruments issued by airports (bonds and/or stocks);

2.2 The History of Economic Regulation

The modern field of market economics emerged during the mid-18th century to the late 19th century. A key element of this emerging theory of economics was that competition in markets would maximise social welfare and the economic wealth of the nation. Costs would be minimised and competition would prevent firms from undue exercise of market power, thus bringing prices consumers would pay down to costs. Economists call such outcomes “economic efficiency” (this term is described in more detail in the next section).

However, there was a concern that not all markets experience full and vigorous competition. It was theorised that some markets were natural monopolies, meaning that economies of scale were such that one firm could serve the market at a lower unit cost than would be the case if several competing firms served the market. However, with only a single firm in the market, there was potential that the lack of competition would not drive prices down to costs. Instead, there was potential for monopolists, even though they would be the low cost producer, to exercise market power and charge prices above costs. Economists refer to such cases as “market failure” in the sense that the market may result in prices that are above the costs of providing the service. While the concept of market failure was developed in the context of natural monopolies, it can also apply to markets with more than one firm, such as oligopolies with a small number of service providers in the market.

Some economists argued that such markets could be made to achieve economic efficiency through government regulation. Laws creating regulatory agencies and empowering them to limit prices charged began to emerge in a number of jurisdictions by mid-19th century. The first industry that was subjected to price regulation was the railway industry, often considered the high-tech industry of the 19th century. In the United States, a number of states began to regulate their railways around 1850, and by 1888 the federal government established the Interstate Commerce Commission (ICC) to regulate the industry via a national agency. Similar developments took place in the UK and a number of developed economies. As new industries developed, such as electric power, telephones, pipelines, trucking and eventually aviation (airlines), the principles of regulation developed for railways were extended to other transportation and utility operators.

2.4 When is Regulation Warranted?

There is no single, widely accepted theory of whether an industry should be regulated. Even the case of natural monopoly is not uniformly recognised as a justification for regulation. The theory of contestable markets says that under certain circumstances a natural monopolist would not be motivated to exercise market power. This would include a case of the threat that another firm would enter the market and completely displace the monopolist. There is also a view that a monopolist could be left unregulated, relying on the threat of regulation to constrain the service provider's pricing decisions.

Lacking a consistent theory of when an industry or a firm should be subjected to economic regulation of its prices, the following generalisations can be made:

- Industries where several service providers compete do not need to be regulated in terms of maximum prices.
- If the price elasticity of demand is high, there is little need of regulation. This means, that if buyers of services are very sensitive to price (e.g., they will not buy services if prices are raised), a monopolist would not be able to raise prices above costs.
- If buyers have significant countervailing power, then regulation would not be needed. Countervailing power might exist if buyers are able to act collectively or in markets with a small number of buyers.
- Regulation would not be needed if there are other constraints on pricing. Some air service treaties between nations contain constraints on certain charges, and thus a separate regulatory regime might not be needed. Here it would be action through the courts, rather than a regulatory agency that would compel non-compliant service providers to reduce prices.
- A credible threat of regulation may also eliminate the need for actual regulation. In the U.S., for example, the Federal Aviation Administration is empowered to regulate airport charges, but only does so upon complaint, rather than as a regular course of action. As a result, very few airport price regulation cases have been brought.
- Airports which have severe capacity constraints with limited prospects to expand capacity have great market power. It is not necessarily the case that they will exercise such power, but the potential is there.
- A number of economists have recognised that a) non-aeronautical services are generally not regulated, b) airport operators are strongly motivated to expand their sale of such services and c) higher airport traffic is the main driver of increases in non-aeronautical services. Thus, airport operators may constrain their exercise of market power on aeronautical services in order to earn non-aeronautical revenues. While most economists studying the airport industry accept the line of reasoning, to date no one has established a formula for assessing the conditions necessary to remove any exercise of market power.

[2] The proponents of the contestable market theory often put forth airlines as a case where a monopoly airline could be displaced by another firm.

We also note that there is a link between airport governance model and the need for price regulation. Government owned airports need not be regulated if their government owners provide instructions to management on pricing policies which constrain the exercise of market power. In some jurisdictions, airports are operated by not-for-profit entities, such as authorities or societies. There is some ambiguity as to what are the objectives of any given not-for-profit, but by definition they are not motivated to earn profits and thus presumably lack motivation to exercise market power to set prices above costs. Some economists (see Gillen and Morrison, 2004), however, raise the issue that not-for-profit entities may engage in "gold plating", incurring costs greater than necessary to provide the service, and thus could be economically inefficient.[3] When considering whether or not a government owned or not-for-profit entity should be regulated, our advice is to examine the organisation's letters patent or enabling legislation to see whether the organisation's objects include motivations for earning profits or surpluses.

2.5 Do Airports Have Market Power?

It is generally agreed that economic regulation is only required in situations where there is limited or no effective competition. Airports facing effective competition (or in some cases the threat of competition through new entrant airports) will not be in a position to charge excessive prices or provide poor quality services. Even airports that do have market power may not seek to exploit this power for fear of the competitive response. For these and other reasons, not all airports are regulated. For example, in the UK, only three airports (Heathrow, Gatwick and Stansted) are regulated out of 24 airports handling more than 500,000 passengers per annum.[4]

There exists a number of ways in which airports can face competition:[5]

- Competition for a shared local market – e.g., Charles de Gaulle and Orly at Paris; JFK, Newark and LaGuardia at New York; Heathrow, Stansted, Gatwick, London City and Luton at London.
- Competition for connecting traffic – passengers (and sometimes airlines) can switch to alternative connecting hubs if cheaper, faster and/or more convenient connections become available.
- Competition for cargo traffic – cargo is highly price sensitive and can switch to alternative routing or other modes. E.g., if cargo rates in Amsterdam are high, the cargo can be flown to Brussels and trucked to its final destination.
- Destination competition – leisure tourism can switch to other destinations if the cost of travel is too high (or quality of service too low).
- Competition for non-aeronautical services (retail, car parking, etc.) with non-airport providers.
- Modal competition – e.g., rail for certain European routes.

[3] Gillen, D. and W. Morrison, "Airport Pricing, Financing and Policy: Report to the National Transportation Act Review Committee", in *The Economic Regulation of Airports: Recent Developments in Australasia, North America and Europe*, edited by Gillen et al., Ashgate Publishing, July 2004.

[4] UK CAA, UK Airport Statistics, 2011. The three regulated airports accounted for 55% of UK passengers in 2011. Manchester airport was subject to price regulation until 2008.

[5] Kincaid, I. and M. Tretheway, "Competition Between Airports: Occurrence and Strategy, in Airport Competition", eds: Forsyth, Gillen, Ashgate publishing, 2010.

2.6 Regulation and Airport Governance

A number of different models for airport governance have developed over the years, many of which have developed in response to the changing nature of airports. These are summarised below (Gillen, 2010):[22]

- **Government Owned and Operated.** Up until the 1980s, this was the standard model of governance for almost all commercial airports around the world. This is still the model used for many airports in the U.S., as well as Asia, South America and parts of Europe. In the U.S., airports are owned and operated by municipal or regional government, whereas in other countries the federal government is responsible.

- **Government Owned and Privately Operated.** In this governance model, the operation of the government-owned airport is contracted out to a private firm for a specified period of time. This model is used in the U.S., Canada, the Caribbean and South America. A similar model is the **public-private partnership**, where firms bid for the right to build an airport (or develop the airport, e.g., a new terminal) and then operates it for a period of time sufficient for the firm to recover the costs of the project and achieve a return on their investment, although the government retains long term ownership of the airport (also known as the Build-Operate-Transfer, or BOT, model).

- **Not-For-Profit.** This is the governance model used in Canada, where the operations of the country's largest airports are the responsibility of local not-for-profit authorities. These authorities are responsible for the capital development of the airport, but the land itself remains under federal government ownership and is leased to the authority, in some cases requiring a rental payment.

- F**ully Private Airports.** A number of governments have fully privatised their major airports. For example, the UK government privatised the British Airport Authority in the 1980s, which at the time owned Heathrow, Gatwick, Stansted and a number of regional UK airports. The privatisation was by an Initial Public Offering (IPO), although the company was later purchased by a consortium led by Ferrovial, S.A., a Spanish construction firm. Other countries, such as Australia, have privatised their airports through a bidding process, where one consortium is selected to purchase the airport.

- **Partially Privatised Airports.** Some governments have retained a controlling interest in the airport ownership. Examples include Hamburg, Rome, Belfast, Brussels, Budapest, Copenhagen, Dusseldorf and Frankfurt and airports in Argentina, Chile, Colombia and Mexico.

With the exception of the not-for-profit airports, there are examples of economic regulation being applied to all these forms of airport governance (see Chapter 5 for details), including government owned and operated airports (e.g., Dublin Airport). However, some economists are of the view that government operation of firms with market power can be an alternative to regulation. In this view, it is assumed that the government will operate the airport to achieve maximum economic efficiency. The concept is that the government can instruct management to constrain exercise of market power and charge prices which cover but do not exceed costs.

[22] Gillen, D., *The Evolution of Airport Ownership and Governance*, Working Paper, Centre for Transportation Studies, October 2010.

This was often the case in aviation infrastructure, where until the 1980s, governments generally owned and operated airports, air traffic control and navigation services, and in many cases airlines. With government ownership, regulation was considered redundant and not necessary. However, government ownership was not without its own issues, often resulting in firms that were inefficient, unresponsive, and imposing significant costs on tax payers. As a result, many have been privatised since the 1980s and even the non-privatized government airports are operated on a more commercial basis in many cases.

Economic regulation has not been applied to the not-for-profit governance model. Typically, such operators have no private sector investors requiring a rate of return on invested capital. Thus, profit maximization may not be a motivation for the firm, potentially negating the need for regulation even where market power exists. However, there can be ambiguity in this governance model. First, small not-for-profit airports struggling with economic viability may in fact be profit maximizers in order to achieve financial break-even, although, until the airport reaches break-even there would be no reason to subject it to economic regulation.[23] Second, because the not-for-profit organization has no access to equity capital, and 100% debt financing is generally not available, some profits will have to be earned in order to generate equity capital via retained earnings. It is not clear what level of profit is justified for such equity generation and what level of profit becomes exploitation of market power. Third, some writers have also claimed (not in an airport context) that not-for-profit organizations may have other objectives that could warrant economic regulation. Perhaps the most commonly cited motivation is "gold plating", where the not-for-profit firm (perhaps a medical clinic) seeks the best equipment, beautiful office facilities, high salaries for employees, etc. If this is the case, then some form of economic regulation might be considered to review capital programs, benchmark salaries, etc.

2.7 The Costs of Regulation

Over the past 30 years, the economics profession has recognised that however noble the purpose of regulation, there are substantial costs associated with regulation. The most easily quantified charges are the **direct costs** of regulation – that is, the costs incurred by the regulating authorities, the regulated entities and other parties (primarily airlines but also trade associations, resident associations, chambers of commerce and other concerned stakeholders). There are also **indirect costs**, imposed on the immediate stakeholders and on the wider society, due to market distortions and skewed incentives caused by the regulation.

Direct Costs

There are significant administrative costs for regulation. The regulatory agency must be staffed by qualified individuals and expertise developed. Regulators also make use outside expertise to support their functions – economists, lawyers and industry consultants. Regulatory proceedings can be lengthy, require legal counsel and thus can be expensive. Regulations may involve an appeal process through the courts, imposing further costs on regulators.

[23] This is not to say that when the airport reaches break even, that regulation is suddenly warranted. An airport achieving profitability is not a sign that it has somehow achieved monopoly power.

3. Models of Economic Regulation for Airports

This section examines regulatory formats for controlling the pricing behaviour of regulated firms. The formats considered include:

- Rate-base rate of return regulation.
- Cost-of-service regulation.
- Price cap regulation (a particular form of incentive regulation).
- Constraining airport pricing power by threat of regulation.
- Constraining airport pricing power by mandatory consultation with stakeholders.
- Constraining airport pricing power by long term contracts with users.
- Constraining airport pricing power via an arbitration option.

It should be noted that the last four perhaps should not be labelled as regulation per se, but rather as alternative means of constraining prices. These four do not have the structure, institutions and jurisprudence of the first three regulatory formats.

3.1 Rate-Base Rate of Return Regulation

Rate-base rate of return is a regulation model which allows a company to earn revenue in an amount sufficient to cover its costs and provide a reasonable rate of return on capital investment. Under this regulation system, a firm operates on full cost-recovery basis and can retain any surplus revenue in the form of a profit.

Rate-base rate of return regulation has its origins in electric and telecommunications utilities, pipelines and railways. A firm is allowed to set prices so long as the overall corporate rate of return on the shareholder's capital investment does not exceed a "fair" rate of return. As the firm cannot set prices too far above economic costs, it cannot exploit its market power. It is often described as a "cost-plus" model, where the firm would receive remuneration for all of its costs, plus a bonus for profits or, in the case of a loss, a portion to hold for the next year.

This regulatory model has a number of advantages and shortcomings. On the one hand, rate-base rate of return regulation provides an incentive for firms to adequately invest, as higher returns can be earned on a higher rate base. In addition, the regulated firm is effectively guaranteed a rate of return, regardless of changes in costs and other market conditions, and does not bear the risk associated with investment.

On the other hand, the rate of return regulatory model has been criticised due to several reasons. The principal criticism arises due to the difficulties of practical implementation of the rate of return regulatory system. While the basic concept behind rate-of-return regulation is simple, its execution is typically problematic due to the following issues:[29]

[29] For example, see Sherman, R., *The Regulation of Monopoly*, Cambridge UK, Cambridge University Press. 1989.

- Lengthy processes may be required to determine which assets (i.e., the rate base) should be included in the calculation.
- Similarly, the determination of what constitutes a reasonable rate of return can be a lengthy process subject to considerable dispute. Even small differences in the allowed rate of return can be significant. For example, the difference of only one half percent on a rate base of $1 billion amounts to $5 million per annum.
- The resulting reviews introduce significant regulatory delay and impose costs on both the regulated company and the regulator.
- Depending on application, regulation can almost amount to a guarantee of financial return, regardless of whether the company is efficient. Rate-of-return regulation is viewed by many economists as resulting in dynamically inefficient industries over time.

Another major issue with rate of return regulation is that this method creates an incentive for firms to overinvest in capital base. The company can obtain higher returns if it has a higher rate base, hence the incentive to increase investment. This effect is known as the Averch-Johnson effect (sometimes referred as the gold-plating problem).[30] To prevent this abuse, rate-of-return regulation can become very intrusive by requiring the regulator to review all major capital decisions in great detail, increasing the complexity, time and cost of regulatory proceedings. The risks of asset investment then are largely borne by the users rather than the operator.

As a result of these serious deficiencies, the rate of return model of regulation is viewed today as cumbersome and expensive from a practical standpoint. It has been abandoned in many jurisdictions where it was previously used (e.g. the United States has abandoned the rate-base rate of return approach in favour of the price cap method, discussed in section 3.3). Any time the airport operator wishes to change a charge or fee, a detailed regulatory application must be developed and submitted. This approach has considerable delay, and regulators tend to favour the status quo and “fairness” over innovation and efficiency. Moreover, this approach requires the regulator to approve every price change, capital decision, and in some cases, service level decisions, which renders it intrusive, cumbersome and expensive in practice. Since it also tends to result in delays to change, and tends to favour the status quo and fairness over innovation and efficiency, this approach has fallen out of vogue.

3.2 Cost of Service Regulation

Cost of service regulation is quite similar conceptually to rate-base rate of return regulation. Instead of setting the rate of return based on invested capital, however, it sets rates based on the cost of providing the service. While the rate-base rate of return approach places emphasis on determining the rate base (the capital base) in order to establish a reasonable rate of return, cost of service regulation does not place much focus on determining the capital base in practice. In both cases, there is an allowance for a fair or reasonable rate of return on invested capital.

[30] Averch, H. and L. Johnson, “Behavior of the Firm Under Regulatory Constraint”, The American Economic Review, 52 (5), December 1962, pages 1052-1069. This analysis is now regarded as simplistic as it assumes the regulator will approve all capital investments made by the firm. However, it is a commonly given criticism of rate-of-return regulation

Cost of service regulation was the traditional approach used for air carriers prior to deregulation and the introduction of substantial meaningful competition.

In practice, cost of service regulation often focuses not on the level of charges, but rather on allowed percentage increases in charges. Thus, instead of reassessing the rate base and the allowed rate of return each time a tariff change is requested, the regulator simply determines the percentage change in the unit cost of providing service and allows the tariff to increase by the same percentage. For example, if fuel costs increase by 20% and fuel represents 10% of the company's cost base, then the tariff is allowed to increase by 2% (20% increase applied to 10% cost base). One problem with this approach is that it tends to ignore productivity gains which can offset the need to raise prices when costs increase.

Cost of service regulation has the advantage of being somewhat simpler to implement than rate-based rate of return regulation, and thus may have less regulatory delay and lower costs to administer. The approach also avoids the problem of having to determine which assets (i.e. the rate base) should be included in the calculation every time a change in rate is requested.

Nevertheless, there are still some shortcomings to this approach. Similar to rate of return regulation, this approach provides no incentive for the regulated entity to reduce costs. Moreover, it also effectively transfers almost all the risk to the users, as any additional costs that result from an external economic shock or changing market conditions will be passed in full to the consumer by the regulated entity. As the rate of return regulation, cost of service regulation is an intrusive approach, requiring the regulator to approve every price change and, in some cases, approve service decisions. As a result, there has been a move away from cost of service to other, less intrusive, forms of regulation.

3.3 Price Cap Regulation

Price cap regulation was designed to reduce or eliminate the undesirable aspects of the intrusive rate of return and cost of service forms of regulation.[31] Price cap regulation was developed in response to the privatisation of state infrastructure in the UK in the 1980s. The original intention was that price cap would fade away as competitive conditions improved (Beesley and Littlechild, 1988).[32] However, its use has continued in many sectors and has been extended to numerous countries.[33]

The original intent of price cap regulation was to substantially reduce or eliminate regulatory delay by giving the firm some authority to change its prices without a hearing before the regulator, and to create incentives for the firm to improve productivity. This is not to say that price cap regulation results in no regulatory delay or cost associated with regulation. However, since individual price changes do not need to be reviewed by the regulator, and since reviews of the operator's capital assets, rate of return and cost of providing service are only done periodically, relative to rate-of-

[31] The discussion of price cap regulation also is relevant for revenue cap regulation. The two approaches are very similar, with one setting the maximum price that can be charged, while the other sets the maximum revenue that can be generated, in the areas under regulatory oversight.

[32] Beesley and Littlechild, "The Regulation of Privatized Monopolies in the United Kingdom", RAND Journal of Economics 20, 1988, pages 454-472.

[33] Price cap regulation has been ended for the UK electricity and telecoms industries, in 2002 and 2006 respectively.

return and cost-of-service regulation, price cap regulation has much lower regulatory delay and cost. Nevertheless the periodic reviews can require significant time and expense, as reflected in the major reviews of airport price caps in the UK, and in Australia (prior to 2002).

In effect, price cap regulation requires that prices covered by regulation must increase at a rate more or less than that of inflation. The difference between inflation and the allowed rate increase is the productivity factor, often referred to as "X" factor. Thus, price cap regulation attempts to provide an effective discipline to firms possessing market power, but at a lower regulatory cost and in a form that provides incentives for firms to be cost efficient. The broad term for this type of regulation is "incentive regulation", as it provides an incentive for firms to control and reduce costs and increase productivity. Price cap is the most widely known and most widely adopted form of incentive regulation.

This price cap regulation format has become the preferred regulatory format for a wide range of infrastructure industries. In the United Kingdom, Australia, New Zealand and Ireland, price cap regulation has become a widely used format for infrastructure industries. In the United Kingdom, for example, it has been used for water, electricity, gas, airports and telecommunications.

While the intent of price cap was to provide a regulatory format that was more light-handed and less intrusive than rate of return or cost based regulation, and with better incentives for efficiency gains, the reality has been that price cap has taken on some of the negative aspects of traditional regulation, as described in subsequent sections (see 'Is Price Cap Light Handed' section on page 18).

The Price Cap Formula

The price cap formula allows a firm, such as an airport, to increase its prices without a regulatory application. The tariff basket or some yield ratio measure can be increased up to a cap set at expected inflation, plus or minus a factor that incorporates expected decreases in costs (due to productivity gains) and increases in costs (due to permitted capital investment) achieved by the firm. Thus, the firm is required to achieve some productivity gains to stay within the cap and is rewarded if gains are higher than expected.

The price caps are normally set during regulatory reviews held normally every four to five years and remain fixed between reviews (except in emergencies such as the failure of an airline or the 9/11 terrorist attacks). The regulated firm is allowed to keep any difference between expected and actual cost savings until the end of the regulatory period. If actual inflation does not meet expectations (higher or lower than projected when the price cap is set) the regulator makes a compensating adjustment later in the regulatory period or in the subsequent regulatory period. Price cap regulation does not seek to regulate profits, only prices, thus providing a strong cost efficiency incentive. The regulator may seek to eventually pass on any additional cost efficiencies to consumers by resetting the price cap at the next regulatory review.

[34] Other forms of incentive regulation include yardstick competition (prices are allowed if they are consistent with prices adopted by firms in competitive markets); automatic rate adjustment mechanisms (which automatically increase all prices when costs increase); and sliding scale plans (a variant of price cap regulation whereby efficiency gains of the firm are shared between the firm and its customers). See R.L. Mansell and J.R.Church (1995), *Traditional and Incentive Regulation*, Van Horne Institute University of Calgary, for a discussion.

The price cap formula is usually represented as:

CPI +/- X or

RPI +/- X

where CPI (consumer price index) and RPI (retail price index) are measures of inflation,[35] and X is a productivity adjustment term incorporating all other factors that are expected to affect the company's average cost (cost per unit of output) year over year.

A strong advantage of price cap regulation is that it removes the need for regulatory approval merely to adjust prices for inflation. In periods of moderate to high inflation, this is a significant advantage.

The X factor is included to recognise a number of different factors. The most important of these is inflation. E.g., if the prices of labour, fuel and the other factors of production needed by a firm increase by 5%, and if the firm is achieving an annual 1.5% increase in productivity, then prices charged by the firm would only have to increase by 3.5%. Thus, the price cap regulated firm would be allowed to increase its prices by CPI - 1.5%.

The X factor can also be used to authorise price increases for non-inflation reasons. One example is to allow for somewhat higher prices in order to cover the costs of compliance of new safety or workplace regulations. Another is to allow price increases to cover increases in annual operating costs when new capital is put into service. In this case, X can be a positive number (i.e., allowing prices to increase by more than inflation).[36]

An example of a determination of X might be as follows:

- Annual productivity growth of 1.5% is expected.
- The airport operator must incur 0.25% higher annual costs to comply with new environmental or safety or workplace regulation.
- The airport requires an annual increase in prices of 2.5% to cover increased annual costs associated with a new terminal that has been opened.

In this case, the X factor is computed as 1.5% - 0.25% - 2.5% = 1.25%. I.e., the airport can annually raise it charges by CPI + 1.25%.

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[35] There are a number of differences between the CPI and the RPI. The market basket differs for CPI and RPI. For example, the calculation of RPI includes the cost of housing, house depreciation, mortgage interest payments and insurance costs, while CPI measures generally do not. A second difference is that the RPI is generally computed as an arithmetic mean while the CPI is a geometric mean. As a general rule, most price cap regulators use the CPI, with the main exception of the U.K., where the RPI has been the traditional measure of inflation.

[36] Note that the cost are the annual costs (depreciation, interest) associated with new capital put into productive use and not the costs of the capital projects themselves. A key element is that the price increase for new annual capital costs is only allowed once the new capital is put into service. This is very different from the not-for-profit pricing policies of U.S. and Canadian airports. The U.S. allows (subject to FAA approval) airports to charge Passenger Facility Charges (PFCs) as a means to finance capital investments. PFCs can be charged prior to the capital actually being put into productive use. Canadian not-for-profit airport operators use a somewhat similar mechanism called Airport Improvement Fees (AIFs) to increase prices paid by today's passengers to generate funds to pay for capital which will not be put into productive use until sometime later.

3.4 Trigger Regulation or Price Monitoring

Trigger regulation is an approach which attempts to restrain the market power of a firm (if they have any), with the threat of regulation. Legislation is put in place which grants powers to a government agency to regulate the charges of an infrastructure service provider. However, the agency defers the exercise of those powers, provided that the infrastructure company does not set charges which are too high. If high charges are set, then the agency will immediately exercise its legislated powers and subject the company to price regulation.

It is a credible threat of regulation that is key to the success of trigger regulation. If the regulation threat is not credible, then it will not act as a constraint on the company's pricing behaviour. For trigger regulation to be effective, it is necessary that the regulatory powers be established in legislation.

Effectiveness also requires that the trigger criteria be established, so that activation of regulation is not viewed as arbitrary, or as being unlikely. The criteria in turn should be clear and should be linked to measures of economic efficiency. The process of monitoring prices and quantities in the market and comparing to benchmarks or other means will have its own costs associated with it.

There are considerable advantages of this regulatory format. Neither the firm nor the regulator incurs costs of regulatory procedures (unless the trigger is pulled). The firm has considerable freedom for setting and changing prices. Monitoring also allows flexibility in the face of unforeseen events.[43] It also has the benefit that it does not significantly distort the functioning of competitive markets. If airports do not have market power and markets are performing effectively, then trigger regulation does not significantly interfere with this in the way that price cap can.

However, economists have raised concerns that this form of regulation may not provide strong incentives for cost efficiency, since it generally focusses on prices (the regulated firm may be able to keep prices constant while still being inefficient or by degrading service quality). There also lies concerns that the regulator may choose to use high profits as a trigger for more formal regulation, particularly under pressure from airlines and other stakeholders, which is not necessarily an indicator of cost inefficiency.

Trigger regulation has been adopted in Australia and New Zealand. In the case of Australia, trigger regulation has replaced an earlier attempt at price cap regulation. The Australian model, referred to as price monitoring, specifies five year independent reviews of airport pricing and behaviour which have the potential to trigger more heavy handed regulation. Under this regime, an airport is required to periodically report its individual prices and an overall price index. The regulatory agency assesses these reported prices and determines whether to continue with the prices monitoring regime, to impose regulation, or whether to remove the prices monitoring requirement entirely. In New Zealand, the approach is more general and looser, as the relevant minister can undertake a review of pricing behaviour in any industry. The two regulatory regimes are described in more detail in Chapter 5.

[43] Forsyth, P. et al., *The Economic Regulation of Airports: Recent Developments in Australia, North America and Europe*, Ashgate Publishing, Aldershot, 2001, chapter 1.

The Australian Productivity Commission conducted a review of airport regulation in Australia in 2011, and provided the following conclusions regarding the trigger regulation:[44]

- Under the light-handed monitoring regime that replaced price cap regulation there has been a marked increase in aeronautical investment and airports have not experienced the bottlenecks that have beset other infrastructure areas.
- A review of aeronautical charges does not suggest an inappropriate exercise of market power.
- Service quality outcomes overall are 'satisfactory' to 'good', although airlines had, on occasion rated two airports as 'poor'.
- Australian airports' aeronautical charges, revenues, costs, profits and investment appeared reasonable compared with (the mostly non-commercial) overseas airports.
- Commercial agreements with airlines had become more sophisticated. Agreements often include service level obligations, consultation on capital investment, price paths and dispute resolution when 'in-contract', but not during contract formation.
- While airlines had maintained that airports adopt 'take it or leave it' negotiation stances and some fail to provide adequate information, no party sought a return to regulatory price setting, given past experience with its associated costs.
- Price monitoring aims to constrain airports from inappropriately exercising any inherent market power. But neither the regulator nor Governments have acted when the regulator has raised the possibility that some airports might potentially be exercising market power.

Although not explicitly stated as such, the regulatory regime in the UK is another example of trigger regulation. Airports in Scotland are not currently subject to price regulation, but could be subject to such regulation if the UK CAA views they are exploiting their market power. The operator of the airports at Glasgow, Edinburgh and Aberdeen voluntarily capped revenue per passenger at their airports, which may be due in part to threat of regulation by the UK government. This suggests that the credible threat of regulation (credible because legislative authority was in place to implement regulation) played a part in constraining the private airport operator's behaviour, without the need to apply direct regulation.

3.5 Mandatory Consultation

Consultation is a form of self-regulation whereby the firm consults with its customers prior to altering its prices. A principle aim of consultation is to increase the negotiating power of airlines vis-à-vis airports. This is part of the reason consultation is specified in European Union Directive 2009/12/EC on airport charges,[45] (described in more detail in Section 5.1).

However, the firm is under no obligation to adjust its pricing as a result of the consultations. Thus, a distinction has to be made between an obligation to consult and an obligation to negotiate price changes. This form of self-regulation may offer some degree of pricing discipline if the firm faces the real threat of countervailing action by its customers or the threat of government intervention or regulation.

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[44] Australian Government Productivity Commission, "Economic Regulation of Airport Services", Inquiry Report No. 57, 14 December 2011, page XX.

[45] European Union, "Directive 2009/12/EC of The European Parliament and of the Council of 11 March 2009 on Airport Charges", preamble, paragraph (2).

The arguments in favour of this regime are that it is cost effective (as regulators are not directly involved) and it offers pricing flexibility. It also gives the customers a voice in some of the airport's investment choices.[47]

However, several issues have been raised with relying solely on consultation. In some cases where customers or users do not have sufficient countervailing power, the consultation process will not prevent a firm from charging excessive prices, essentially defeating the purpose of consultation. If there is no threat of action against the firm, there is little incentive for the firm to adjust prices in line with the consultation.

Similarly, there can be little incentive for the customers to agree to any price rises. This is particularly the case where the consultation is backed up by an appeals process (as is the case with EU Directive 2009/12/EC). The appeals process, which all users can avail of regardless of the degree and quality of their involvement in consultation, at a minimum postpones the implantation of charges at little cost and will always give users at least a chance of getting a better deal.

Thus, the regulator needs to consider how to best incentivise users to engage constructively in the consultation process. One possibility is the threat of regulation (trigger regulation), as described in the previous section.

3.6 Long Term Contracts

Long term contracts are bilateral agreements between a firm and its customers. While formal regulation does not exist, a contract is enforceable in the court. For this reason, provided that the contract is comprehensive in its coverage of charging principles, it may be as effective as direct regulation but without its regulatory costs.

Under this approach, the infrastructure provider enters into a long term contract with its customers. The contract would specify what charges the company can impose on its customers, the principles for setting those charges, and a contractually binding process for changes in charges.

The concept here is that airport users (airlines) enter into contracts with full knowledge of the economics and dynamics of the industry. If a customer freely enters into a long term contract with a service provider, then that contract would normally contain pricing provisions which would prevail for the duration of the contract. Typically these will include provisions for cost adjustments.

This type of pricing constraint is possible where a firm has a small number of customers who are knowledgeable and can enter into a long term (or renewable) contract. However, where there are a large number of customers, a small number of major customers may enter into a contract which governs the principle for setting fees and charges (e.g., signatory airlines).

The effectiveness of this approach will depend on the relative bargaining powers of the buyer and seller. Some market conditions may provide the needed balance. For example, a rail carrier may be considering construction of a new rail line to serve a customer with a new plant. Because the asset has not yet been built, there is a dedicated customer (or small number of customers), and the long life of investments of both buyer and seller, regulation by contract may produce a desirable outcome for both parties. In an airport context, the motivation may be the need to

[46] Tretheway, M., "Airport Ownership, Management and Price Regulation", March 2001.

[47] Smyth, M. and B. Pearce, "Economic Regulation", IATA Economics Briefing N0 6, February 2007, page 39.

construct a new terminal or runway. The major users of the facility could enter into a long term use agreement which specifies the pricing regime that will apply for the life of the asset.

The benefits of this approach are similar to those listed above for consultation; there are incentives towards reaching technical and dynamic efficiencies, risk is shared between the firm and the customer, and it is inexpensive. As the contract is agreed upon by both the airport and the customer, both parties would not have barriers to impede technical efficiency as it is in the best interest of both parties. Likewise, risk is split between the airport and the customer, making both parties deter from risky choices. Lastly, it is an inexpensive form of pricing constraint as regulators are not involved, as provisions for later changes would be already agreed upon in the contract.

The arguments against binding long term contracts as a form of constraint on pricing are the potential for loss of allocative efficiency, and the timeliness being dependent on the length of negotiations. In regards to allocative efficiency, long term contracts have the potential to increase the market power of incumbent airlines at the expense of new entrants, as the contract can allow to the incumbent to influence airport development and policy to its own advantage. However, this can be addressed by the terms of the contract. Timeliness is a major issue with regulation by bargaining if parties come to an impasse on issues, and bargaining is stalled until compromise is found.

There are a number of instances where long term contracts have been used as the basis for determining airport pricing:

- In the U.S., many airports have entered into binding, contractual arrangements with air carriers governing airport fees and charges, as well as capital programs undertaken by the airports. The original motivation for some of these contracts was to provide security for airport borrowing via the issuance of revenue bonds. These contractual relationships have been instrumental in the fact that airline-airport rate disputes have been relatively infrequent in the U.S.

- Again in the U.S., in the proposed privatisation of Chicago Midway Airport, the City of Chicago (the owner of the airport) entered into a long term contract with the major users of the facility, and the successful bidder would be obligated to honor that contract. This gave a degree of certainty to the potential bidders while providing users with a meaningful long term pricing constraint without the need for formal regulation.[48]

- Similarly, many long term concession agreements, where the government awards the operation and development of an airport to a private company or consortium, can be used as means of regulating airport pricing. The concession agreement can set out the future level of airport charges, investment requirements, service quality standards and expected efficiency improvements. The bidders for the concession determine their bid price and/or revenue-sharing with the government on the basis of these concession terms. In such cases, a balance needs to be struck between the level of charges and the revenue potential to government.

- In Germany, Fraport has entered into five-year contracts with airlines at Frankfurt Airport. Airlines agreed to growth in airport charges that varies inversely with passenger traffic development. If growth in passenger traffic exceeds expectations, permitted growth in airport charges will be lowered.

- In Denmark, Copenhagen airport has signed agreements with its airline users on the price path for airport services for specified periods of time.

[48] While the privatisation process resulted in the selection of an operator in late 2008, the latter was unable to complete financing of the bid payment due to the general collapse of U.S. financial markets in 2008 and 2009.

3.8 Summary

Figure 3-1 evaluates each of the forms of regulation discussed previously on the basis of various criteria:

- **Technical Efficiency.** Producing goods and services at the lowest possible cost (or with the minimal use of resources).
- **Allocative Efficiency.** Ensuring that those goods and services most demanded are produced and go to those individuals or groups that most value them. Allocative efficiency is achieved when resources are allocated in a manner that maximizes net social welfare (the limited resources of a country are allocated in order to best service the material requirements of consumers).
- **Dynamic Efficiency.** Dynamic efficiency is the ability to enhance technical efficiency over time, through the development of new processes and technologies, balancing short-run concerns (e.g., price level) and long term requirements (e.g., investment in research, development and innovation).
- **Investment.** Ability to provide the right signals and incentives regarding investment decisions. Sub-optimal investment decisions could result in insufficient capacity and congestion issues or, alternatively, over-investment resulting in under-utilization and over pricing.
- **Averch-Johnson Effect.** A regulated company may over-invest in order to achieve returns on a higher capital base (the gold-plating problem).
- **Risk Transfer.** The extent to which risk is shared between the regulated firms and its customers.
- **Price Discrimination.** Does the regulatory mechanism allow price discrimination? Price discrimination refers to the practice of charging different customers different prices for essentially the same product. Price discrimination may be a desirable result in situations where a regulated firm faces economies of scale and is not subsidised.
- **Cost of Regulation.** The financial cost, both to the government and the regulated firm, of maintaining the regulation mechanism.
- **Timeliness.** The ability and flexibility of the regulatory process to respond to changing market and economic conditions.
- **Information Requirements.** The amount of information required by the regulator in order to assess pricing decisions. Detailed information requirements increase the time and resources required to regulate and can result in erroneous decisions, particularly due to information asymmetry. This refers to the difficulty the regulator may have in obtaining adequate information on the regulated firm's operations and costs in order to determine the most economically efficient prices.

Figure 3-1: Comparison of Regulatory Approaches

Criteria	Rate-of-Return / Cost-of-Service	Price Cap	Monitoring / Trigger	Consultation	Binding Contract	Arbitration
Economic Efficiency						
Technical Efficiency	Cost plus regulation discourages adoption of new technology	Incentives to achieve technical efficiency	Potential for low achievement	Potential for low achievement	Incentives to achieve technical efficiency	High incentives to achieve technical efficiency
Allocative Efficiency	High achievement	High achievement	Potential for high achievement	Potential for low achievement	Potential for high achievement	High achievement
Dynamic Efficiency	Low achievement: Known to discourage adoption of new technology	Incentives to adopt new technologies, but regulatory approval typically required	Potential for high achievement	Potential for low achievement	Incentives to achieve dynamic efficiency	High incentives to adopt new technologies
Other Economic Objectives						
Investment	May tend to over-invest	Regulatory delays observed to delay investment	Some incentives for optimal investment	May tend to over-invest	Strong incentives for optimal investment	Strong incentives for optimal investment
Averch-Johnson Effect	Outcome depends on regulator's diligence in examining appropriate investment and expenditures	Outcome depends on regulator's diligence in examining appropriate investment and expenditures	Depends on the credibility of the triggers	Firm is unconstrained	Uncertain	Limited opportunity for arbitration of major capital decisions allowed
Risk Transfer	Outcome depends on regulator's diligence in examining appropriate investment and expenditures	Outcome depends on regulator's diligence in examining appropriate investment and expenditures	Depends on the credibility of the triggers	Firm is unconstrained	Uncertain	Limited opportunity for arbitration of major capital decisions allowed
Price Discrimination	Can be prevented, or enabled if appropriate	Pricing flexibility allows price discrimination unless prohibited	Pricing flexibility allows price discrimination unless prohibited	Pricing flexibility allows price discrimination unless prohibited	Pricing flexibility allows price discrimination unless prohibited	Price discrimination a possibility if arbitration is by individual customers
Regulatory Process						
Cost of Regulation	Very expensive	Expensive	Inexpensive (depending on the trigger mechanism)	Inexpensive	Inexpensive	Inexpensive
Timeliness	Long time lags to make decisions	Long time lags to make decisions	Trigger response may be slow	Long time lags to make decisions	Depends on negotiation process	Fairly timely decision process
Information Requirements	Extensive information requirements	Fairly extensive information requirements during quinquennial reviews	Light information requirements	Light information requirements	Light information requirements	Light information requirements

4.3 Single Till versus Dual Till

Regardless of the form of regulation undertaken (price cap, rate-of-return, etc.), one of the key decisions to be made by the regulator, and one of the more controversial, is the treatment of non-aeronautical revenues. In particular, whether those revenues, or at least the profit from those revenues, should contribute to aeronautical costs. This is commonly referred to as single till vs. dual till regulation.

Single till

Under single till, total airport costs are reduced by net earnings from non-aeronautical services revenues before computing regulated aeronautical charges.[60] All revenues go into the same "till" and the company is not allowed to earn a return greater than what is deemed as "reasonable" by the regulator. With single till, aeronautical users benefit from the airport operator's net income from retail, car parking, land development, etc. if they are profitable.[61] Effectively, any gains made in non-aeronautical activities are transferred in full to the aeronautical users.

The strictest version of single till rate setting is referred to as residual pricing which incorporates the costs and revenues of all of the airport's activities. Non-aeronautical revenues are subtracted from the operational costs of both aeronautical and non-aeronautical services. The difference, or residual cost, is then divided by the number of aircraft landing units yielding the aeronautical fee.[62] With residual pricing, all gains accrue each year to aeronautical users; but it also means that all financial risk of operating the airport is shifted to the aeronautical users. The airport company bears little, if any financial risk. Residual pricing has been commonly used at a number of U.S. airports.

Residual pricing has been criticised for creating weak incentives for cost efficiency. Airport operators with residual pricing agreements or regulation know that cost overruns are simply added to the cost base and that airport users will be required to pay for them. Further, such airport operators have weakened incentives to develop non-aeronautical revenues or undertake management or operational innovation. Efforts to develop new retail revenues, for example, do not result in a higher return for the airport; merely they result in an offsetting reduction in aeronautical charges, removing the incentive to develop non-aeronautical revenues.

[60] There is some subtlety here as to whether total non-aeronautical revenues are used or only net earnings from non-aeronautical services. If all the costs of providing non-aeronautical revenues are included in total airport costs, then the total revenue from non-aeronautical services are used. In some cases, airports do not include some of the costs of providing non-aeronautical services in their total airport cost, in which case only net earnings from non-aeronautical services are used in the single till approach. For example, if the airport operates its own retail outlets, gross retail revenues need to be netted from cost of goods sold and retail outlet labour costs (if retail outlet employees are not employees of the airport operator).

[61] However, the single till also means that losses in the non-aeronautical activities are borne by the aeronautical users.

[62] The division of residual costs by the number of units of activity by the air carriers has some challenges. Because landing fees are typically determined by the weight of the aircraft, some airports would calculate the expected number of tonnes landed, rather than the number of landings. However, because landing fee schedules typically have different charges on aircraft of different weight classes, the computation requires some care, and must estimate tonnes landed by weight class. Further, most airports use both terminal fees and landing fees, requiring additional analysis before the final fee schedule is established.

Dual or Multi-Till

Under the dual till approach, the costs of aeronautical services are not cross-subsidised by non-aeronautical profits. Essentially, aeronautical tariffs (or the aeronautical price cap) are set to completely recover the costs of providing aeronautical services. In its purest form, aeronautical users receive no benefit from non-aeronautical revenues, nor do they bear any risk from non-aeronautical activities.

This retains incentives for the airport operator to develop commercial activities at the airport, and is more consistent with economic principles in congested conditions. (With a single till, a congested airport with high non-aeronautical revenues can paradoxically end up with very low landing fees.) This model tends not to be favoured by the airlines as it generally results in higher aeronautical charges.

Hybrid Till

Hybrid till is a form of dual till where a specified fraction of non-aeronautical revenues, or only certain non-aeronautical revenue streams, are used to subsidise aeronautical revenues.

The Debate

Almost all airline users support the use of single till at regulated airports, as has IATA.[63] The arguments put forward in favour of single till are:

- Single till results in lower aeronautical charges due to the contribution from non-aeronautical revenues. Lower charges, as well as benefiting airlines and ultimately passengers, are claimed to incentivise the airport to lower its costs, although the logic of this is not apparent.
- It ensures that any supposed monopoly rents or windfall profits that the airport achieves from non-aeronautical services are transferred to users (airlines in the first instance, and ultimately passengers).
- Airlines contribute to the generation of non-aeronautical revenues – without their air services, there would be no passenger spending on retail, food & beverage, parking, etc. Therefore, airlines should benefit from these revenues.
- Single till is easier and less costly to apply, as there are no complex or contentious cost allocation issues (between aeronautical and non-aeronautical activities) to consider.

The main arguments put forward in favour of dual till (or against single till) are:

- Regulation should be applied only to those areas of airport activity where there is the potential for excess market power. This is not the case in regards to non-aeronautical revenues, where airport can face competition from a wide of alternative providers (e.g., “high street” shops for retail, third party parking providers near airports, etc.).

[63] It has been claimed that ICAO supports the use of single till. However, this is no longer the case, and the organisation is neutral on this issue. In ICAO’s ninth edition of “Policies on Charges for Airports and Air Navigation Services”, it states that: “In determining the cost basis for airport charges...[the] cost to be allocated is the full cost of providing the airport and its essential ancillary services, including appropriate amounts for cost of capital and depreciation of assets, as well as the costs of maintenance, operation, management and administration. Consistent with the form of economic oversight adopted, these costs **may** be offset by non-aeronautical revenues.”, page II-1.

- Niemeier (2009) argues that it is passenger spending and not airlines that create non-aeronautical revenues and therefore the airlines have no automatic entitlement to benefit from these revenues.[64] Furthermore, while dual till may result in higher aeronautical charges, regulation should not try to regulate profits directly as this reduces incentives for cost savings from which the airlines also gain, especially in the long run.

- Starkie (2001) argues that dual till significantly reduces the likelihood that airports will exploit any market power they may have, as airports will be incentivised to keep aeronautical charges lower in order to maximise unregulated commercial revenues (airports as two-sided platforms – see Section 2.4).[65]

- Dual till pricing increases incentives to invest in airport facilities, thereby encouraging investment and increasing capacity. Under single till, any gains in non-aeronautical revenues flow through to reductions in aeronautical charges. Therefore, airports have little incentive to invest in capacity either to increase traffic (as aeronautical investment would do) or increase non-aeronautical revenues (through investment in commercial capacity). Dual till avoids this distortion. However, the UK Competition Commission considered the application of dual till for regulated London airports (Heathrow, Gatwick and Stansted), and determined that there was no evidence of under-investment that resulted due to the single till method applied to the London airports. The Commission also stated that it was unclear whether dual till would lead to better aeronautical investment in the future. In their view, dual till could be inferior to single till, unduly favouring commercial investment where financial constraints exist.[66] Starkie (2002) criticised the logic of the Competition Commission decision, as well as its failure to fully consider congestion issues at the London airports (see below).[67]

- Another limitation of the single till approach is that aeronautical charges are not set according to economic principles when there are congested conditions. This can increase congestion at an airport that is nearing capacity. Since aeronautical fees are reduced by net non-aeronautical revenues, the prices charged to airline users for landing and the use of the terminal are lower than their economic and social costs. Starkie and Yarrow (2001) argue that single till exacerbates this problem of stimulating more congestion - as greater numbers of passengers are squeezed into congested facilities, commercial revenues will rise, resulting in further declines in aeronautical fees (all else being equal), which encourages more airline service to the now lower priced airport.[68] So under conditions whereby rising charges should be required in order to ration capacity and incentivise investment, the exact opposite occurs. Thus, dual till is preferable at airports under conditions of congestion. Yang and Zhang (2011) also argues that dual till regulation yields higher welfare at significantly congested airports.[69]

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[64] Niemeier, H.M., "Regulation of Large Airports", OECD International Transport Forum, 2009.

[65] Starkie, D., "Reforming UK Airport Regulation", Journal of Transport Economics and Policy 35, 2001, pages 119-135.

[66] Competition Commission, "BAA plc: A report on the economic regulation of the London airports companies (Heathrow Airport Ltd, Gatwick Airport Ltd and Stansted Airport Ltd)", November 2002.

[67] Starkie, D., "A critique of the single till", 2008, in Starkie, D., Aviation Markets, Ashgate, Aldershot, pages 123-130.

[68] Starkie, D. and G. Yarrow, "The Single Till Approach to the Price Regulation of Airports", paper commissioned by the UK Civil Aviation Authority, London, 2000.

[69] Yang, H. and A. Zhang, "Price-cap regulation of congested airports", Journal of Regulatory Economics 39, 2011, pages 293-312.

- The additional income from non-aeronautical revenue is essential for favourable credit ratings and the airport's ability to attract investors, private or public (and the associated financing of large infrastructure projects). Without control over these revenues, airports would be considered less attractive investments, reducing their ability to obtain low cost financing. Ultimately, this benefits airlines, as it reduces the costs of capital improvements.
- While single till may seem simpler to apply, this is not always the case. Many airports now engage in auxiliary activities not generally used by their air passengers – e.g., the development of office facilities on airport land, or providing services to or making investments in other airports (such as airport management). In these cases there is greater difficulty justifying a benefit to airlines.

Empirical Evidence

Some empirical research has examined the issue of single vs. dual till regulation with mixed results:

- Bel and Fageda (2010), based on airport charges at 100 airports in Europe, found no statistical difference between the single till and dual till on the overall level of charges.[70]
- Bilotkach (2012) conducted similar analysis on 61 European airports over an 18 year period, and found that single till regulation resulted in lower charges than dual till.
- Adler and Liebert (2012) examined the cost efficiency and charges of European and Australian airports over a 10 year period.[71] The analysis found that dual till produced greater cost efficiencies than single till and that dual till results in higher charges at congested airport (than single till) but lower charges at uncongested airports, the latter result supporting the arguments of Starkie (2001) regarding dual till restraining market power.

The issue of single till vs. dual till continues to generate considerable debate. Despite strong argument in favour of dual till, single till is still the most common regulatory format used, although there are a considerable number of countries now regulating on a dual till basis (e.g., Germany, Austria, Denmark and Italy).

[70] Bel, G. and X. Fageda, "Privatization, regulation and airport pricing: an empirical analysis for Europe", Journal of Regulatory Economics 37 (2), 2010, pages 142-161.

[71] Adler, N. and V. Liebert, "Joint Impact of Competition, Ownership Form and Economic Regulation on Airport Performance and Pricing", unpublished research paper.

5. Global Experience of Airport Economic Regulation

5.1 European Union

In order to establish "a common framework regulating the essential features of airport charges and the way they are set", the European Union issued Directive 2009/12/EC.[86] The Directive does not seek to impose a like regulatory regime on all Member States, but instead seeks to ensure common principles underlie airport charges throughout the Community.

The Directive specifies that charges should be non-discriminatory, transparent, and cost-related, and that regular (at least yearly) consultation with users be undertaken. In the case where multi-year agreements exist between airport and users, the consultation period shall be determined by agreement. The Directive specifies that changes to rates or rate structure should be agreed to by airport and users wherever possible. The Directive also calls for the nomination or establishment of an independent supervisory authority in order to ensure the correct application of the Directive, to deal with appeals by either party, and to review changes to charges. It allows for the authority to play a stronger role than overseeing consultation and remedy, including determination or approval of charges.

The principle of non-discrimination does not preclude the "modulation of airport charges for issues of public and general interest, including environmental issues. The criteria for such a modulation shall be relevant, objective and transparent."[87]

The transparency principle (Article 7) specifies information to be provided by the airport. It includes the services/infrastructure provided in return for airport charges, methodology used to determine charges, the overall cost structure, revenues by charge and cost of services covered by them, public financing, forecasts, actual use of infrastructure and predicted outcome of major proposed investments.

Charges refer only to those that "are related to landing, take-off, lighting and parking of aircraft, and process of passenger and freight."[88] It does not apply to air navigation charges. Charges may be differentiated for particular services, terminals or parts of terminals (Article 10).

The Directive allows airports and users to reach a service level agreement, but does not require it (Article 9).

The Directive applies to all airports with annual traffic volumes in excess of five million and, in the case where a nation has no airport with that volume, the airport which has the highest volume.

[86] European Union, "Directive 2009/12/EC of The European Parliament and of the Council of 11 March 2009 on Airport Charges", preamble, paragraph (2).

[87] European Union, "Directive 2009/12/EC of The European Parliament and of the Council of 11 March 2009 on Airport Charges", Article 3.

[88] European Union, "Directive 2009/12/EC of The European Parliament and of the Council of 11 March 2009 on Airport Charges", preamble, paragraph (4).

The Directive is consistent with the recommendations of the International Civil Aviation Organization (ICAO). In fact, the Directive notes the ICAO Councils policy on airport charges include "the principles of cost-relatedness, non-discrimination and an independent mechanism for economic regulation of airports."[89]

The Directive seeks to ensure that a set of principles underlies the regulatory approach of all Member States. These principles are consistent with ICAO and with the approach already applied in many Member States. It does not seek to impose any particular regulatory regime, which allows nations to continue existing approaches, as long as the fundamental principles are abided by.

A key element in the Directive is the call for all Member States to nominate or establish an independent authority to supervise the correct application of the measures in the Directive. This body must be "legally distinct from and functionally independent of any airport managing body and air carrier."[90]

One potential issue is the blanket application to any airport with over 5 million passengers. The Directive does not consider whether or not an airport has market power or is in a competitive environment based on its location and market. Thus the provisions may be imposed on an airport for no economically sound reason, given that regulation is normally only applied where there is a lack of competition and exercise of market power.

Another potential issue is that this is a Directive, not a Regulation. This provides more leeway for interpretation in how it is implemented by individual Member States. If States differ in their implementation of the Directive, the objective of a common framework may be compromised.

5.2 United Kingdom

Background

The UK was the first country to privatise its major airports and the first to regulate airport pricing using the price cap regulatory format. The basis for these innovations was the Airports Act of 1986.

Under the 1986 Act, economic regulation can be applied to airports in the UK whose turnover exceeds £1 million for two years (unless directly managed by the government). Any "qualifying" airport meeting this criteria may be "designated" for more intrusive economic regulation where it is found to have market power and be exploiting that power (whether through pricing, service quality or discrimination), and where existing UK or EU competition law is insufficient to address any such market abuses.[91]

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[89] European Union, "Directive 2009/12/EC of The European Parliament and of the Council of 11 March 2009 on Airport Charges", preamble, paragraph (9).

[90] European Union, "Directive 2009/12/EC of The European Parliament and of the Council of 11 March 2009 on Airport Charges", Article 11, paragraph 3.

[91] Qualifying airports can only levy airport charges with the permission of the CAA. The CAA cannot refuse an application for permission nor does the level of charges require CAA approval. However, if the CAA establishes that the airport is abusing its market power or applying unreasonable discrimination, the CAA can revoke the airport's licence to levy airport charges, apply additional conditions or recommend designating the airport for economic regulation (the designation decision is made by the Secretary of State).

Only four airports in the UK were originally "designated" airports and, as such, were subject to price regulation. These airports were the three large London airports operated, originally, by the British Airports Authority Limited (BAA) - Heathrow, Gatwick and Stansted – and Manchester Airport.[92] Effectively in 2009, Manchester Airport was de-designated for regulatory purposes, following a consultation process.

It should be noted that non-designated airports are subject to a credible threat of reregulation in case they abuse their market power. In 1993 it was discussed whether the three Scottish BAA airports (Aberdeen, Edinburgh and Glasgow) should be regulated or not[93] and in 2000, the airport of Luton was criticised by the UK airline EasyJet for abusing its dominant market position.[94] In both cases the CAA decided against designating the airports for regulation and relied instead successfully on the threat of regulation.[95]

Regulatory Format

Airport price controls in the UK are administered by the Economic Regulation Group of the UK Civil Aviation Authority (CAA) in conjunction with the Competition Commission (formerly the Monopolies and Mergers Commission). The CAA sets "conditions" on airport charges generally in the form of a price cap. The price caps are re-set every five years (a five year or quinquennennial review). Before an airport's price cap is modified, the CAA refers that matter to the Competition Commission for a review. The CAA's referral includes its initial views on the future price controls following a review and consultation process. The Competition Commission conducts an inquiry and makes a recommendation to the CAA. Then the CAA reviews the recommendation, conducts its own assessment and releases a proposal for consultation before making a final decision. The CAA is not required to accept any of the Competition Commission's recommendations. Airports do not have any rights of appeal, but may request a judicial review.

The price cap formula uses the RPI +/- X format using a single till formulation and is applied to revenue per passenger.[96] The determination of the X is based on a detailed account by account assessment (the CAA refers to this as a "building block" approach) of the airport's costs and revenues, forecast traffic levels, capital structure and investment needs, in combination with a consultation process involving airport users and other stakeholders. In the last few reviews, the regulatory structure has incorporated capital investment triggers so that the cost of certain capital projects can only be included in the price cap once there is a demonstrated need (e.g., traffic hits specified levels triggering the need for expansion) or where the airport has reached specified completion levels for these projects. As described in Section 4.4, the CAA has introduced a service quality regime at Gatwick and Heathrow whereby airlines receive a rebate if the airports do not meet service quality targets in areas such as security screening queue times, passenger seating, cleanliness, way-finding, flight information, baggage reclaim, transfer/transit times, etc.

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[92] The other BAA operated airports were not designated for regulation. Originally, this included Aberdeen, Glasgow International, Glasgow Preswick (since sold by BAA in 1992) Edinburgh Airport (sold in April 2012) and Southampton Airport. In October 2012, the company changed its name to Heathrow Airport Holdings Limited.

[93] Starkie, D., "Regulating Airports and Airlines", in M.E. Beesley (Hrsg.), Regulating Utilities: The Way Forward, Institute of Economic Affairs, London, 1994, pages 37-55.

[94] UK Civil Aviation Authority, easyJet Application for Designation of Luton Airport, London.

[95] Wolf, H., Privatisierung im Flughafensektor. Eine ordnungspolitische Analyse, Berlin, Heidelberg, New York, Hongkong; Springer, 2003.

[96] Specifically, residual revenue after allowing for the contribution commercial and other non-regulated revenues.

While early price caps generally had negative X's, reflecting requirements for greater efficiency, some of the more recent price caps have been above the rate of inflation, particularly in regards to Heathrow, reflecting capital requirements. For example, the price caps for the most recent quinquennial period, 2008-2013 (or 2009 to 2014 in the case of Stansted), were set as follows:[97]

- Heathrow: RPI + 7.5%
- Gatwick: RPI + 2.0%
- Stansted: RPI + 0% (2009-11), increasing to RPI+1.63% (2011 going forward).

Prior to the review for the 2008-13 price caps, the CAA reviewed the designation of Stansted and Manchester airports.[98] The CAA concluded that both airports should be de-designated for regulation on the basis that neither airport held significant market power and that existing UK and EU competition law was sufficient to correct potential abuses. They also concluded that price regulation may be distorting airport incentives by encouraging investment that is both too large and too early. Manchester Airport was de-designated, but the UK Department for Transport decided to continue regulation of Stansted Airport.

In previous reviews, the CAA has also explored the option of a dual till regulatory format.[99] The CAA found some merit in this format, particularly in regards to addressing congestion issues at Heathrow. However, such a change to the regulation was opposed by many airlines and by the Competition Commission, and so the CAA has continued to use single till.

BAA's Scottish airports at Glasgow, Edinburgh (prior to its 2012 sale) and Aberdeen were not designated for regulation, but are qualifying airports which could be subject to regulation if the CAA views they are exploiting their market power. However, BAA voluntarily capped revenue per passenger at Glasgow, Edinburgh (before its sale) and Aberdeen. This may be due in part to threat of designation by the UK government, as well as enhancing the commercial relationship between these airports and their airline customers. This suggests that the credible threat of regulation (credible because legislative authority was in place to implement regulation) played a part in constraining the private airport operator's behaviour, without the need to apply direct regulation.

Conclusions

The 2008-13 quinquennial period was the fifth such regulatory period since price cap regulation was introduced for UK airports. The review process for the sixth regulatory period (covering 2014-19) started in 2012. The regulatory format used in the UK has been criticised for its complexity: the reviews for each regulatory period have recently taken over two years to complete, which is both costly and time consuming. It is further complicated by the scope of CAA powers and their coordination with the UK Competition Commission and other government departments (e.g., the Secretary of State, not the CAA, ultimately decides which airports are designated for regulation).

[97] In 2011, the CAA extended the price caps for Heathrow and Gatwick to 2014.

[98] UK CAA, "De-designation of Manchester and Stansted airports: The CAA's advice to the Secretary of State", July 2007.

[99] UK CAA, "Economic Regulation of BAA London Airports (Heathrow, Gatwick and Stansted) 2003 – 2008" CAA Decision, February 2003.

Following various reviews, the UK government has put forward a new Civil Aviation Bill which would modify the role and powers of the CAA:

- Replace the CAA's current multiple priorities with a primary focus on furthering passengers' interests.
- The CAA would have the power to designate airports, subject to specified criteria where the benefits of regulation outweigh the costs.
- A more flexible approach to licencing and regulation (e.g., removal of requirement for fixed five year periods).
- Removal of the referral of decisions to the Competition Commission.
- Power to apply financial penalties for up to 10% of airport turnover.
- A tiered approach to licencing and regulation based on airport size and market power, consistent with the EU Airport Charges Directive. Although not finalised, it is proposed that airports in Tier 1 would be those with substantial market power where regulatory intervention is warranted (such as Heathrow, Gatwick and Stansted currently), those in Tier 2 will be all other airports meeting the five million passengers per year threshold in the Airport Charges Directive (ACD), and Tier 3 would be airports with between one and five million annual passengers subject to existing conditions.[100]

5.3 Denmark

Background

Historically, the Copenhagen airports (both the primary airport at Katsrup and the secondary airport at Roskilde) were owned by the government and operated by the public sector Copenhagen Airports Authority under the Danish Ministry of Transport. In 1990, Copenhagen Airport A/S, a public company, took over ownership and operations at both Copenhagen airports. The Danish Government sold 25% of Copenhagen Airports A/S to private investors in 1994, another 24% in 1996 and a further 17% in 2000.[101] When the third tranche was floated in 2000, a formal price cap was introduced. As the government could no longer control the company, price control via regulation was considered to be required, both to protect consumers and to provide more certainty to potential investors about airport charges in the future.

The regulatory framework that was established in 2000 was amended in January 2003. The new framework was made provisional until 2008 at which time it was reviewed and amended. The current framework was implemented on 19 December 2008.

[100] House of Commons Library Standard Note SN5333, Aviation: airport regulation,

[101] As of December 31, 2011, the Danish state held 39.2% of the shares in Copenhagen Airports A/S.

5.15 ICAO's Stance on Airport Pricing

The International Civil Aviation Organization (ICAO) is a United Nations agency responsible for promoting the safe and orderly development of international civil aviation throughout the world. It sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection.

ICAO's recommended policies for airport pricing are set out in "ICAO's Policies on Charges for Airports and Air Navigation Services", Document 9082, Ninth Edition, 2012.[135] The document does not recommend that economic regulation of airports be always applied nor does it specify a particular format of regulation. It does state that any such economic regulation (referred to as economic oversight) should match the specific circumstances in each country state, including degree of competition, balance of cost and benefits of oversight and institutional framework, and should be clearly separated from the operation and provision of airport (and air navigation) services. This economic oversight should seek to minimise the risk of market power abuses, ensure transparent and non-discriminatory pricing, encourage cost-effective investment, and balance the interests of passengers and other users with those of the airport (or air navigation provider).

In regards to the setting of airport charges, Document 9082 encourages States to incorporate in their national legislation the four key charging principles of: non-discrimination, cost-relatedness, transparency, and consultation.[136] However, it is neutral as to whether non-aeronautical revenues should subsidize aeronautical charges:

> "The cost to be allocated is the full cost of providing the airport and its essential ancillary services, including appropriate amounts for cost of capital and depreciation of assets, as well as the costs of maintenance, operation, management and administration. Consistent with the form of economic oversight adopted, **these costs may be offset by non-aeronautical revenues.**" (Page II-1; emphasis added).

In other words, ICAO does not provide a recommendation for the application of single or dual till pricing.

5.16 Summary

Figure 5-1 summarises the approaches to airport regulation applied around the world. It includes the countries covered in the previous sections as well as a number of other countries. It shows that price cap regulation has become fairly prevalent for the economic regulation of airports, although rate of return / cost-based approaches are still fairly common. The growth of price cap regulation is associated with the privatisation or commercialisation of airports in many parts of the world.

There is a considerable mix of single and dual till formats, as well as the use of hybrid approaches, although the majority of price cap regulation employs single till.

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[135] http://www.icao.int/publications/Documents/9082_9ed_en.pdf

[136] Non-discrimination in this case relates to the principles of applying the same charges to home and foreign carriers for the same type of service. It does not rule out charges that vary by time of day, aircraft type or noise profile. However, charges offered for the purpose of attracting or retaining new air services should only be offered on a temporary basis.

Figure 5-1: Regulation of Airport Around the World

Country/Airport	Regulation method	Accounting method
Canada	Contracts (cost-plus method)	N/A
United States	Contracts (cost-plus or rate-of-return method)	Single or dual till
Austria	Price cap (CPI-X)	Dual till
Denmark Copenhagen Airport	Mixed Negotiation and Price cap (CPI-X)	Regulatory delays observed to delay investment
Italy	Cost-plus method	Dual till
Poland	Not regulated	N/A
Portugal	Price cap (revenue per passenger)	Single till
Germany Frankfurt Airport Hamburg Airport	Contracts (or cost-plus method) Hybrid price cap (CPI-X with a sliding scale)	Dual till Dual till
United Kingdom Heathrow/Gatwick/Stansted	Price cap (RPI-X)	Single till
Ireland	Price cap (CPI-X)	Single till
Switzerland (Zurich and Geneva)	Negotiation Regulation of fees based on airport benchmarking (if negotiation fails)	Hybrid single till
The Netherlands	Cost-plus method	Dual till
France	Hybrid price cap	Adjusted single till
Russia	No set regulation method (government approval required for aeronautical charges)	N/A
Australia Sydney Airport	Price monitoring (trigger regulation) Price cap for regional air services Trigger regulation for other air services	N/A Dual till
New Zealand	Price monitoring (trigger regulation)	N/A
South Africa	Price cap (CPI-X+K)	Single till
Singapore	Price cap	Single till
China	Price-cap (based on airport size)	Single till
Malaysia	No set regulation method (aeronautical and non-aeronautical fees are regulated)	N/A
India New Delhi international Airport	Price cap (Inflation-X) Price cap (Inflation-X)	Single till Hybrid single till
Brazil	Price cap (CPI-X)	Hybrid single till
Argentina	Price cap (CPI-X)	Single till
Chile	Price cap	Dual till
Mexico	Price cap (revenue per passenger)	Dual till

Appendix B: Glossary of Terms

Term	Definition
Aerodrome	An area on land or water intended to be used for the arrival, departure and surface movement of aircraft.
Aeronautical fees	Fees charged by airports relating to the operation of aircraft (i.e. aircraft take-off or landing charges, lighting charges, security charges, cargo charges, etc.).
Air carrier	An air transport provider offering or operating an international or domestic air service.
Averch-Johnson effect.	A theoretical argument that firms regulated to a specific rate of return on capital have an incentive to overinvest in order to earn the highest possible dollar value of return on their capital asset base. Also known as the Averch-Johnson effect.
Compensatory pricing	A pricing method used by airports under which airlines are responsible for paying any costs associated with the provision of aeronautical services and facilities by an airport (runways, aprons, taxiways, terminals, etc.).
Countervailing power	The ability of the buyer to counteract exercise of market power by the seller.
Dual till	A method of airport regulation whereby aeronautical fees are set to completely recover the cost of providing aeronautical services. Non-aeronautical revenues are not used to offset the cost of providing aeronautical services.
Hybrid till	A method of airport regulation whereby aeronautical fees are partially subsidised by commercial or non-aeronautical revenues in order to keep regulated tariffs lower than would otherwise be the case.
Marginal Cost	Marginal cost is the change in total cost that arises when the quantity produced changes by one unit.
Non-aeronautical fees	Fees charged by airports that are not related to the operation of aircraft
Productivity factor or "X"	A productivity adjustment term incorporating all factors other than inflation that are expected to affect the company's average cost (cost per unit of output) year over year.
Residual pricing	A pricing method used by airports under which airlines are responsible for paying any residual cost of airport services after non-aeronautical revenues are subtracted from the cost of providing aeronautical and non-aeronautical services.
Single till	A method of airport regulation whereby aeronautical fees are set after reducing the total airport costs by net earnings from non-aeronautical revenues. The non-aeronautical revenues subsidise the provision of aeronautical services by the airport.
Sliding-scale	A variant of price cap regulation whereby efficiency gains of the firm are shared between the firm and its customers. If growth in passenger traffic exceeds expectations, permitted growth in airport charges will be lowered.
Tariff	A specific price charged for an airport service. Also referred to as rate, charge, fee or price.
Total Factor Productivity (TFP)	The proportion of output not explained by the amount of inputs used. TFP measures the intensity and efficiency of input usage.
Work Load Unit (WLU)	A measure of airport output. The relationship adopted by ICAO is that one WLU is equivalent to 1 passenger or 100 kilograms of cargo.

Appendix C: Abbreviations

AAI	Airport Authority of India
ACAA	Austrian Civil Aviation Authority
ACCC	Australian Consumer and Competition Commission
ACI	Airports Council International
AERA	Airport Economic Regulatory Authority of India
ANAC	National Civil Aviation Agency of Brazil
ANSP	Air Navigation Service Provider
CAA	Civil Aviation Authority
CAPM	Capital Asset Pricing Model
CPI	Consumer Price Index
DAA	Dublin Airport Authority
FAA	Federal Aviation Administration
FOA	Final Offer Arbitration
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICC	Interstate Commerce Commission
NCC	National Competition Council
NPV	Net Present Value
PPI	Producer Price Index
RAB	Regulatory Asset Base
RPI	Retail Price Index
WACC	Weighted Average Cost of Capital