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REGIONAL AVIATION COMPETITIVENESS

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PREFACE

Regional airlines can be a lifeline in remote parts of Australia.

Competitiveness is an important issue in the regional aviation industry. Although regional aviation has undergone deregulation in most jurisdictions over the last decade, many single-operator routes still exist. The impact of deregulation on air services in regional Australia is an issue of interest to all levels of Government, to the passengers who use regional airlines, and to the regional airlines themselves.

This study was completed for the Aviation Working Group of the Standing Committee on Transport (SCOT) by Emma Ferguson (team leader), Tammy Braybrook and Shebnem Pollack. The team acknowledges the contribution of David Smith. The assistance of Aviation Working Group members, Avstats, the Regional Airlines Association of Australia, and many of the regional airlines is also greatly appreciated.

Joe Motha
Deputy Executive Director

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Canberra
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ABBREVIATIONS

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission

SUMMARY

This study sets out to answer the question '*how competitive is the regional aviation industry?*' posed by the Aviation Working Group of the Standing Committee on Transport (SCOT). The Working Group identified broad areas of interest in the regional aviation industry—the level of air services to regional areas, the monopolistic behaviour of airline operators, the cost structure of air fares, and the impact of route-specific factors on service operators. A structure-conduct-performance framework is used to examine the competitiveness of regional airlines.

The basis for questioning the competitiveness of regional airlines is twofold.

Firstly, Australia is highly dependent on the efficient operation of regional aviation services. Over the ten years to 1997–98, regional airline passenger movements grew at an annual rate of 13.2 per cent (Creedy 1999b p. 29) and these airlines now carry 15 per cent of all domestic passengers (Avstats 1999a). These services can provide a lifeline to regional communities, allowing for the transportation of residents and visitors and providing access for goods and services to regional markets. As such, an efficient regional aviation industry is important.

Secondly, regional aviation has undergone deregulation to varying levels in most States over the last decade. The objectives of deregulation, in part, were to remove barriers to efficient industry operation and increase industry competitiveness. However, there remains a high proportion of regional routes operated by only one service provider.

THE INDUSTRY

Regional airlines service the market segment between those of the two domestic airlines (Ansett Australia and Qantas Airways) and the charter operators. By this definition, airlines operating regular public transport (RPT) services within Australia, other than Qantas and Ansett, are considered to be regional airlines. All routes serviced by these airlines on a RPT basis, typically linking regional centres with capital cities, are considered regional routes. These routes serviced 206 airfields in 1997—the most recent calendar year for which good data are available.

In the same year, regional airlines moved an estimated 5.7 million people on a traffic on board by stage (TOBS) basis, 5162 tonnes of freight and 1728 tonnes

of mail. In carrying out this task, approximately 286 aircraft were used and an estimated 2700 people directly employed. Interestingly, despite Australia's size, more than half of the flight sectors offered covered distances of less than 300 km. Around 80 percent of these shorter routes were also serviced by land-based transport.

The regional aviation industry in Australia typically comprises between 40 and 50 airlines of various sizes—there were 46 regional airlines operating in 1997. There is a relatively high turnover or 'churn' rate within the industry. This is driven by both business failure and company merger/takeover, but also, importantly, through business decisions to move in and out of supplying RPT services while maintaining operations in other sectors of the aviation industry. Even in the case of the long-term and stable industry participants, there is a process of ongoing change in terms of the aircraft used and routes serviced, which may be indicators of the presence of some competitive force.

The domestic operators, Qantas and Ansett, have a strong presence in the regional airline market. Although, in 1997, they operated services directly on only 15 per cent of regional routes, airlines with which they have an alliance of some form operated on 83 per cent of regional routes (80 per cent of routes were operated *only* by airlines with alliances with Ansett or Qantas). Just over half of the regional airlines had an alliance with one of the domestic airlines, yet these airlines carried 97 per cent of the regional passengers. The 21 non-aligned airlines carried only 3 per cent of regional traffic. It appears that the duopoly structure of the domestic aviation market is strongly influencing the regional industry.

The lack of strong competitive pressures is most apparent at the individual route level. An examination of routes highlighted that around two-thirds of route sectors support only a single operator and the remainder, although being serviced by multiple operators (typically two airlines), tend to have one dominant firm. This structure is supported by the spatial spread of the industry. No regional airline operates in all States and Territories, and due to the networked nature of the industry, Australian air routes have been split between operators along geographical lines.

INDUSTRY BEHAVIOUR

The highly concentrated and strongly oligopolistic nature of the regional aviation industry does not necessarily mean that air passengers will be facing higher prices and experiencing lower levels of service than would be achieved in a strongly competitive market. Contestability theory indicates that, under certain conditions, even a highly concentrated market can result in an optimal outcome.

The threat of entry can simulate the features of a market experiencing strong competition. The industry has certainly shown a turnover of participants, but this does not fully exclude the possibility of entry barriers, which may limit the contestability of the market. Indeed, evidence suggests that there are barriers to entry, which, although not so high as to prohibit new entry, certainly favours entry by companies with aviation industry experience.

The risk faced by a new airline, difficulties encountered in raising necessary operating finance, and importantly, the low level of passenger demand on many regional routes, are hurdles for potential entrants. The strategic barriers set in place by industry incumbents may be more restrictive—the importance of enabling customers to both recognise the airline and easily place reservations can act to enforce the oligopolistic industry structure or give those within this framework a clear advantage. The presence of barriers to entry and exit from the industry indicates that incumbent operators do have some level of market power that they can exert to reap higher returns on their investment.

Demand and supply factors provide some control over the extent to which operators can generate profits and also influence the ability of new operators to enter the industry. The demand for air services is driven by:

- the quality of service offered;
- the air fare compared with costs of alternative modes of travel; and
- characteristics of the travellers and routes.

Characteristics of the travellers and routes encompass many factors, but three stand out as being of particular importance to airlines. First, the split between business and leisure passengers can impact heavily on average fare, as business travellers tend to travel on the more flexible full economy fare tickets while leisure travellers seek out restrictive discount tickets. Around 65 per cent of regional airline passengers are business travellers and 77 per cent of regional routes have a discount fare available—typically a 45 per cent discount on the full fare. Second, the cyclical demand for air services—on a daily, weekly and annual basis—is another important consideration in airline operations. Third, demand for air travel is also heavily influenced by regional and national economic trends.

Airlines are able to control the service quality-price trade-off, but their ability to influence prices relative to other modes of transport is limited by cost structures. The characteristics of travellers, and of the particular routes, cannot be influenced by airlines to any great extent; instead they use these characteristics as a basis for supply decisions.

Supply and demand for air services are clearly interdependent. Demand must be matched with the supply of air services, over which airlines have much more control. The supply of air services depends on the costs of the input factors (labour, fuel, aircraft, finance, etc.) and a number of relationships between costs and operations (such as aircraft size, route networks and distance flown). Airlines use the factors they know about and those they can control in supply and demand to determine what services to provide and how much to charge for those services.

MEASURING COMPETITIVENESS

Given industry structure and conduct, how do the airlines perform in terms of competitiveness? The econometric modelling undertaken in this study examines the relative prices (air fares) between services operating on routes with and without direct competition from other air services using a model which relates the fare to distance, route density, average aircraft size and competition.

As average fare data are unavailable, both the full economy fare and the best discount fare are used to provide an upper and lower bound to the possible range of the average fare. Modelling results indicated that the level of competition was insignificant in determining the air fare. That is, air fares are not significantly different between routes with competitors and those with a single operator. The air fare is proportional to distance in the case of both fare types. Route density (the number of passengers on the route) and the average aircraft size are also important in describing air fares, but their close relationship to each other limited the usefulness of the results of the model.

Operations in individual States were also examined where possible. These produced findings consistent with those for all of Australia.

The competitive pressures on regional airlines from alternate modes of transport were also examined, but the presence or absence of alternate transport means was found to have no discernible impact on the setting of air fares.

The modelling indicates that the relative price is important in discerning if all routes are providing super-normal profits, not the overall price level. The ability to examine overall price level is inhibited by data deficiencies relating to the actual costs faced by individual airlines and the actual average per-passenger revenue they receive. Some simple, broad-brush analysis comparing the full economy revenue per-passenger and the best discount revenue per-passenger with a range of estimated costs of providing services, however, gives some insight into the price level for regional air services.

An examination of full economy fares showed that per-passenger revenues, for the most part, were slightly above the estimated cost range. The case of the best discount fares showed the majority of routes with per-passenger revenues lying within the estimated cost range. These results indicate that regional airline profits are unlikely to be excessive.

In summary, although the modelling indicated no difference in the relative price between routes with and without competition, the strongly oligopolistic structure of the industry, the limited pool of entrants and the existence of barriers to entry show the potential for uncompetitive pricing practices. A simple comparison of per-passenger revenue with estimated costs shows that such practices are unlikely to be widespread within the industry.

CHAPTER 1 INTRODUCTION

Regional aviation is an essential transport service in Australia, given the distances between population centres and between markets. The services of regional airlines and regional airports contribute to the continued viability of smaller rural centres through transporting residents, business people and tourists, enabling products and services to access markets, and by providing employment. The alternative for the more remote communities would be poor, or seasonally unreliable, land transport systems or sea transport depending on location.

This study focuses on regional airlines and, in particular, provides an assessment of their competitiveness. Competitiveness is an important issue considering that, although regional aviation has undergone deregulation in most jurisdictions over the last decade, many single operator routes still exist. The impact of deregulation on air services to regional Australia is an issue of interest to all levels of Government.

DEFINITION OF REGIONAL AIRLINES

The Australian regional aviation industry encompasses the activities of all regional airlines and the regional (non-capital city) airports these serve. Australian regional airlines traditionally service the market segment between those of the two domestic airlines (Ansett Australia and Qantas Airways) and the charter operators. The small numbers of services by regional airlines to overseas destinations, such as the Flight West Cairns–Port Moresby route, are excluded from examination.

The Commonwealth Department of Transport and Regional Services (DoTRS) collects data concerning aviation activity. It defines regional airlines as those operating regular public transport services with fleets containing exclusively low-capacity aircraft (up to 38 seats or with a 4200 kilogram or less payload). In spite of this definition, a number of airlines which are now operating larger capacity aircraft (BAe 146, Fokker F50/F28, DHC-8) on routes with heavier traffic are commonly regarded as regional airlines (Avstats 1999a).

The definition of regional aviation is, of course, somewhat arbitrary, and a degree of blurring occurs at both the upper and lower boundaries. A case in point is the Canberra–Sydney route which is served by four airlines: Qantas (Boeing jets); Ansett (Boeing/Airbus jets); Eastern Australia Airlines (De

Havilland Dash 8 turboprops); and Kendell Airlines (SAAB 340 turboprops). Eastern Australia and Kendell are defined as regional airlines, and thus the services they provide between Canberra and Sydney are regarded as regional aviation, whereas the service on the same route provided by Qantas and Ansett jets is considered as ‘domestic’ or ‘trunk’ aviation.

At the other end of the spectrum, a thin route which might appear to be serviced by only one regional airline operator may in fact have a fairly regular passenger charter service ghosting the route in parallel with the RPT operation. This is less common than in previous years, as the Civil Aviation Safety Authority (CASA) are strictly enforcing the requirement for companies undertaking such operations to gain an RPT licence.

Regional airlines have features in common with both domestic airlines and charter operators. Like the domestic airlines, regional airlines offer RPT services within Australia. That is, they have a published schedule of regular services over specific routes between fixed terminals that are available to the public, albeit with smaller aircraft, and in some cases, offer a less frequent service. In addition to the difference in scale of operation, the defining aspect of regional airlines is that their routes predominantly originate and/or terminate at regional airports. For this reason, wholly owned subsidiaries of Qantas (Airlink, Eastern Australia Airlines, Southern Australia Airlines and Sunstate) and Ansett (Aeropelican, Kendell and Skywest) are regarded as regional airlines.

In this study, no distinction is made within regional aviation between what earlier reports (IC 1992, BTCE 1988) have called ‘third-level’ or ‘commuter’ airlines (those utilising low-capacity aircraft for regional RPT) and ‘regional’ airlines (which use higher capacity aircraft for regional RPT). These two groups are considered together and are referred to as regional airlines.

At the lower boundary of the definition, passenger charter companies appear. In many cases, regional airlines also offer charter services. Charter services can be differentiated from RPT as they operate non-scheduled, or non-public, air transport services. From the passengers’ perspective, the difference between the two is that charter operators, unlike RPT operators, cannot sell passenger seats individually. As a result, charter operators offer services according to passenger demand, while airlines provide a fixed schedule. Passenger numbers are not a reliable indicator for distinguishing between regional and charter operators, as low passenger numbers may merely reflect, for example, a regional airline using a small aircraft for a once-weekly service.

RELATED RESEARCH

This study builds on an extensive body of previous research into various facets of Australia’s regional aviation industry. It updates and brings together the individual parts to provide a picture of the whole of the industry and its competitiveness. In particular, the Bureau of Transport and Communications Economics (BTCE) has made systematic studies of segments of the Australian aviation industry. This work provides a basis for comparison of the regional aviation industry over time.

The most recent relevant study (BTCE 1996) examined general aviation flying in Australia. Regional airlines (low-capacity RPT) form a subset of this industry sector and the report provides comprehensive data on the composition, activity, conduct, and financial structure of this industry in 1992–93. Since this period, regulatory changes with the potential to markedly change the structure of the industry, with resultant impacts on conduct and performance, have occurred.

The Progress of Aviation Reform (BTCE 1993) catalogued the microeconomic reform program experienced by the Australian domestic aviation industry. Some of this reform has had flow-on impacts for regional operators, considering the extensive ownership linkages to the domestic airlines.

In 1991, the Treasurer referred a review of the regulation of intra-State aviation to the Industry Commission (IC). The IC concluded that the costs of continuing to regulate intra-State air services outweighed the benefits of deregulation, recommending the dismantling of industry regulation by State and Territory Governments (IC 1992). Recommendations were also made concerning improving safety and air navigation and airport services. These findings were to significantly influence government thinking regarding regulation of intra-State aviation.

In 1988, the BTCE released a study of the performance of, and prospects for, intra-State aviation (BTCE 1988). This study specifically examined the impending shift of regulatory control from Commonwealth to State Governments. The performance of intra-State carriers was considered with reference to economic efficiency, equity and safety criteria. The current study is more expansive in including inter-State carriage by regional airlines.

One significant State-based study is *The Dynamics of Intra-State Aviation Competition in South Australia* (Duldig 1996), which provides a comprehensive assessment of that State's regional airline industry. The Standing Committee on State Development's (1998) interim report on the regulation of regional air services provides a concise survey of the views of participants in the NSW industry.

The situation in other countries regarding regional aviation is also of interest in understanding the Australian industry. Much data are available on commuter airlines in the United States. Its larger population centres and resultant higher demand for intra and inter-State air travel provide for a more cost-effective industry operation, but lessons remain to be learnt by the Australian industry from the American case.

CURRENT ISSUES

This study aims to provide answers to a number of more focussed issues raised by the Aviation Working Group of SCOT.

The Aviation Working Group provides a forum for the collaboration of aviation interests of the State and Territory Governments. In its work program, SCOT identified three broad areas of the regional aviation industry where it is interested in broad investigations taking place. These are:

Monopolistic behaviour: On many regional routes there is only one operator, which provides the potential for maximum charges to be extracted from passengers. This raises particular concerns when State subsidies are based on a basket of 'other State' equivalent route fares.

Level of service to regional areas: The adequacy of air services to regional areas and communities and the related question of the extent to which sole operators on a route make ‘optimal’ aircraft allocation decisions.

Industry monitoring: The Australian Competition and Consumer Commission (ACCC), formerly the Prices Surveillance Authority, monitored air fares charged by the domestic airlines on the top 21 intra-State routes until the third quarter of 1996. Would similar monitoring of regional aviation have a positive impact on industry behaviour?

These issues can, to a large extent, be consolidated into a broader question: *how competitive is the industry?*

Although the States/Territories have a good understanding of the State of the industry in their own domain, those representatives contacted agreed it would be beneficial to shed some light ‘cross-sectionally’ on the industry. This is particularly so when the changes seen since deregulation are considered. Having a comparative basis between all States and Territories—in terms of industry structure and performance—would provide a fuller information set for decision making regarding the relationship between government and aviation industry and the roles of each level of government. The information contained in this study could be used within consultative processes to improve the performance of the regional aviation industry. More generally, the information in this study may be used for regional development planning as well as to provide a basis for appropriate pricing of subsidised/regulated air routes.

State and Territory Governments also raised specific issues that are addressed in the study. These include:

- the route specific factors (such as passenger numbers) that determine the shifts in service operator: the introduction of RPT services, the shift from one regional airline to multiple operators, the entry of a domestic subsidiary as opposed to a non-aligned operator, and the entry of a domestic airline;
- the impact these shifts have on service price/quality and operating costs and the cross-State/Territory applicability of these relationships;
- transitional impacts of a move from sole-operator licensed routes to unfettered competition; and

- cost structure of fare charges.

AIMS AND STRUCTURE OF THE REPORT

The report is couched within the classic industry economic analysis paradigm of 'structure, conduct and performance'. Caves, Ward, Williams and Wright (1994) define these three elements:

- Market structure consists of the relatively stable features of the market environment that influences the rivalry among the buyers and sellers operating within it.
- Market conduct consists of the policies that participants adopt towards the market with regard to price, product characteristics etc.
- Market performance is the normative appraisal of the social quality of the allocation of resources, which results from a market's conduct.

This framework allows the identification and analysis of the causal chains linking aspects of market structure with elements of business conduct and industrial performance. The causal relationship is not uni-directional but contains feedback elements, making the three facets under examination tightly inter-related.

This style of analysis has benefits for industry and governments. A clear understanding of the links between structure, conduct and performance is a key to industry members raising or maintaining the performance of their own businesses and allows them to learn from each other. For the Government, this information provides a sound basis for designing public policies to help raise industry performance levels.

The following two chapters examine the level of activity in the industry and the participants that make up the industry. A review of regional airline economics forms chapter 4 and chapter 5 contains an assessment of competition and contestability in the industry. The conduct of the regional aviation industry is addressed through an assessment of pricing by the industry and sub-groups of the industry and is presented in chapter 6. Finally, in chapter 7, all this information is used to reach conclusions regarding the competitiveness of the Australian regional aviation industry. Two appendixes complete this study. The first contains maps of regional air routes, while the second contains details of the survey of regional airline operators active in 1997 undertaken in 1998. Information from this survey is referred to at various points throughout the study.

CHAPTER 2 INDUSTRY ACTIVITY

In examining the competitiveness of the regional aviation industry it is necessary to understand the activity undertaken. The level of demand for passenger and freight movement is one factor driving the structure of the industry and hence the competitiveness of the services offered. This chapter outlines the task carried out by regional airlines and places this in context with the activities of the two domestic airlines. The route and network structure, regional air fleet and level of employment are also examined as these enable the airlines to complete the transport task. This analysis provides a foundation for the examination of industry participants and their spatial distribution in chapter 3.

THE AGGREGATE TRANSPORT TASK

The task carried out by regional airlines can be measured in a number of ways—passenger numbers, freight, or hours and distance flown. In 1997, the regional aviation industry in Australia was made up of 46 airlines and, excluding Airlink whose activity is combined with Qantas, these flew a total of 356 600 flight sectors in 272 400 flying hours, reflecting 2.6 million return journeys (Avstats 1998a). Across the portion of the regional network serviced for the full year in 1997, the estimated average route density was just over 17 000 passengers (measured using TOBS data).

To enable the changes within the regional aviation industry to be better understood, time series information is used where available. However, this study also relies extensively on cross-sectional econometric analysis, and thus requires a ‘base’ year where comprehensive data are available for the industry. The most recent period for which good data are available is calendar year 1997. Hence, the activity data reflects the aggregate for this year. Changes subsequent to December 1997, in terms of airlines in the market and the air routes operated by each airline, are not reflected below. The changes tend to have largely occurred at the margins of the industry and are not deemed to have substantially changed the nature of the industry. As a result, the data remains useful for drawing conclusions about the *current* state of competitiveness in the industry.

Passengers carried

When passenger numbers are considered, the regional aviation markets show three key features. First, the market includes only a small proportion of total Australian domestic RPT air travel, the bulk of passenger carriage being by Qantas and Ansett jet services (table 2.1). Second, even without the inclusion of Qantas-owned Airlink, the proportion of the total domestic market being served by regional airlines is growing. Third, regional airlines operate at significantly lower average load factors than do Qantas and Ansett. The load factor is a measure of the proportion of available seats filled with paying passengers. This last point is significant when the relationship between ticket price and the cost of providing the air service is examined in later chapters.

TABLE 2.1 AIRLINE ACTIVITY: PASSENGER EMBARKATIONS, 1995–1997

	Year ended 31 December			
Passengers	*1995* [a]	*1996* [a]	*1997* [b]	*1997* [b] *including Airlink as regional*
Regional[c]	3 783 244	4 161 384	4 690 000	5 690 000
Domestic	22 789 674	23 678 307	23 300 000	22 300 000
Regional proportion of Australian market (%)	14.2	14.9	16.5	20.5
Domestic load factor (%)	74.3	73.5	74.5	na
Regional load factor [c] (%)	57.8	58.1	57.5	58.5

a. 1995 and 1996 data include Airlink within the *domestic* operations of Qantas.

b. 1997 numbers include estimates.

c. These data do not include the direct operations of Qantas and Ansett on regional routes.

na Not available.

Source Avstats 1998b and BTE estimates.

There are two main approaches to measuring the level of passenger carriage: traffic on board by stage (TOBS) and origin–destination (OD). Table 2.11 expresses passenger carriage in terms of TOBS which is the traffic unit used by Avstats in reporting domestic airline activity. TOBS measures the physical transport task of an airline—how many passengers are on board for a flight stage. For example, TOBS for a journey from A to C with a stop at B (figure 2.1) would provide a count of passengers on board from A to B (90) and passengers on board from B to C (412). However, it can provide only an estimate of travel from A to C. No information is provided concerning disembarkation and boarding at point B, making the level of passenger turnover unknown. TOBS gives no indication of whether most passengers found landing at point B, and the associated delay, a nuisance or a benefit.

The other approach to measuring passenger carriage involves the use of OD data, which provides a clear picture of passenger demand for travel between points. A count of OD traffic describes the actual trip undertaken by the passenger, irrespective of how many flight stages made up the trip. However, OD data are not readily available for Australian aviation activity, and so a reasonable proxy must be used. This proxy is uplift–discharge within flight (UD). This differs from OD in that it measures the number of passengers on a particular flight (identified by an airline allocated flight number) rather than between two points.

The proxy relationship between OD and UD holds true in most circumstances. However, it is prone to break down where airlines hub at regional centres or serve connecting ports via a capital city—at these ports flight numbers usually change, and so a single OD passenger is likely to be recorded twice. Thus, the aggregate UD dataset may tend to overstate the true level of OD demand. The extent of overstatement is not possible to estimate well, but given that regional airlines tend to utilise hubbing to a much less extent than domestic airlines, it is assumed to be relatively minor and to not invalidate the use of UD as a proxy for OD.

FIGURE 2.1 TOBS AND UD ROUTING

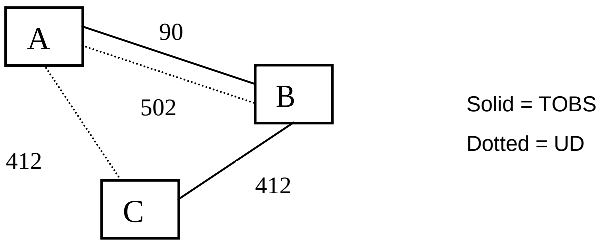


Table 2.2 provides UD information for regional airlines, and this can be compared with the TOBS information in table 2.1. Assuming most trips are undertaken on a return basis, the demand for regional air services in 1997 was approximately 2.55 million return journeys. On individual routes where both UD and TOBS information is available (this excludes all regional routes where Qantas and Ansett directly operate a service) the difference between these figures is less than ten per cent in over one-third of cases.

TABLE 2.2 UD WITHIN FLIGHT (PROXY FOR OD DEMAND), 1995–1997

	Year ended 31 December			
Passengers	*1995*	*1996*	*1997* [a]	*1997* [a] *incl. Airlink as regional*
Regional	3,168,054	3,553,720	4,100,000	5,100,000

a. 1997 numbers include estimates.

Source Avstats 1998b and BTE estimates.

UD numbers give a slightly more accurate picture of the scale of actual demand for air services and are lower than TOBS because they are (largely) independent of routing and thus proxy the demand for transport from origin to destination. However, to reflect the involvement of Qantas, and particularly Ansett, in regional air services, it is necessary to use TOBS data, which are inclusive of these airlines' operations.

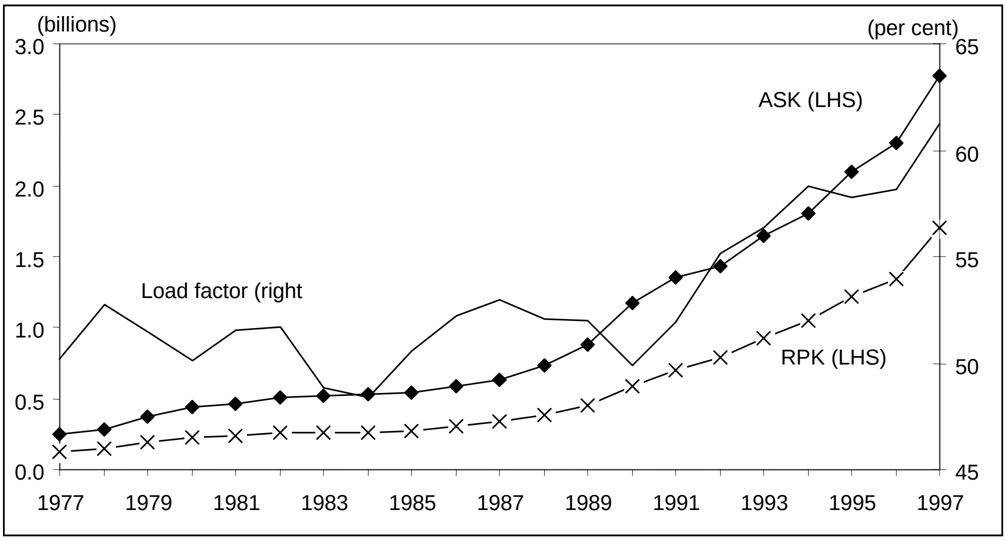
Freight carried

Freight and mail carriage is clearly a second tier service for most regional airlines. The exceptions to this include Government subsidised 'mail' routes, such as the Augusta Airways weekly route from Port Augusta (SA) to Boulia (Qld), and routes which connect remote islands (such as Indian Ocean Territories, Norfolk, Lord Howe and Bass Strait Islands) to the mainland. During 1997, regional airlines carried an estimated total load of 5162 tonnes of freight and 1728 tonnes of mail on a UD within-flight basis.

Other indicators of activity level

Applying a distance factor to the number of paying passengers provides a commonly used measure of activity—revenue passenger-kilometres (RPK). This measures the total number of kilometres which passengers paid to travel. In 1997, RPK totalled 1.7 billion. In the same year the available seat-kilometres (ASK) were 2.8 billion. This is the number of kilometres flown multiplied by the number of seats available for sale to the public. These two figures are used to derive the load factor, which indicates the level of available seats filled by paying passengers.

FIGURE 2.2 PASSENGER CARRIAGE PERFORMANCE MEASURES, 1977–97



Notes 1. Airlink data (1991-present) are not included as its performance data were combined with those of Qantas during most of this period. Airlink's inclusion would be expected to confirm the growth trend.

2. The load factor is higher than that referred to in later chapters, as it is derived from total RPK and ASK, and as it is unweighted it is less accurate.

3. LHS = left hand side axis; RHS = right hand side axis.

Source Avstats 1999b.

The task performed by regional airlines is growing (figure 2.2). The increase in ASK indicates a growth in the capacity offered by regional airlines—whether this is through the use of larger aircraft, new or longer routes, or some combination of these factors. The increase in RPK indicates a growing passenger demand for regional air travel. The variable pattern shown by the load factor reflects the nature of the industry, whereby increases in capacity are not incremental and so tend to lag the increasing passenger demand for regional air travel.

REGIONAL AIRLINES

In 1997, 46 airlines served regional air routes. Table 2.3 illustrates the cascading scale of operators within the regional aviation industry, with operators clustered into groupings of aggregate market size. The two most straightforward measures of an airline's scale are the aggregate number of passengers it carries and the number of city-pair services it offers. Chapter 3 provides more information about these airlines and their ownership, as well as the geographic spread of their operations.

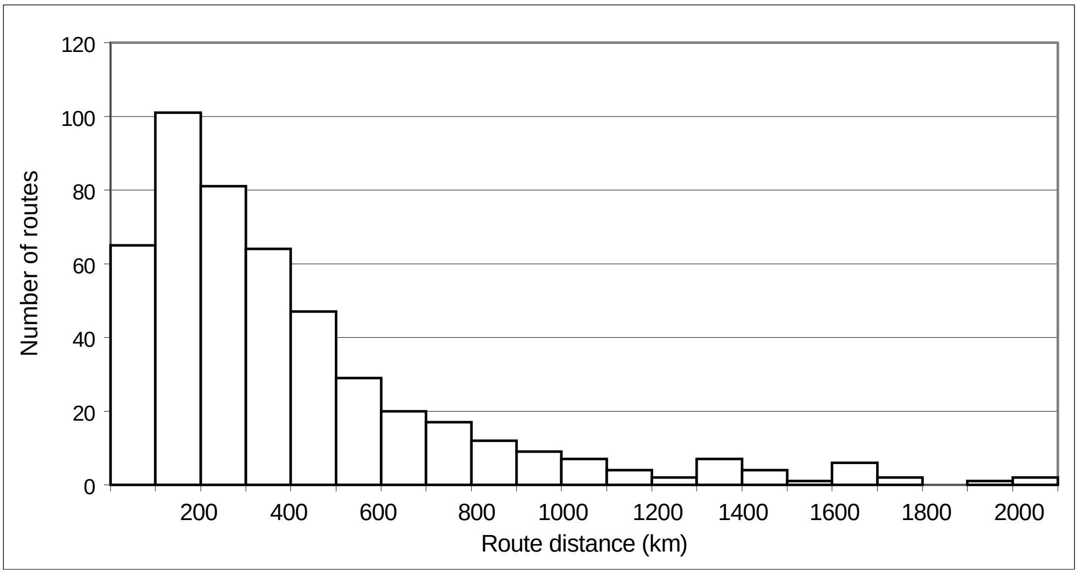
ROUTE AND NETWORK STRUCTURES

The route and network structures of regional airlines are an important indicator of industry activity. The level of service on these regional air routes can be indicated by a number of related criteria: flight frequency, type of aircraft, and number of competing airlines. The basic drivers of these are factors such as route density (passengers carried), predominant nature of the task (general transport, tourism, business, or mail/freight), and distance between ports.

Regional air routes

In Australia, regional flight stages are predominantly short (figure 2.3). In 1997, over half of the 481 regional flight stages offered were less than 300 km, more than a third were less than 200 km, and 14 per cent were less than 100 km. The average length of a flight stage was 405 km. This figure does not reflect the majority of stages, being held artificially high by a small number of very long legs. The median route length, which lessens the impact of the skewed data, was 295 km.

FIGURE 2.3 LENGTH OF REGIONAL AIR ROUTES, TOBS DATA, 1997



Sources Avstats 1998b and BTE calculations.

The short length of many flight stages is counter-intuitive, as the appeal of flying to the consumer is generally believed to be the greatly reduced travel time. Over short distances this advantage is lessened, as other forms of transport are more likely to be available, and can generally offer competitive total travel times and lower costs. In terms of operating costs, short air legs are relatively more expensive to provide on a cost-per-kilometre basis. Chapter 4 discusses the factors impacting on the cost economies of aircraft.

One explanation for the number of short air routes is that physical barriers may limit alternate travel options or increase alternate travel time. Links between mainland Australia and islands comprise some of the very short (less than 100 km) routes where relatively slow barge or ferry services are the only transport alternatives. There are also seasonal factors that influence the availability of alternative land transport, and hence the demand for air travel, in some areas. In northern Australia, monsoonal rains can place seasonal restrictions on road access, making air travel the only way in and out of communities such as Ramingining and Milingimbi (Northern Territory) during the wet season. However, 77 per cent of very short regional routes do have viable land transport alternatives.

A more robust explanation for the high proportion of short routes is found in the non-hubbed network structure of regional airlines (chapter 4). The limited use of hubbing means that many passengers will undertake flights consisting of two or more stages. When very short routes are examined, they are seen to be largely regional links with only four having a capital city as one port. Additionally, many short routes have low passenger numbers. The inclusion of these short linking routes within a network allows improved aircraft utilisation to be balanced against passenger demand.

TABLE 2.3 SUMMARY OF REGIONAL AIRLINE ACTIVITY, 1997

Density (passengers—TOBS)	*Airline*	*City pairs*
Over 500 000	Airlink	30
	Eastern Australia	17
	Kendell	28
100 000–499 999	Flightwest	56
	Hazelton	35
	Impulse	23
	Skywest	39
	Southern Australia	12
	Sunstate	33
50 000–99 999	Aeropelican	1
	AirNorth [a]	22
	Tamair	5
10 000–49 999	Arnhem Air	10
	Augusta Airways	5
	Aus-Air	10
	Eastland Air	7
	Emu Air	1
	Lincoln Airlines	1
	Missionary Aviation Fellowship	11
	National Jet	9
	Norfolk Jet Express	2
	O’Connor	2
	Transtate [b]	13
	Whyalla Air	4
	Yanda	5
5000–9999	Air Facilities	3
	Air Link	14
	County Connection	5
	Island Airlines	5
	Rottnest Airlines	3
	Skytrans	6
	Sydney Harbour Seaplanes	2
1000–4999	Airlines of Tasmania [b]	11
	Albatross	1
	Eyre Commuter	4
	Geelong Flight Centre	2
	Kentialink [b]	4
	King Island Airways	1
	Ord Air	12
	Southern Sky [b]	1
	Western Airlines	4
0–999	Air Swift [b]	1
	Golden Eagle	6
	Pacific Interline [b]	2
	Shepparton Airlines [b]	1

a. Includes the operations of its subsidiary Air Tiwi.

b. These airlines operated for only part of 1997.

Source Avstats 1998b and BTE estimates.

The flight stage distances (from TOBS data) do not reflect the distance that each passenger is travelling. Using UD data, the average flight distance is 487 km (compared with 405 km from TOBS data) and the median distance is 367 km (compared with 295 km). This indicates that passengers may undertake more than one flight stage, which makes the advantage of choosing to fly more apparent.

Level of air service received

There are a number of factors important in measuring the level of air service, with the primary consideration being whether the service was offered all year round, or if there were periods of no service. Once the continuity of service is established, the issue of service frequency becomes important. The number of service providers and the presence of domestic airlines can be used as an indicator of level of service. Finally, the type of aircraft used (propeller, turboprop or jet) is also an indicator of service, reflecting the speed of the journey and passenger comfort (this is discussed in the following section, which examines the regional fleet).

The nature of an area, in terms of generating demand for air travel, is a major influence on the availability of RPT air routes. Typically, areas with higher populations will develop a strong base of business travellers and also have more leisure travellers. The exceptions to this relationship between population and air travel are specific-purpose routes. Mining areas (such as Jabiru and Useless Loop) and tourist destinations (such as Ayers Rock, Kings Canyon, and Rottnest and Kangaroo Islands) support regular air services despite having low permanent population levels. In addition to population, broader economic conditions can be important in determining demand for regional air services. For example, areas heavily reliant on the agricultural sector can experience large fluctuations in demand for air transport (and hence in supply of air services) as farm incomes rise and fall.

Of the 481 routes serviced by regional airlines in 1997, around 31 per cent were operated for less than the full year. It should be noted that this figure is artificially high due to difficulty in distinguishing some routes where non-reporting of passenger numbers by airlines was a problem. Nevertheless, this indicates considerable change within airline networks. Partial routes were operated for periods from a couple of weeks through to most of the year. Tasmanian routes, in particular, suffered from uneven service provision due to the closure of Airlines of Tasmania in 1997 and the lack of uptake of some of their routes by other airlines.

Estimated route densities for partial year services were extrapolated from density data during the period of service. These routes had an estimated average annual route density of 1100 passengers, and an average load factor of 41 per cent. This indicates that poor loading could be a major reason for the discontinuity in services. Indeed, regional airlines withdrawing from routes frequently indicated that poor load factors were a reason (*Australian Aviation*, December 1997). This, however, is not the only reason, as there are over 40 routes with both a lower density and load factor that operated throughout 1997. Although there are no clear differences in factors such as average route length or the number of subsidised routes in these two groups, there are a number of reasons why some thin routes continue to receive a service while others do not. Passengers are not the only sources of airline revenue—freight was important on some of these routes. A further factor may be geographic location—a low-density route can be sustained indefinitely through cross-subsidisation if it allows improved utilisation of aircraft, for example through providing a connecting service between two points within the existing network.

The frequency of service is a convenience factor for the passengers, allowing greater flexibility and choice in travel plans. More frequent services also reduce the total cost of travel by eliminating the necessity for overnight stays. Naturally, on a route of a given density, the service frequency is determined in concert with the aircraft size, to ensure a commercially viable load factor.

An example of this trade-off can be seen in the situation of a single-operator flight sector with an underlying demand of 75 return passengers per week, and an airline requirement for an average 60 per cent load factor. To satisfy the market, and its own operational requirements, the airline needs to offer in the order of 250 one-way seats per week. This can be done through a variety of arrangements, but focusing on the trade-off between aircraft size and flight frequency, the airline could offer:

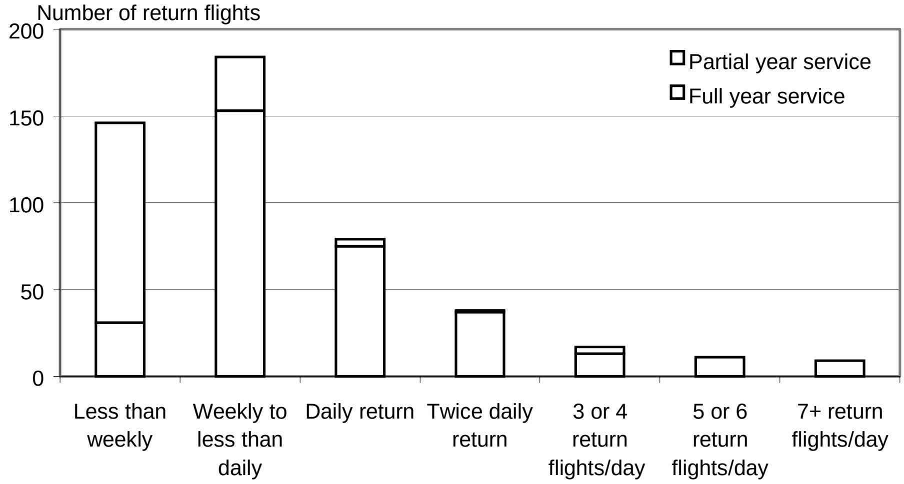
- four return flights each day using a 5-seat aircraft (280 seats per week), or
- two return flights each day using a 9-seat aircraft (252 seats per week); or
- one return flight each day using an 18-seat aircraft (252 seats).

Apart from issues of comfort, an airline in making the aircraft allocation decision will have in mind the need to provide a satisfactory basic level of service in terms of flight frequency.

A satisfactory base level of service frequency will vary from route to route, being influenced by considerations such as demand for services and travel time via alternate forms of transport. The NSW Country Mayors Association claimed that a daily return flight to Sydney was vital for rural and regional communities in NSW (Standing Committee on State Development, 1998).

Considering only full-year services in 1997, over 90 per cent of routes received a minimum of a weekly return service (figure 2.4). The majority of these regional air routes (56 per cent) received less than a daily service. Partial-year services were clearly less frequent (during the period of operation) than were full-year services. When frequency of service is compared across a grouping of routes with similar density, although there is a strong positive association found between these variables, it does not allow a minimum acceptable service level to be determined solely on the basis of customer demand.

FIGURE 2.4 FREQUENCY OF RETURN FLIGHT SERVICE, 1997



Source Avstats data and BTE estimates.

The final indicator of service considered is the number of service providers on each route. Table 2.4 highlights the number of service providers on routes within various density groups. In 1997, 23 per cent of routes were serviced by more than one airline, and 15 per cent had a domestic airline as a service provider. Domestic airlines worked alongside their subsidiaries and associated airlines on these routes to provide a coordinated timetable in which the larger domestic aircraft catered to the peak-load passengers. The remaining routes (254) were served by single airlines. However, these single airline routes existed in all of the density groups, as did multiple operator routes.

TABLE 2.4 COMPETITION ON FLIGHT SECTORS OF VARYING DENSITIES

		Extent of 'competition' on flight sectors			
Density (TOBS)	*Flight sectors*	*1 airline sectors*	*2 airline sectors*	*3 airline sectors*	*4 airline sectors*
100,000 +	19	7	10	2	0
50 000–99 999	24	10	8	5	1
20 000–49 999	29	19	8	1	1
10 000–19 999	48	37	9	2	0
5000–9999	52	42	6	4	0
1000–4999	91	78	12	1	0
1– 999	66	61	5	0	0
Total	329	254	58	15	2

Note Does not include services operated directly by Qantas and Ansett.

Source Avstats 1998b and BTE estimates.

The competition experienced on regional routes from Ansett and Qantas operated jets has changed significantly since the end of 1997. By early 1999, Qantas had pulled out of regional routes (except Alice Springs–Darwin; Brisbane–Cairns; Brisbane–Townsville; Canberra–Melbourne; Canberra–Sydney; and Hobart–Sydney) and left them to its subsidiaries, predominantly Airlink. Regional airlines typically face a lower cost structure, especially in terms of unit aircrew costs, than the domestic airlines. Ansett is implementing a staged withdrawal from unprofitable regional routes in Queensland and south east Australia in an attempt to stem an annual loss of around $55 million in 1998 (Thomas 1998, p. 1). These routes will be taken up by its subsidiary, Kendell Airlines, between November 1999 and mid 2001. Routes in the Northern Territory and north west Western Australia have also proved unprofitable, and Ansett has contracted AirNorth to operate 30 such services a week on its behalf (Creedy 1999a, p. 4). Some of these routes are expected to remain serviced by jet aircraft, while others will experience a decline in aircraft size. Continued operation with jet aircraft reflects the increasing size of aircraft operated by regional airlines.

The withdrawal of domestic airline flights to regional Australia means that an examination of the density required to support a domestic airline on a regional route in 1997 does not provide useful information in today's operating environment. The impact of the presence of domestic airlines on air fare is considered in chapter 6.

Similarly, drawing boundaries between routes that subsidiaries will and will not service, on the sole basis of route density, can be misleading. Subsidiaries service low-density routes within their networks for reasons such as improving aircraft utilisation, offering a more attractive network, or providing a feeder service to their denser routes.

However, one pattern that has become apparent over time is that, as airlines grow, they tend to move towards higher density routes leaving the lower density routes to smaller airlines. Hazelton, for example, has consolidated its network since the BTCE last mapped regional air services in 1988, leaving some ports to smaller airlines. By 1997, Air Link provided feeder services from remote NSW towns such as Lightning Ridge, Brewarrina, Bourke and Cobar (formerly serviced by Hazelton) to Dubbo, from where Hazelton operated flights to Sydney and a number of larger regional centres. Air Facilities and Country Connection also both serviced routes formerly operated by Hazelton. One reason for such actions may be to avoid retaining small aircraft typically needed to service the low-density routes cost-effectively.

REGIONAL AIRLINE FLEET

In 1997, 286 aircraft were used in regional RPT aviation activities. The fleet size has been increasing over time (236 aircraft in 1990) and indications are it will continue to do so, particularly if NSW chooses to deregulate and the domestic airlines continue to pull back from regional services allowing regional airlines to pick up the task.

Individual airline fleets vary in both size and composition. The airline fleet size reflects the scale of network serviced by the airline and will also be affected by the aircraft demands of any other aviation businesses (charter, training etc) in which the airline is involved. In 1997, the average fleet size was six aircraft and the median 4.5 aircraft. It must be noted that this is a snapshot of the industry, and the small fleet size reflects entrants and also those exiting the industry. Excluding these airlines by calculating the average fleet size of airlines in the industry for five years or more increases the average fleet size to seven aircraft.

Aircraft types

The fleet in 1997 comprised aircraft ranging from 87 seats (BAe 146-300) down to five seats (mainly Beechcraft, Cessna and Piper models). Across the fleet, the average aircraft size was twenty seats. Growth at the top end of aircraft size is a recent development, with the largest aircraft in the fleet in 1990 being De Havilland DHC-8-100/200 and Saab 340s with approximately 34–37 seats (*Australian Aviation* 1990). In 1997, jet aircraft (BAe 146s) and larger turboprops (eg DHC-8-300) were a more common part of the fleet.

Associated with the increasing size of regional aircraft has been the reduced role of the piston-driven nine seat and under category in the fleet. In 1988, 52 per cent of the 250 aircraft involved in intra-State RPT aviation had nine seats or less (BTCE 1988). In 1997, 48 per cent of the fleet were ten seat or less aircraft. Concurrently, jet aircraft are increasingly carrying the regional load, growing in number from two to fifteen. One characteristic of the fleet that has not changed is that the piston-driven Piper PA-31 (7–10 seats) has remained the most common aircraft type. Table 2.5 lists the 47 aircraft types, their estimated RPT seating configurations, and the number making up the regional airline fleet in 1997.

The contribution of each aircraft to the regional transport task varies and is not fully reflected by the industry average aircraft size of twenty seats. A measure of average available seats per trip better reflects the size of aircraft carrying out regional services. In 1997, on average, 38 seats were available per trip. This figure is higher than average aircraft size as some of the smaller aircraft in the fleet are partially used for non-RPT activities, such as charter work, while the larger aircraft tend to be used solely for RPT on regional routes, and generally at high utilisation rates. Even between purely RPT aircraft the asset utilisation rate may differ, with some aircraft being more ‘productive’ than others—determined largely by a better match of aircraft to task.

Suitability of aircraft types to specific route

As table 2.5 illustrates, aircraft tend to come in discrete size categories. The aircraft chosen by Australia's regional airlines fall broadly into the following: 5 seats; 9 seats; 18–20 seats; 30–36 seats; and a small range of bigger turboprops and BAe 146 jets. In order to maximise revenue, airlines should theoretically match aircraft to routes. Most airlines, however, are not in the position to purchase a different aircraft for each route type, and instead, this matching process becomes a matter of the best aircraft for the average route serviced. In lieu of the hubbing system, air routes are commonly made up of several stages of differing lengths. The mix of long and short legs on such routes makes aircraft and route matching difficult.
For example, an Airlink BAe 146-200 flight travels from Perth to Karratha (airtime of 2 hours 10 minutes) and then on to Port Hedland (35 minutes). In Queensland, Sunstate operates a Dash-8 from Brisbane to Blackwater (1 hour 30 minutes) and on to Emerald (20 minutes).

A number of factors affect the choice of which aircraft type to allocate to an air route. The most important is clearly the underlying demand for transport, as airlines need to offer a reasonable frequency of service at commercial load factors in order to both attract and retain a market. On many of the more dense routes a mix of aircraft types (sometimes from associated airlines) are used to better match daily demand cycles. The cost of providing different types of service is important and the relevant economies and cost relationships are discussed in detail in chapter 4. The choice of aircraft size is also constrained by the existing fleet. Once an airline has committed itself to an aircraft of a certain size there are difficulties in downsizing, as this would impact negatively on the number of pilots, the level of training required and pilots' career prospects (Duldig 1996). Downsizing aircraft may mean a turnover of pilots, while upsizing aircraft can mean the same or require additional training to be undertaken.

Airlines operating on contracts or licenses over certain routes may have agreed aircraft standards that determine aircraft size or type. For example, the route from Cairns to Weipa in Queensland demands a jet aircraft of a minimum of thirty seats—a BAe 146 is used. Chapter 6 examines regulated routes and the impact this has on the cost of providing the service.

EMPLOYMENT

As well as providing a transport service, regional airlines contribute to the economy, particularly regional economies, by being a source of employment.

TABLE 2.5 REGIONAL AIRCRAFT FLEET, 1997

Aircraft manufacturer	*Aircraft model*	*Seating (est. range)*	*Aircraft on regional RPT services*
Jet			
British Aerospace	146-300	87	2
British Aerospace	146-200	75 to 76	7
British Aerospace	146-100	63 to 64	6
Turboprop			
De Havilland	DHC-8-300	54	1
Fokker	F27 MK 50	46	5
De Havilland	DHC-8-100/200	34 to 37	19
Shorts	SD3-60	34 to 36	8
Saab	340B	34 to 35	14
Saab	340A	34 to 35	9
Shorts	SD3-30	30	2
Embraer	EMB-120 ER	30	9
British Aerospace	Jetstream 41	29	1
De Havilland	DHC-6-320	20	11
Beechcraft	1900C	19	1
Beechcraft	1900D	19	9
Fairchild	SA227-CC/DC (Metro 23)	19	14
Fairchild	SA227-AC (Metro 3)	18 to 19	2
British Aerospace	Jetstream 31	18	6
British Aerospace	Jetstream 32	18	3
Swearingen	SA226-TC (Metro 2)	16 to 18	3
Embraer	EMB-110P1/P2	14 to 18	15
Beechcraft	200 (Super King)	9	5
Cessna	441	9	3
Cessna	425	9	1
Piston—Twin Engine			
Piper	PA-31-350	7 to 10	54
Beechcraft	65-B80 (Queen Air)	9	1
Britten-Norman	BN-2A-26	9	1
Cessna	402A	9	1
Cessna	402B	9	10
Cessna	402C	9	16
Cessna	404	9	7
Cessna	421C	9	1
Cessna	401	7	1
Cessna	310R	5	8
Beechcraft	58 (Baron)	5	5
Beechcraft	95-B55	5	2
Partenavia	P68	5	3
Piper	PA-23-250	5	1
Piper	PA-30	5	1
Piper	PA-34-200	5	4
Aerocommander	500-S	5	2
Tedsmith	600	5	1
Piston—Single Engine			
De Havilland	DHC-2 (Beaver)	7	3
Cessna	210	5	7
Cessna	U206G	5	1
TOTAL			286

Source *Australian Aviation* 1997; Avstats 1998a,1998b; and Eyre 1988.

Direct employment

Airlines provide direct employment to flight crews, ground staff, maintenance staff and management personnel. Across all regional airlines in 1997 it is estimated that a total of 2700 people were employed. This employment figure only includes staff involved in RPT activities in cases where the company is involved in other business activities. Other data sources for regional aviation employment support this estimate. The Regional Airlines Association of Australia (1998) states: 'regional airlines…directly employ more than 3000 people (as pilots, flights attendants, engineers and airports staff).' In surveying every member of the regional aviation industry in early 1997, BASI estimated these to total 2223 (BASI 1999, p. 7).

Survey information estimated an average of 57 jobs created directly by each regional airline, compared to the average of 46 in 1993 (BTCE 1996). The across-the-board employment growth reflects the increased task carried out by regional airlines. The industry is also embracing more flexible staffing methods; for example, some airlines are contracting pilots, allowing a faster reaction to changing business conditions. Table 2.6 summarises the findings from the BTE survey of regional airlines regarding employment.

TABLE 2.6 DIRECT EMPLOYMENT BY REGIONAL AIRLINES
(number of employees)

	Total (1997)		*Average per firm*	
Activity Group	*Full-time*	*Part-time*	*1997*	*1993*
Management staff	132	-	2.9	3.1
Pilots	868	12	19.1	19.7
First Officers	288	-	6.3	-
Flight attendants	140	-	3.0	-
Maintenance staff	412	20	9.4	10.0
Clerical/Other office staff	380	20	8.7	13.2
Other	404	-	8.9	-
TOTAL	2 624	52	57.0	46.0

Notes 1. This data includes owners who are involved in the day-to-day running of the airline.
2. When employees perform duties in more than one category they have only been recorded once, under their area of main duty.

Source Survey of Regional Airlines, BTCE 1996.

The geographic location of this employment is important in regional development terms. Many of these skilled aviation sector jobs are based in regional Australia. Of the 46 regional airlines operating during 1997, over half (26) had their head office outside the capital cities and all would have directly employed staff in the regional centres they service.

There are, however, limits to company growth imposed by some regional locations. Hazelton Airlines is one example of a company that has outgrown its original headquarters at Cudal, NSW. The location of Hazelton's maintenance base in Cudal requires that empty aircraft need to be moved to and from Cudal for maintenance as the airport supports only around 660 RPT trips annually. This imposes an unnecessary cost on the airline. Hazelton has stated its intention to select a new base in country NSW, rather than Sydney, and the minimum proposal would include a hangar, engineering workshops, administrative offices and housing for employees (Centenera 1999 p. 13).

Indirect employment

As well as those directly employed by the regional airlines, even greater numbers of people rely on jobs indirectly supported by the airlines' operations. These people are employed in industries such as travel agencies, catering, cleaning and hospitality that provide services to airlines and airline passengers. A further group is employed by regional airlines to support other business enterprises they undertake—such as charter, training, and tourism.

CONCLUSION

This chapter has highlighted the increasing activity of regional airlines. This increased activity has been due partly to growth in the size of regional airlines (measured by factors such as employment and fleet size) and increased aircraft size, and also, in some cases, through rationalisation of routes by domestic airlines. Chapter 3 examines the industry participants mentioned in this chapter in more detail.

CHAPTER 3 INDUSTRY PARTICIPANTS

This chapter examines two industry participants—airlines and government—and in doing so provides an organisational framework in which the industry functions. Commonwealth and State governments have influenced industry structure through the regulation and oversight of various market elements. The variability of the regional aviation industry in terms of task is reflected in the alliances and ownership structures of the regional airlines themselves. The industry task and participants are presented on a State/Territory basis to highlight the spatial spread of demand for services. This gives an added layer of detail to the analysis of the task facing the regional aviation industry.

AIRLINES

Ownership and alliances

In 1997, there were 46 airlines operating on Australia's regional air routes. There has been increasing concentration of ownership through takeovers and mergers—Arnhem Air was purchased by AirNorth in June 1998; in January 1998 Lincoln and Augusta Airways merged to form Airlines of South Australia; and Eastland Airlines took over Sabair in December 1996.

In practice, the close relationships between some of these airlines, either in terms of actual financial relationships or client relationships, reduces this apparent level of competition. As a result, the regional airline industry can usefully be examined within an ownership and alliance framework. Alliances outline the client relationships between airlines and can be segmented into three strata: 100 per cent owned subsidiary airlines of Qantas or Ansett; airlines allied with Qantas or Ansett; and independent operators.

Seven regional airlines were 100 per cent owned subsidiaries of Qantas and Ansett in 1997, ten had strong commercial alliances and a further eight had weaker or indirect alliances with the domestic airlines (table 3.1). For example, AirNorth Regional uses Ansett's ground handling, reservation hosting and catering services. Table 3.1 illustrates this structure. In 1997, the remaining 21 airlines were essentially independent (table 3.2).

This network of alliances shows the reach of the domestic airlines into the regional aviation market. All regional airlines carrying more than 50 000 passengers annually are aligned with one or other of the domestic airlines.

Below this level there was domestic airline involvement with half of the airlines which carried 10 001–50 000 passengers annually, and even amongst the airlines carrying only 5000–10 000 passengers annually, half had links to the domestic airlines.

TABLE 3.1 OWNERSHIP AND ALLIANCE STRUCTURE OF REGIONAL AIRLINES, 1997

ANSETT	*QANTAS*
100% owned	*100% owned*
Aeropelican Air Services	Airlink
Kendell Airlines	Eastern Australia Airlines
Skywest Airlines	Southern Australia Airlines
	Sunstate Airlines
Strong alliance	*Strong alliance*
AirNorth Regional	Country Connection Airlines
Flight West Airlines	Eastland Air
Hazelton Airlines	Lincoln Airlines [a]
Impulse Airlines (alliance to cease 1 October 1999)	O'Connor Airlines
Tamair [a]	Yanda Airlines
Weak alliance	*Weak alliance*
Air Facilities	National Jet Systems
Transtate Airlines	Norfolk Jet Express
	Whyalla Airlines
Indirect alliance	
Air Tiwi [a] (owned by AirNorth Regional)	
Air Link (strong alliance with Hazelton Airlines)	
Airlines of Tasmania [a] (commercial agreement with Tamair)	

a. Airline did not operate in the regional aviation industry as at 31 July 1999.

Notes 1. A ‘strong’ alliance was considered to involve feeder service relationships or shared services such as terminals, ground handling, reservations hosting or in-flight catering.

2. A ‘weak’ alliance indicates a frequent flyer rewards partnership or the appearance of a small regional airline in the timetable of Ansett or Qantas.

Source Ansett and Qantas electronic timetable 1999, *Australian Aviation* 1997.

TABLE 3.2 INDEPENDENT REGIONAL AIRLINES

Air Swift [a]	Geelong Flight Centre	Pacific Interline [a]
Albatross Airlines [a]	Golden Eagle Aviation [a]	Rottnest Airlines [a]
Arnhem Air [a]	Island Airlines	Shepparton Airlines
Augusta Airways [a]	Kentialink Australia [a]	Skytrans
Aus-Air [a]	King Island Airlines	Southern Sky Airlines [a]
Emu Airways	Missionary Aviation Fellowship (MAF)	Sydney Harbour Seaplanes
Eyre Commuter [a]	Ord Air Charter	Western Airlines

a. Airline did not operate in the regional aviation industry as at 31 July 1999.

The importance of domestic airlines in the regional aviation industry is demonstrated most clearly when the carriage of passengers is examined. Although just over half of the regional airlines had an alliance with one of the domestic airlines, these airlines carried 97 per cent of the regional passengers. These were split equally between Qantas and Ansett aligned airlines. The remaining 21 non-aligned airlines carried only 3 per cent of regional traffic.

The announcement that the alliance between Impulse and Ansett will cease from 1 October 1999 will change this balance somewhat (Thomas 1999, p. 59). Assuming Impulse maintains its market share, the proportion of passengers carried by non-allied airlines will increase from three to around seven per cent after that date. The impact, if any, on the conduct of the industry remains to be seen.

The domestic operators also have a strong direct presence in the regional airline market, operating services on 15 per cent of full-year regional routes in 1997. Airlines with which they have an alliance of some form operated on 84 per cent of regional routes (80 per cent of routes were operated solely by airlines having alliances with Ansett or Qantas).

Why are alliances so important?

Airlines have developed a wide range of cooperative arrangements to provide a broader, more efficient range of services.

To the regional airlines the recognised benefits of an alliance with a domestic airline include primarily access to on-carriage passengers, but also involvement in their large frequent flyer schemes and use of domestic aviation infrastructure. Domestic airlines also benefit from alliances with regional airlines as they serve to increase density on major routes. So alliances enhance revenue and result in cost savings. Alliances allow many of the benefits of ownership to be gained, while maintaining the separate identity and management structure of the airlines.

The importance of on-carriage passengers differs greatly between airlines and routes. Naturally, to benefit from on-carriage arrangements with a domestic airline, a common port is required; most, but not all, regional airlines meet this requirement. Respondents to the BTE survey indicated that, on average, 20 per cent of regional airline passengers transfer directly to or from trunk carriers. IC (1992) found that between 8 and 20 per cent of regional passengers to trunk ports are on-carried by the domestic airlines. Harris (1988) estimated that on-carriage links with regional operators accounted for 2 to 3 per cent of total passenger revenue for domestic airlines. The recent growth in regional airline passenger numbers should have increased this estimate.

From the passenger's perspective, alliances can improve service quality, making the journey between regional centres and inter-State capitals relatively seamless. Passengers benefit from expanded route networks, better connections, increased frequent flyer program benefits and more streamlined ticketing, check-in and baggage handling (*The Avmark Aviation Economist* 1999, p. 13). They also indicate to the passenger that the regional airline has the approval of a domestic airline, which may limit safety concerns passengers hold regarding small aircraft.

Alliances do have some negative aspects. The joining of networks may lead to fewer operators dominating major airports, driving out weaker competitors, increasing fares and reducing passenger choices. Analysis in the United States by the General Accounting Office suggested that alliances could reduce competition, although on some routes the linking of small operators could promote viable competition for a dominant airline (*Avmark Aviation Economist* 1999, p. 13). They recognised that 'tacit coordination' is relatively easy in an industry where there are only a few companies and where rivals' fare and schedule information is widely available.

Changing role of the domestic airlines in regional aviation

Historically, Qantas (as Australian Airlines) and Ansett Australia have been heavily and directly involved in regional aviation. The Australian airline industry is now looking at the success of the United States' model where major airlines provide their subsidiaries with marginal routes. The smaller aircraft and lower salary structure of regional airlines makes this a cost-effective move for the domestic airlines.

Chapter 2 noted the recent and planned reshaping of the domestic airlines' regional networks and the uptake of these routes by their subsidiaries. Qantas and Ansett are increasingly competing on the major trunk routes, while subsidiaries and new operators seek to develop other business. Although this may cause the number of regional airlines to increase, the ownership linkages mean that there need be very little observable change for passengers.

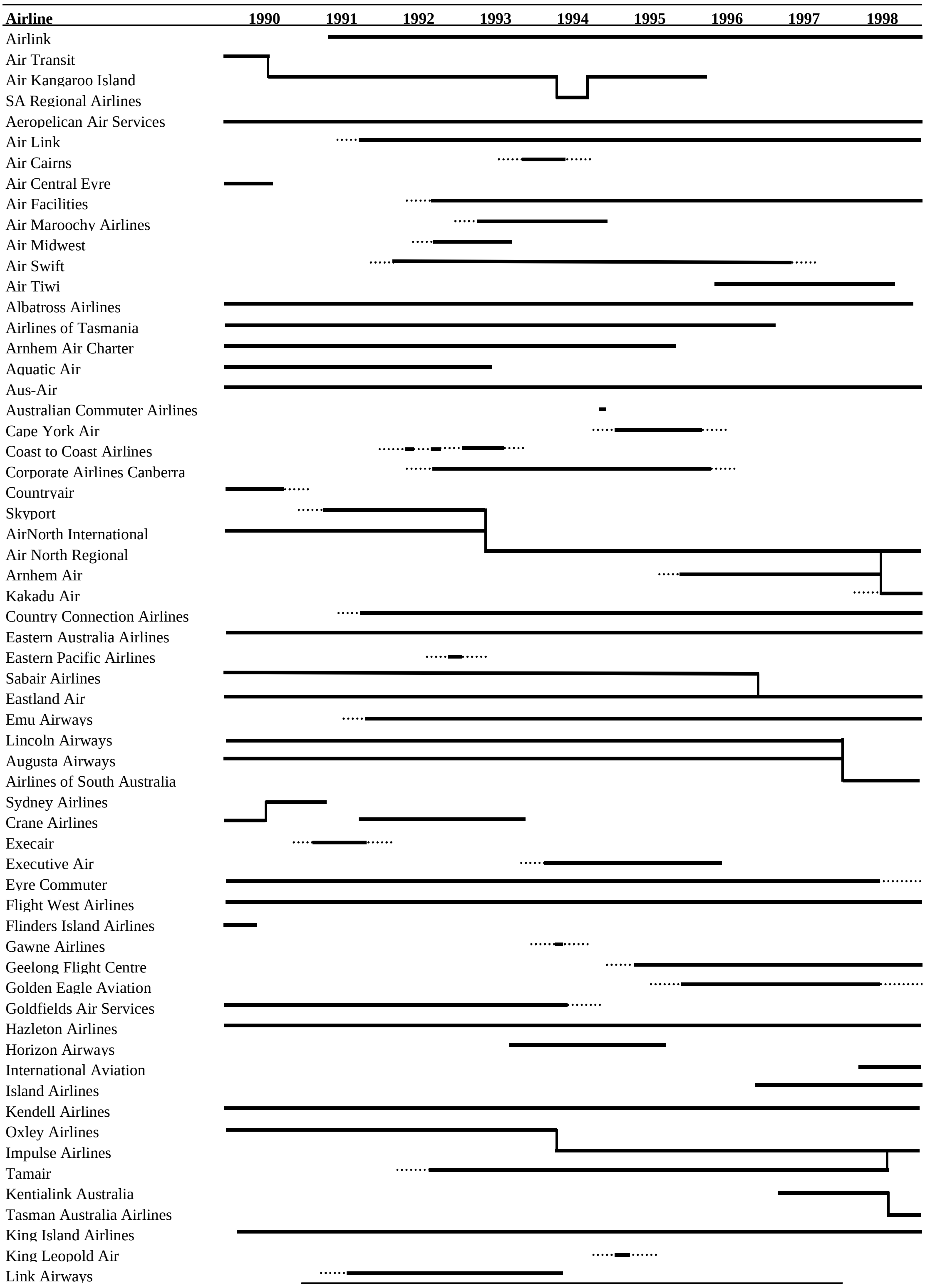
Change in industry participants

The number of operators of regional RPT services fluctuates and is greatly affected by general economic conditions. Figure 3.1 shows the regional airlines operating over the period 1990–1998. This change in operators is referred to as 'churn'.

There has been significant churn in the regional airline industry, primarily at the smaller airline level. When the IC released a report on intra-State aviation in mid 1992, there were 49 regional airlines operating in Australia. Through 1997, 46 regional airlines operated, of which only 26 had been operating continuously in RPT since 1992.

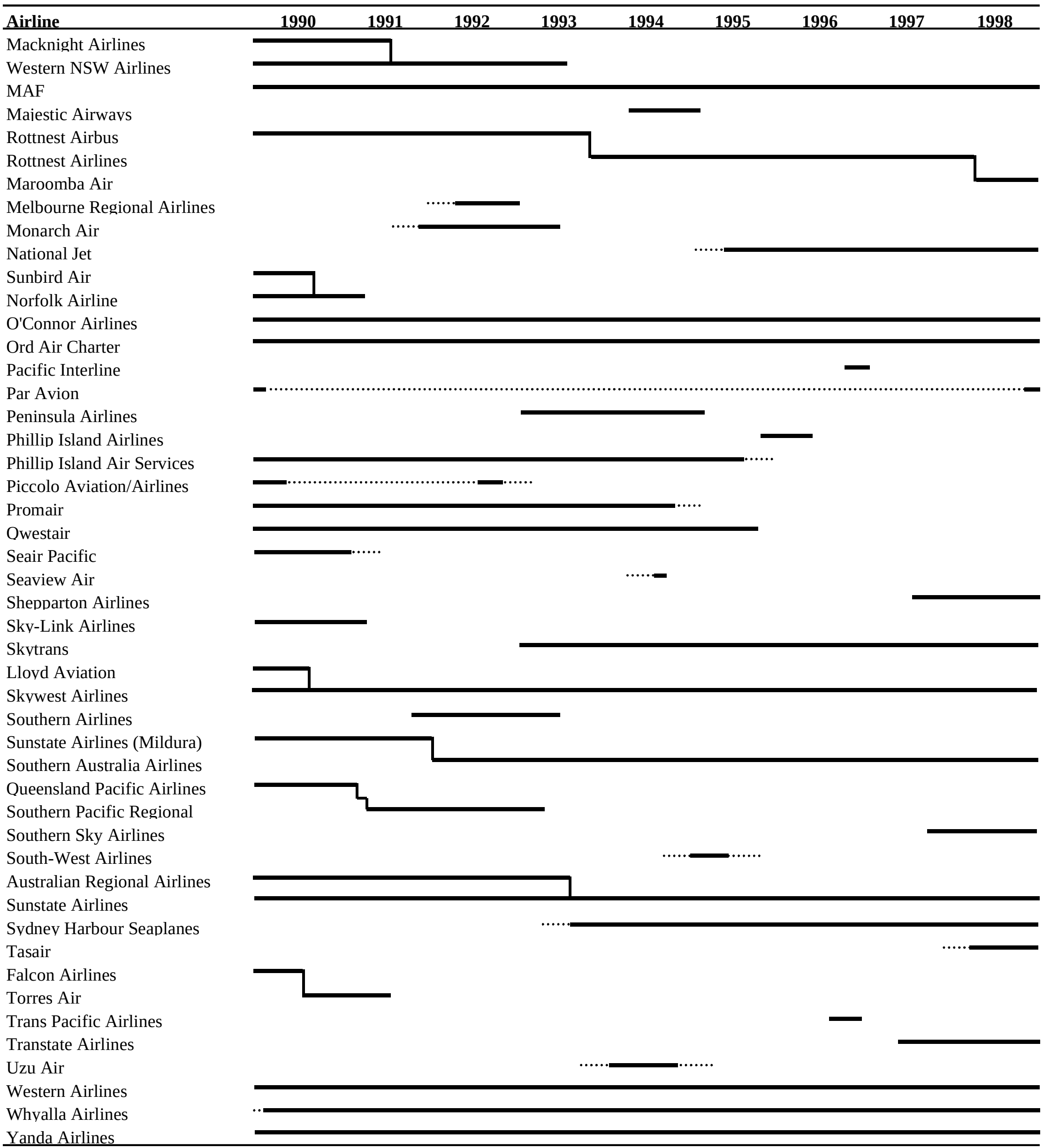
There are a number of factors behind industry churn. Business failures have recently occurred within the regional aviation industry. Administrators have been appointed to a number of airlines—Airlines of Tasmania (1997), Southern Sky (June 1999) and Aus-Air (July 1999). However, the churn within the industry does not necessarily solely reflect a high business failure rate. Rather, the close link with charter operations, in the case of many of the smaller regional airlines, means that companies may move their investment in and out of RPT operations depending on a range of economic and other factors.

FIGURE 3.1 REGIONAL AVIATION COMPANIES, 1990–1998



(Figure 3.1 continued over)

(Figure 3.1 continued)



Notes 1. Dark boxes indicate RPT operation and dotted lines charter operations.

2. Vertical lines linking airlines indicate a name change due to a merger, takeover or business decision.

Source *Australian Aviation* 1990-1998, Avstats 1998b.

New entrants tend to have been elsewhere within the aviation industry, rather than completely outside the industry. Thus, although there is a reasonable level of churn in the industry, the pool of potential entrants is limited. When the geographic spread of the airlines is examined later in this chapter it will be seen that the pool of potential service providers for specific routes is even further reduced.

Change also occurs at a lower level within the industry. Even in the case of the stable airlines, there is a process of continuing change in terms of aircraft used, routes serviced and scheduling of individual routes. However, it must be remembered that while the activity of passengers will be affected by route and schedule changes, aircraft changes or a change of airline may not impact on their access to aviation services.

ACTIVITY BY STATE/TERRITORY

The level of activity by regional airlines varies between State and Territories and the situation in each State and Territory is examined below. No single regional airline services all States and Territories. However, Kendell, Airlink and Southern Australia have the broadest geographic reach of the regional airlines. In general, most regional airlines only operate in one or two adjacent States/Territories.

There are nearly 770 airfields in Australia licensed by CASA as meeting requirements of the Civil Aviation Act and which have details on their state published in aeronautical information publications (AOPA 1996, BASI 1999). Licensed and unlicensed airfields total over 1800 (AOPA 1998). Regional airlines serviced 206 airfields (including all State and Territory capitals) in 1997, of which almost 15 per cent were unlicensed. The maps contained in appendix 1 display the location of airfields serviced by regional airlines and the routes originating from each.

New South Wales

During 1997, regional RPT services were provided by 19 airlines (table 3.3) to 53 airports (table 3.4). These airlines performed an estimated 150 100 flight stages which terminated and/or originated in New South Wales. In terms of numbers of airlines, airports serviced and flight stages completed, this State was the most densely serviced State/Territory. The 19 airlines carried 2 153 000 passengers (TOBS) and 469 tonnes of freight and mail. Separate flight sectors (port-to-port pairs) offered totalled 118, of which 21 were contested by two or more regional airlines, leaving the remaining 97 as single-operator sectors.

TABLE 3.3 AIRLINES OPERATING REGIONAL RPT SERVICES IN NSW, 1997

Aeropelican Air Services [a]	Hazelton Airlines	Southern Australia Airlines [b]
Air Facilities	Impulse Airlines	Sunstate Airlines [b]
Air Link	Kendell Airlines [a]	Sydney Harbour Seaplanes
Country Connection Airlines	Kentialink Australia	Tamair [c]
Eastern Australia Airlines [b]	Norfolk Jet Express	Yanda Airlines
Eastland Air	Pacific Interline	
Flight West Airlines	Shepparton Airlines	

a. 100% Ansett subsidiary.

b. 100% Qantas subsidiary.

c. Airline operated for only part of 1997.

Note Sydney Helicopters, although offering RPT services in 1997, have been excluded from further analysis due to their differing operating cost structure and routing pattern which does not leave the greater Sydney area.

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

TABLE 3.4 NSW AIRPORTS SERVED BY REGIONAL RPT FLIGHTS, 1997

Albury	Cootamundra	Lismore	Singleton
Armidale	Corowa	Lord Howe Island	Sydney
Ballina	Cowra	Merimbula	Tamworth
Bathurst	Cudal	Moree	Taree
Belmont	Deniliquin	Moruya	Wagga Wagga
Bourke	Dubbo	Mudgee	Walgett
Brewarrina	Forbes	Narrabri	West Maitland
Broken Hill	Glen Innes	Narrandera	West Wyalong
Casino	Grafton	Norfolk Island	Williamtown
Cobar	Griffith	Nyngan	Wollongong
Coffs Harbour	Gunnedah	Orange	Young
Cooma	Inverell	Parkes	
Coonabarabran	Kempsey	Port Macquarie	
Coonamble	Lightning Ridge	Scone	

Note 1. Norfolk Island and Lord Howe Island are considered NSW airports, as the NSW government regulates these air routes. As a result, airlines servicing these islands are considered regional airlines in this study.

Source Avstats 1998b.

Victoria

During 1997, regional RPT services were provided by 12 airlines (table 3.5) to 9 airports (table 3.6). These airlines performed an estimated 39 000 flight stages which terminated and/or originated in Victoria. They carried 738 000 passengers (TOBS) and 3190 tonnes of freight and mail. A total of 25 separate flight sectors (port-to-port pairs) were offered, five of which were contested by two or more regional airlines, leaving the remaining 20 as single-operator sectors.

TABLE 3.5 AIRLINES OPERATING REGIONAL RPT SERVICES IN VICTORIA, 1997

Airlines of Tasmania [a]	Impulse Airlines	O'Connor Airlines
Aus-Air	Island Airlines	Shepparton Airlines
Geelong Flight Centre	Kendell Airlines [b]	Southern Australia Airlines [c]
Hazelton Airlines	King Island Airlines	Tamair

a. Airline operated for only part of 1997.

b. 100% Ansett subsidiary

c. 100% Qantas subsidiary

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

TABLE 3.6 VICTORIAN AIRPORTS SERVED BY A REGIONAL RPT FLIGHT, 1997

Essendon	Melbourne	Portland
Geelong	Mildura	Sale
Latrobe Valley	Moorabbin	Shepparton

Source Avstats 1998b.

Queensland

During 1997, regional RPT services were provided by 11 airlines (table 3.7) to 53 airports (table 3.8). These airlines performed an estimated 89 000 flight stages which terminated and/or originated in Queensland. They carried 1 657 000 passengers (TOBS) and 4750 tonnes of freight and mail. A total of 115 separate flight sectors (port-to-port pairs) were offered, 18 of which were contested by two or more regional airlines, leaving the remaining 97 as single-operator sectors.

TABLE 3.7 AIRLINES OPERATING REGIONAL RPT SERVICES IN QUEENSLAND, 1997

Air Swift [a]	Hazelton Airlines	Transtate Airlines
Airlink [b]	Impulse Airlines	Skytrans
Eastland Air	National Jet	Sunstate Airlines [b]
Flight West Airlines	Norfolk Jet Express	

a. Airline operated for only part of 1997.

b. 100% Qantas subsidiary.

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

TABLE 3.8 QUEENSLAND AIRPORTS SERVED BY A REGIONAL RPT FLIGHT, 1997

Aurukun	Cloncurry	Julia Creek	Rockhampton
Bamaga	Coen	Karumba	Roma
Barcaldine	Cooktown	Kowanyama	Saint George
Bedourie	Coolangatta	Lizard Island	Thangool
Birdsville	Cunnamulla	Longreach	Thargomindah
Blackall	Doomadgee	Mackay	Thursday Island
Blackwater	Dunk Island	Maroochydore	Toowoomba
Boulia	Edward River	Maryborough	Townsville
Brampton Island	Emerald	Mornington Island	Weipa
Brisbane	Gladstone	Mount Isa	Windorah
Bundaberg	Great Keppel Island	Normanton	Winton
Burketown	Hervey Bay	Proserpine	
Cairns	Hughenden	Quilpie	
Charleville	Iron Range	Richmond	

Source Avstats 1998b.

South Australia

During 1997, regional RPT services were provided by 11 airlines (table 3.9) to 15 airports (table 3.10). These airlines performed an estimated 41 000 flight stages which terminated and/or originated in South Australia. They carried 432 000 passengers (TOBS) and 550 tonnes of freight and mail. There were 25 separate flight sectors (port-to-port pairs) offered, six of which were contested by two or more regional airlines, leaving the remaining 19 as single-operator sectors.

TABLE 3.9 AIRLINES OPERATING REGIONAL RPT SERVICES IN SOUTH AUSTRALIA, 1997

Albatross Airlines	Eyre Commuter	Southern Australia Airlines [a]
Airlink [a]	Kendell Airlines [b]	Southern Sky Airlines
Augusta Airways	Lincoln Airlines	Whyalla Airlines
Emu Airways	O'Connor Airlines	

a. 100% Qantas subsidiary.

b. 100% Ansett subsidiary.

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

TABLE 3.10 SOUTH AUSTRALIAN AIRPORTS SERVED BY A REGIONAL RPT FLIGHT, 1997

Adelaide	Kingscote	Port Augusta	Whyalla
Ceduna	Leigh Creek	Port Lincoln	Woomera
Cleve	Mount Gambier	Renmark	Wudinna
Coober Pedy	Olympic Dam	Streaky Bay	

Source Avstats 1998b.

Western Australia

During 1997, regional RPT services were provided by 7 airlines (table 3.11) to 41 airports (table 3.12). These airlines performed an estimated 29 900 flight stages which terminated and/or originated in Western Australia. They carried 659 300 passengers (TOBS) and 1510 tonnes of freight and mail. There were 79 separate flight sectors (port-to-port pairs) offered, of which eight were contested by two or more regional airlines, leaving the remaining 71 as single-operator sectors.

TABLE 3.11 AIRLINES OPERATING REGIONAL RPT SERVICES IN WESTERN AUSTRALIA, 1997

Airlink [a]	Rottnest Airlines
Golden Eagle Aviation	Skywest Airlines [b]
National Jet	Western Airlines
Ord Air Charter	

a. 100% Qantas subsidiary.

b. 100% Ansett subsidiary.

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

TABLE 3.12 WESTERN AUSTRALIAN AIRPORTS SERVED BY A REGIONAL RPT FLIGHT, 1997

Albany	Esperance	Leinster	Port Hedland
Balgo Hills Mission	Fitzroy Crossing	Leonora	Rottnest Island
Broome	Geraldton	Marble Bar	Shark Bay
Busselton	Halls Creek	Margaret River	Telfer
Camp Nifty	Kalbarri	Meekatharra	Useless Loop
Carnarvon	Kalgoorlie	Monkey Mia	Wiluna
Christmas Island	Kalumburu	Mount Keith	Woodie Woodie
Cocos Island	Karratha	Mount Magnet	Wyndham
Cue	Kununurra	Newman	
Derby/Curtin	Laverton	Paraburdoo	
Drysdale	Learmonth	Perth	

Source Avstats 1998b.

Tasmania

During 1997, regional RPT services were provided by 7 airlines (table 3.13) to 7 airports (table 3.14). These airlines performed an estimated 26 100 flight stages which terminated and/or originated in Tasmania (or Bass Strait Islands). They carried 575 500 passengers (TOBS) and 1200 tonnes of freight and mail. There were 26 separate flight sectors (port-to-port pairs) offered, six of which were contested by two or more regional airlines, leaving the remaining 20 as single-operator sectors.

TABLE 3.13 AIRLINES OPERATING REGIONAL RPT SERVICES IN TASMANIA, 1997

Airlines of Tasmania [a]	Kendell Airlines [b]
Aus-Air	King Island Airlines
Geelong Flight Centre	Southern Australia Airlines [c]
Island Airlines	

a. Airline operated for only part of 1997.

b. 100% Ansett subsidiary.

c. 100% Qantas subsidiary.

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

TABLE 3.14 TASMANIAN AIRPORTS SERVED BY A REGIONAL RPT FLIGHT, 1997

Burnie	Devonport	Hobart	Launceston
Cape Barren Island	Flinders Island	King Island	

Source Avstats 1998b.

Northern Territory

During 1997, regional RPT services were provided by 7 airlines (table 3.15) to 27 airports (table 3.16). These airlines performed an estimated 34 300 flight stages which terminated and/or originated in the Northern Territory. They carried 597 000 passengers (TOBS) and 2900 tonnes of freight and mail. There were 57 separate flight sectors (port-to-port pairs) offered, three of which were contested by two or more regional airlines, leaving the remaining 54 as single-operator sectors.

TABLE 3.15 AIRLINES OPERATING REGIONAL RPT SERVICES IN THE NORTHERN TERRITORY, 1997

AirNorth Regional	Kendell Airlines [b]
Airlink [a]	MAF (Missionary Aviation Fellowship)
Air Tiwi (subsidiary of AirNorth Regional)	National Jet
Arnhem Air	

a. 100% Qantas subsidiary.

b. 100% Ansett subsidiary.

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

TABLE 3.16 NORTHERN TERRITORY AIRPORTS SERVED BY A REGIONAL RPT FLIGHT, 1997

Alice Springs	Garden Point	Kings Canyon	Ramingining
Ayers Rock	Gove	Lake Evella	Roper River
Bathurst Island	Groote Eylandt	Maningrida	Snake Bay
Borroloola	Hooker Creek	McArthur River	South Goulburn Is.
Croker Island	Jabiru	Milingimbi	Tennant Creek
Darwin	Kalkgurung	Numbulwar	Victoria River Downs
Elcho Island	Katherine/Tindal	Oenpelli	

Source Avstats 1998b.

Australian Capital Territory

During 1997, regional RPT services were provided by 6 airlines (table 3.17) to Canberra airport. These airlines performed an estimated 21 000 flight stages which terminated and/or originated in Canberra. They carried 516 000 passengers (TOBS) and 435 tonnes of freight and mail. Six separate flight sectors (port-to-port pairs) were offered, one of which (Canberra to Sydney) was contested, leaving the remaining five as single-operator sectors.

TABLE 3.17 AIRLINES OPERATING REGIONAL RPT SERVICES IN THE AUSTRALIAN CAPITAL TERRITORY, 1997

Air Facilities	Impulse Airlines
Airlink [a]	Kendell Airlines [b]
Eastern Australia Airlines [a]	Southern Australia Airlines [a]

a. 100% Qantas subsidiary.

b. 100% Ansett subsidiary.

Source Avstats 1998b and *Australian Aviation* 1997, 1998.

GOVERNMENT

The structure of the regional aviation industry and its competitiveness are greatly influenced by the institutional framework in which the industry operates. The Government, at all levels, is a significant player in regional aviation. However, the overriding trend this past decade in the regional aviation industry has been increased deregulation and a commensurate reduction in the control Government holds over the industry structure. The role of Commonwealth and State/Territory Governments in regional aviation is examined here.

Commonwealth Government

The Commonwealth Government has moved back from a direct role in the Australian aviation industry. Significant events in this shift included:

- the deregulation of inter-State aviation (1990), which saw the removal of price regulation, aircraft import restrictions, and capacity sharing arrangements on inter-State routes;
- the sale of Australian Airlines to Qantas (1993);
- the divestment of regional and remote airports through the airport local ownership program (ALOP) (early 1990s), and
- the 25 per cent trade-sale of Qantas to British Airways (1993);
- the subsequent public float of Qantas (1995); and
- the sale of Federal Airports Corporation (FAC) airports (1997/98).

Significantly though, the Commonwealth Government still retains control of airways' services through Airservices Australia (ASA), and aviation safety regulation through CASA. It is now generally accepted that the Commonwealth's power is restricted to matters concerned with safety, security, regularity and efficiency, where regularity and efficiency have been interpreted as relating to safety and navigational aspects (BTCE 1988).

The Department of Transport and Regional Services is responsible for the development of policies and legislation that protects community and consumer interests in the operation of airports and air transport services. To this end, the Department administers the requirements of the Air Navigation Act and Regulations, including aviation security provisions, and the Airports Act and Regulations and works to minimise the adverse effects of aircraft operations. It also ensures the full implementation of the slot management regime at Sydney's Kingsford Smith Airport.

The Department additionally plays a liaison and facilitation role, managing the continuing relationship between the Government and Australia's airlines. Oversight of ASA and CASA is provided, as is the policy framework in which both of these authorities operate.

The Department of Transport and Regional Services also administers the Remote Air Service Subsidy (RASS) scheme. The subsidies ensure that remote communities continue to receive a basic level of air service in cases where there are no reasonable alternatives to air transport and the air service is not otherwise commercially viable.

The scheme currently serves an estimated 9000 people, located predominantly in Queensland and the Northern Territory, with a few airports in Western Australia and South Australia (Anderson and Macdonald 1999). The services primarily provide regular weekly deliveries of mail and educational materials and, in some cases, general freight and passengers.

In the period May 1998 to April 1999, five air operators were subsidised to service 221 specified remote airports at a cost of $1 257 500. The operators were Air Mt Isa, Airline of South Australia, AirNorth, Cape York Air and Ord Air Charter. Unlike the other operators, Air Mt Isa is not a regional airline but holds a charter operator’s certificate.

The subsidy is assessed as the expected shortfall between costs and revenue (including other subsidies) for the coming year with an allowance for a five per cent profit. Operators also receive a subsidy from Australia Post to support these air routes (totalling $344 700 in 1998–99), while the service operated by Airlines of South Australia between Port Augusta and Boulia is also subsidised by the South Australian and Queensland State Governments.

Civil Aviation Safety Authority (CASA)

CASA is responsible for civil aviation safety in Australia, including safety regulation, safety education and training, and provision of accurate and timely aviation safety advice. This involves setting standards, controlling industry entry (including certification and licensing), safety surveillance of the industry, and enforcement of standards. CASA also provides regulatory oversight of the national airways system, and of the air traffic, aviation rescue and fire fighting services provided by ASA.

CASA directly influences the operation of regional airlines in a number of ways. It is necessary to hold an AOC provided by CASA before offering RPT services. In this way, CASA influences industry entry, an issue examined in more detail in chapter 5. CASA’s surveillance of airline safety can result in regional airlines, which choose not to operate in compliance with the regulations, being grounded, as was the case with Airlines of Tasmania in 1997.

More broad-reaching is CASA’s review and revision of the Australian aviation safety requirements contained in the Civil Aviation Regulations and Civil Aviation Orders. The ongoing review was initiated in June 1996 and aims to consolidate these into one body of rules. The guiding principles are to focus regulatory effort on protecting the fare-paying passenger through development of aviation safety regulations that are simple, unambiguous and generally harmonised with other leading aviation nations.

Airservices Australia (ASA)

ASA was established in July 1995 under the *Air Services Act 1995* (ASA 1999). It is a Government-owned commercial authority responsible for the management of air traffic control in the Australian flight information region (over 11 per cent of the world's surface). Its principal functions are:

- air traffic control and airspace management;
- aeronautical information;
- communications;
- radio navigation aids;
- search and rescue alerting; and
- airport rescue and fire fighting services.

Regional airlines use ASA provided services, predominantly funded by a user-pays system of charging. In 1997–98, 97 per cent of income was provided through revenue from charges, and 97 per cent of this was from the operations of airlines (ASA 1998). ASA charges are based on the type of aviation operation and the service used. For example, in mid-1998 ASA introduced location-specific charging for terminal navigation services and, in recognition of this, the Government removed the ASA component for terminal navigation services of the duty on aviation gasoline in July 1998 (DoTRD 1998). En route charges are treated similarly. This means avgas powered operators do not support services they do not use; the full burden of payment for services has shifted to users.

Bureau of Air Safety Investigation (BASI)

BASI operates within the Australian Transport Safety Bureau (ATSB) of the Department of Transport and Regional Services. BASI is responsible for investigating accidents, serious incidents, and safety deficiencies involving civil aircraft operations in Australia and participates, or assists, in some overseas investigations of accidents and serious incidents. As well, BASI conducts investigations and studies of the aviation system to identify and rectify underlying factors that can affect safety and potentially become significant factors in accidents.

The House of Representatives Standing Committee on Transport, Communications and Infrastructure Report *Plane Safe* (1995), found that ‘a paucity of information’ and ‘an absence of safety indicators’ were features of the low-capacity RPT sector of the Australian aviation industry. BASI is involved in studying the ongoing safety of the regional aviation industry.

In 1999, BASI released a report examining all areas of the regional airlines operations, including cabin safety, flight operations, maintenance, airspace management, regulations and surveillance. Where a safety deficiency was identified, safety action, in the form of a recommendation or a safety advisory notice, was taken by BASI.

BASI also publishes the *Regional Airlines Safety Bulletin* for the regional airline industry. It covers either a three- or six-month period and includes information on occurrences related to operations and airworthiness, and relevant recommendations and safety advisory notices.

Australian Competition and Consumer Commission (ACCC)

The ACCC (and its predecessor the Prices Surveillance Authority—PSA) monitors charges for airport services and has also monitored air fares. Air fare monitoring has not been conducted in relation to regional airline operations. Between 1991 and 1996 the ACCC/PSA did monitor fares over 21 principal inter-State routes common to Ansett and Qantas. The objective was to assess the overall pricing benefits of deregulation of the domestic air market.

It was found that full economy fares had risen 15–35 per cent, but the number of passengers paying this fare fell from 50 to 20 per cent (ACCC 1996). This, in combination with increased passenger numbers, allowed average fares to decrease 8.7 per cent in nominal terms. The deepest discount increased from 50 per cent to over 60 per cent. The spread of gains, however, was not even—average fares fell 11.1 per cent on long-distance routes but rose 3.1 per cent on short-distance routes.

This study provides a snapshot in time, so it is difficult to identify changes in the regional industry to compare with these domestic trends. However, the strong involvement of domestic airlines in the regional industry supports the assumption that similar trends are present. Indeed, deep discounts of over 60 per cent are available on some regional routes and passenger numbers have shown a sharp increase.

State Governments

State Governments control intra-State aviation matters, while inter-State issues remain the domain of the Commonwealth. State Government control of intra-State air services, however, applies only to economic aspects and does not cover issues of safety—exclusively a Commonwealth responsibility.

New South Wales

New South Wales is the last remaining jurisdiction with significant licensing/ regulation that limits competition in intra-State aviation—although from 26 March 2000 some restrictions will be lifted (NSW Department of Transport 1999). The policy framework is one of ‘managed competition’, aiming to increase consumer benefits such as lower fares, more frequent flights, and appropriate aircraft (ATC 1999). The Air Transport Council (ATC), established in 1987, administers the licensing of intra-State passenger transport and regulates the number of operators to be licensed on specific routes.

There have been a series of reviews of air services that have seen the State move towards increased competition on intra-State air routes (IC 1992, IPART 1997, Standing Committee on State Development 1998). In August 1999, the NSW Department of Transport released an outline of the new licensing and administration arrangements applying from 26 March 2000. This does not involve any changes to the scope and coverage of the *Air Transport Act 1964*.

Intra-State RPT routes in NSW are classified as either ‘open routes’ or ‘regulated routes’. Regulated routes are those where the point of origin or destination of *passengers* is Sydney’s Kingsford Smith Airport and includes routes generally hubbed through regional centres. Historically, these have had access restrictions. Routes with less than 40 000 passengers per annum were considered to be best serviced by a single operator, while larger routes would have two operators providing competitive services.

Open routes tend to exclude Sydney as either an origin or a destination, although there are some exceptions. Operators on these routes are permitted to compete directly with each other, although this does not generally occur because most of these licences are used to operate triangulated services, to re-position aircraft for other services, or to develop new routes (ATC 1999).

The new licensing arrangements for the two route types have been made consistent:

- Restricted routes in and out of Sydney with annual passenger numbers above 20 000 are to be covered by the Open Route licensing arrangements. The licence period for these routes will be extended to three years.
- For open route licences, there will be no limit to the number of licences issued for a particular route. This category will now include all routes which do not have Sydney as an origin or destination and have more than 20 000 passengers annually. Service conditions will no longer be specified on the licence. Under the current proposal some of these routes will be re-regulated.

The process for awarding licenses on regulated routes will be unchanged. Calls for expressions of interest in regulated routes are made, applicants are shortlisted, and then the preferences of local councils and information in public submissions are taken into account in making the draft and final determinations.

Victoria

The Victorian intra-State aviation industry has had no licensing requirements since the 1950s, and was effectively deregulated in 1979 with the removal of Commonwealth licensing requirements. However, there is limited intra-State aviation supplied by regional airlines in Victoria—regional airlines are more frequently involved in routes linking Victoria to neighbouring States (appendix 1).

Queensland

Aviation services in Queensland have been deregulated since 1987, with the exception of ten routes, and Queensland has not licensed operators since 1994. The Queensland Government aims to deregulate routes to the point at which the service cannot be operated profitably by the market, or the market will provide what is assessed as an inadequate standard of service. Market entry restrictions have been applied to certain routes where it is considered in the public interest to ensure that remote communities are provided with a specified standard of air service.

Two routes from Cairns are regulated regarding aircraft standard. Sunstate Airlines hold a service contract for the Cairns–Horn (Thursday) Island route and Ansett for the Cairns–Weipa route. A further eight routes to western Queensland are subsidised and subject to five-year service contracts:

- Townsville–Hughenden–Richmond–Julia Creek–Cloncurry
- Townsville–Hughenden–Winton–Longreach
- Brisbane–Roma–Charleville
- Brisbane–Roma–Charleville–Quilpie–Windorah–Birdsville–Bedourie–Boulia
- Boulia–Mt Isa
- Brisbane–Barcaldine–Longreach
- Brisbane–Blackall–Longreach
- Toowoomba–St George–Cunnamulla–Thargomindah

Flight West Airlines hold the exclusive service contract for the western route. All service contracts are awarded as a result of an open tender process and provide for pricing as quoted in the tender documents. Comparative pricing is used to benchmark a reasonable price during the tender process. The contracts also allow for consumer price index (CPI) based fare adjustments.

South Australia

South Australia has never had State licensing requirements for regional aviation, and the industry was effectively deregulated in 1979 with the removal of Commonwealth licensing requirements. There are no State restrictions on the establishment of new airlines, or on route entry, and the State plays no role in licensing airline operations or in setting airline prices. Indeed, South Australia is the State with the longest experience of deregulation. Over this period, numerous arguments have been put in favour of regulation and several reviews and studies of the impacts of deregulation undertaken.

In the year under examination, only one air route was subsidised by the South Australian Government. The Government contributed to Airlines of South Australia's operation of a route serving twenty stations and townships between Leigh Creek and Boulia, of which eleven are in South Australia. This route was also subsidised under RASS and by Australia Post and the Queensland Government.

Western Australia

Western Australia deregulated jet routes in the early 1980's, while non-jet routes were deregulated in 1994. The impact of deregulation has been limited competition by Airlink on some routes in Western Australia, but no operator has commenced competitive services on the non-jet network operated by Skywest.

Although entry is not restricted, routes remain licensed in the sense that operators are required to apply for a State Government licence to offer an RPT service. The licence fee to operate a jet RPT aircraft is 1.5 per cent of gross earnings. The licence fee to operate a non-jet RPT aircraft is 7.2 cents per kg of maximum take-off weight (MTOW) per annum (this is CPI indexed). These fees are irrespective of routes or flying hours.

There are, however, a number of routes deemed commercially non-viable for which there is believed to be a community need for the service. The State restricts entry to these routes and subsidises the three operators.

- Ord Air Charter flies Derby–Fitzroy–Halls Creek–Kununurra. The subsidy is based on the shortfall between an agreed hourly rate for the aircraft and revenue collected.
- Western Airlines flies Geraldton–Kalbarri. The subsidy is based on an annual forecast of the likely revenue and costs for the route.
- Maroomba Airlines operates the Perth–Busselton route. The subsidy is based on the operator carrying the cost of the first three seats on the flight, with the Government funding the cost of the next three passengers, at which point the aircraft is able to break even.

The State Government’s major role is one of working with operators to increase frequency and capacity to key inter-State and intra-State destinations, and providing information which encourages decision makers to consider the frequency and routing of these services (Department of Transport Western Australia 1995).

Tasmania

In 1992, when most other States had largely introduced deregulation, the intra-State aviation industry was still heavily regulated in Tasmania. More recently this situation has changed. The Government, through the Tasmanian Department of Transport, has pursued a policy of deregulation for all intra-State passenger and freight air services following recommendations of a 1997 Committee of Review into Public Vehicle Licensing. In effect, the previous State licensing system had given Airlines of Tasmania (in which the Government had a stake) a closed market.

The Tasmanian Government does not provide air services to remote areas where commercial services are not viable, nor does it offer subsidies to private operators.

Northern Territory

The Northern Territory deregulated all intra-territory aviation services in January 1992. The Territory now has an ‘open skies’ policy where the level of air services is driven by market forces. The Government believes small centres seem well serviced and, in keeping with this, there are no Territory Government subsidised routes.

Australian Capital Territory

The Australian Capital Territory differs from other areas of Australia in that it has a single airport (Canberra) and so no intra-Territory aviation occurs.

CONCLUSION

The domestic airlines have a strong involvement in the regional aviation market through direct operation, but particularly though ownership of subsidiary airlines and systems of alliances. In the 1990s, the role of the domestic airlines in directly offering regional services has declined but still encompasses around 15 per cent of regional routes. Their influence can be measured in terms of routes serviced, but more importantly in terms of passenger numbers. The domestic airlines, through ownership / alliances with half the regional airlines, have a link with 97 per cent of passengers flying on regional routes, reflecting the effects of the ‘two-airlines’ policy of Commonwealth Governments of the past.

The close tie between domestic airlines and regional operations means that many of the trends of domestic aviation are increasingly being observed in regional aviation. Pricing patterns by regional airlines are examined in chapter 4, but work by the ACCC highlights increased discounts and increased patronage among domestic airlines.

The past and present actions of both Commonwealth and State Governments continue to have an influence on industry structure—through the support given to operators servicing otherwise non-viable routes, decisions to restrict entry to certain routes and licensing of operators (particularly at the Commonwealth level). New South Wales remains the only State / Territory regulating route entry, although both Western Australia and Queensland restrict entry to subsidised routes.

The following chapter looks at the economic aspects driving airline operations, providing a context to examine government interventions and, more importantly, an explanation of the factors driving price competitiveness.

CHAPTER 4 AIRLINE ECONOMICS

The factors that determine the demand for, and supply of, regional air services, influence the industry structure and contribute to industry participants' conduct by describing the nature of the market. The interaction of demand and supply in the marketplace results in the determination of prices, that is, the setting of fares.

This chapter sets the scene for the examination, in chapter 5, of price setting by analysing the determinants of demand and supply for regional air services. Demand determinants provide the reasons why people choose to travel by regional airlines, whereas determinants of supply show why airlines offer the quantity and quality of services they do.

DEMAND FACTORS

Airlines use their knowledge of demand factors to determine the likely usage of particular air services. The actual levels of these factors that cause consumers to change their travel decisions depend on the individual. The four major factors affecting demand for air travel (BTE 1986) are:

- Air fares, relative to the prices of other goods and services which compete with air travel for the consumer's dollar;
- Prices and availability of alternative modes of transport;
- The quality of service (for example, availability and frequency of service, travel time and comfort) provided by air transport relative to alternatives; and
- The socio-demographic characteristics of travellers and the level of economic activity in the route catchment area, measured by, for example, population, disposable income, tourism and major developments in industry.

These factors are examined in turn.

Air fares

Air fares are the main form of revenue for airlines operating regular passenger transport services; freight earnings and subsidy payments are other revenue sources. Total revenue must cover all of the airline's costs in order for the airline to continue operating in the long-term. However, the fare has a significant impact on the demand for air services—when prices are lower more people will be able to afford to fly, increasing demand. Because airlines fly aircraft of discrete sizes, they want to fill them to capacity to maximise profits on each route. To do this, airlines operate complicated yield management systems where the level of demand on individual routes is manipulated to closely match the capacity provided. These systems allow airlines to offer higher or, more usually, lower fares to decrease or increase demand on the route, or even individual flights, at more or less attractive times of the day.

The challenge of yield management involves deterring those who would normally fly from taking advantage of the discount fare and reducing the profit to the airline. This is achieved by placing conditions and restrictions on the discount fare tickets (table 4.1). Discount fare conditions are continually evolving, however the overall trend is towards increased restrictions on their use. Business travellers are historically a major source of airline revenue, in part due to their general willingness to pay higher fares. They need to be able to purchase tickets at short notice and to be able to change their plans whenever necessary. By placing restrictions, such as requiring 21-day advance purchase and not permitting flight changes on the discount fares it is possible for airlines to limit the suitability of such tickets for business travellers. The widespread disappearance of the standby fare is evidence of the increased restrictions required of discount fares.

Table 4.2 shows the number of routes in the data set for which discount fares were available and the level of the discount as a proportion of the full economy fare. The strong involvement of domestic airlines in the regional industry, highlighted in chapter 3, leads to an expectation that regional airlines would exhibit the same high level of discounting that the two domestic airlines have shown in recent years. So it is not surprising to see that a large proportion of regional routes in Australia have some kind of discount fare. Just over three-quarters (77 per cent) of the routes had a discount fare of some form available, most of which were between 40 and 60 per cent of the full economy fare. Less than 3 per cent of routes had a fare available that attracted a discount greater than 60 per cent on the full economy fare.

TABLE 4.1 DISCOUNT AIR FARE CONDITIONS

Type of discount	*Conditions*	*Discount on full economy fare*
21-day advance	Book and pay for trip at least 21 days in advance. Stay away at least 1 Saturday night. Return within 30 days after departure. Non-refundable. No re-routing.	50–60%
14-day advance	Book and pay for trip at least 14 days in advance. Stay away at least one Saturday night. Return within 60 days of departure. Non-refundable. No re-routing.	40–50%
7-day advance	Book and pay for trip at least 7 days in advance. Stay away at least one Saturday night. Return within 60 days after departure. Non-refundable. No re-routing.	30–40%
5-day advance	Book and pay for trip at least 5 days in advance.	10%
Seniors	Customers aged 60 years or over. No advance purchase or minimum stay requirements.	40–60%
Post-secondary students	Full-time students attending a recognised post-secondary institution.	25%
Secondary students	Full-time secondary school students with approved student identification.	50%

Note 1. These discounts are indicative only and not all are available on all routes.

Source Ansett electronic timetable for domestic travel.

TABLE 4.2 DISCOUNTS AVAILABLE ON REGIONAL ROUTES

Level of best discount available	*Number of routes*	*Proportion of routes (%)*
>60% of full economy fare	5	2
>50% and <= 60%	96	37
>40% and <= 50%	46	17
>30% and <= 40%	26	10
>20% and <= 30%	14	5
>10% and <= 20%	10	4
>0% and <= 10%	6	2
No discount available	60	23
TOTAL	263	100

Note 1. The information in this table is based on the full-year routes for which fare information was available.

2. > greater than, <= less than or equal to.

Source Avstats 1998b and Sabre 1998.

Alternate modes of transport

Air travel is generally an intermediate good; that is, air travel is not purchased for its own sake but as a means to an end. People need to decide whether the time saved in flying outweighs the extra cost. People will be less likely to fly if alternative modes of travel (eg. car, bus, train or ferry) are cheaper and / or more convenient. The substitution of alternative modes of transport, where available, depends on differences in travel costs and travel times between modes. Airlines cannot influence the actual price or convenience of other modes of travel. However, they can influence the relative prices, or take advantage of inadequacies that may exist, possibly through charging a higher price for their services if no alternative is available.

The convenience and cost of alternative modes will depend on a number of factors. These include the distance between the passenger's intended origin and destination, road quality, the comfort of the alternative and the range of alternatives available (bus, car and train or only a ferry). Long distances give air travel a significant time advantage. Poor roads increase the time taken by bus or car, and island routes often have only infrequent or slow ferry services.

The time / travel cost trade-off means that different people will chose different modes depending on their own value of time. The overall cost of travel increases significantly when the time in transit is more than a day. At this point, accommodation and meal expenses must be taken into account. This is often the point where a decision is made to use a faster method of travel, such as air transport (Douglas and Miller 1974, p. 29).

Only 16 per cent of the regional routes for which there were identified alternative modes of transport had alternate travel times estimated as taking three hours or less. The cut-off point of three hours was chosen as it allows a return journey in one day with time at the destination, providing a realistic alternative for same-day-return business trips.

Quality of service

The third factor influencing demand for air services is the service quality. If a higher quality of service is offered, all other things remaining equal, demand for air services will be greater. Aspects of quality of service, such as more frequent flights or reduced delays, make trips more convenient. Facilities for business travellers at airports in which they can work while waiting reduces the amount of time these travellers 'waste' in transit. Safety is an important component of service quality—passenger’s perceptions of airline and aircraft safety have an influence on service demand. In some cases, improved service quality changes the decision not to fly, thereby increasing the demand for air travel.

Quality also provides an alternative to price (fare) competition between airlines. Airlines advertise their airport lounge facilities, the amount of space between seats on-board the flight, the quality of in-flight meals and entertainment, safety features, safety records and the friendliness of their flight attendants. These aspects distinguish service between airlines and influence consumer choices.

There are a number of service quality factors that can alter a consumer’s choice of airline. These may not affect the total level of demand on a route, but will change the demand for particular airlines. In this way, service quality may have implications for the ability of airlines to effectively compete against each other. These issues are discussed below.

Same airline (and network) preference

All other factors being equal, passengers prefer large airlines (those that serve a large number of points) to small airlines. One reason for this is information costs. With smaller carriers, passengers may have to deal with different people to organise tickets or get information for each stage of their journey. A higher quality of service is also associated with larger airlines, including a higher perceived level of safety. A large carrier can get passengers to more places they may need to go. Connections are more likely to be scheduled to minimise time between flights, and baggage is less likely to get lost with a single airline on a multi-sector trip.

Large airlines also offer attractive Frequent Flyer programs. These were first introduced in the United States in the early 1980s (Tretheway and Oum 1992, p. 53) and in Australia in the early 1990s (BTCE 1993) in an attempt to create brand loyalty. These programs can induce increased travel as they effectively provide a discount to regular travellers, but more importantly, can also affect the passenger's choice of airline as points are non-transferable. This leads to a preference for larger airlines or for airlines which have joint Frequent Flyer programs. The ability of airlines to use such programs to limit the ability of competitors to enter a route is discussed in chapter 5.

Many of the attributes of large airlines preferred by air travellers can be gained by small airlines through the use of alliances.

Schedule and frequency sensitivities

An important consumer demand factor is the elapsed time from origin to destination. If an airline can offer a shorter elapsed time it will be more successful in attracting passengers than competing airlines. Also, it may mean the difference between alternative modes of travel; if the trip time for a particular route is reduced, total demand will increase.

Trip time can be broken down into three components, with different means for reducing the amount of time in each component. Schedule wait time can be reduced by higher flight frequencies. Airport access time can be reduced through streamlined check-in procedures. Faster aircraft or improved scheduling of connecting flights can reduce actual flight time.

Often, there is a trade off between particular aspects of the trip time. For example, more frequent flights can be achieved by using a hub and spoke network (discussed later in this chapter). However, this reduces the number of direct flights thereby increasing the connection time for other passengers.

Empirical estimates of flight frequency elasticity (travellers’ sensitivity to changes in flight frequency) are hard to come by. For example, a flight frequency elasticity of 0.05 means that for every 10 per cent increase in the number of flights offered on a route, overall demand for air travel will increase by 0.5 per cent; or conversely, if frequencies fall then so too will demand. Thus business travellers are more sensitive to changes in flight frequency than non-business travellers. In earlier BTCE work an average value of 0.15 was assumed for business travellers and 0.05 for non-business travellers. This broadly accords with the findings of Morrison and Winston (1986) who derived a business frequency elasticity of 0.21 and a leisure elasticity of 0.05 for the United States domestic market.

Flight frequency versus aircraft size

Aircraft size is often regarded as an aspect of service quality. Passengers tend to prefer larger aircraft to smaller ones. This preference can be for a number of reasons including the higher perceived safety of larger aircraft, more space in the cabin including the potential for larger seats and more overhead locker room, pressurised cabins, a smoother flight and faster flight times.

However, there is a trade-off between aircraft size and flight frequency. With a given level of demand, it is possible to service a market with a frequent service using small aircraft, or a less frequent service using larger aircraft. This relationship was discussed in chapter 2.

Flight frequency is important because of the travel-time savings it provides, as discussed above. In addition, it is a determinant in consumer's choice between airlines (Tretheway and Oum 1992, p. 27). If an airline adds flights in a particular market, it can generally gain a more than proportional share of the total market. Consumers’ preferences for more frequent flights allow them to decrease their schedule delay time. This effect is even more pronounced for business travellers, for whom maximising their productive time is of prime importance. Since business travellers also tend to pay higher fares, there is an even greater effect on an airline's revenue from increased flight frequency.

Socio-demographic influences

Types of travellers

Generally, analysis of air travellers looks at two broad groups based on the reason for travel—business and leisure passengers. These groups have varying quality of service preferences and behavioural characteristics. Airlines can stimulate demand by some groups through improved quality of service, while others are more responsive to ticket prices. It is also important to note that passengers affect airline operations through their behaviour and service preferences.

Business travellers typically have their ticket paid for by their employer and are most concerned with maximising the productivity of their time. Generally speaking, these travellers need flexibility in their schedules, as they often have to change their plans at short notice. They also demand higher levels of service, looking for frequent flights, lounges and frequent flyer reward programs (Tretheway and Oum 1992, p. 15).

One feature of business travellers that has impacted on the way airlines operate is the tendency for ‘no-shows’, to simply not turn up for a flight. As no-shows usually have flexible tickets that can be used later, the airline effectively loses a fare. Modern airline yield management systems take no-shows into account when taking bookings for flights and therefore sell more tickets than there are seats on the aircraft. This can result in some passengers being 'spilled' to the next flight. The higher the average load factor, the more likely it is that a particular flight will be full or over subscribed. Qantas and Ansett reported load factors for their groups of airlines as 71.9 per cent and 67.9 per cent respectively for the 1997-98 financial year (Qantas 1998 and Ansett 1998). This is significantly higher than the median of the weighted average load factors for the full-year regional routes which, in 1997, was 54 per cent. Only seven sectors had estimated average load factors over 80 per cent, indicating that across the regional airlines, spillage is not a major quality of service issue.

Leisure travellers are sensitive to price and are less interested in maximising productive time and changing their plans on short notice. They travel on personal time and are self-funded, so are more willing to take flights at inconvenient times in order to get a cheaper fare (Tretheway and Oum 1992, p. 15).

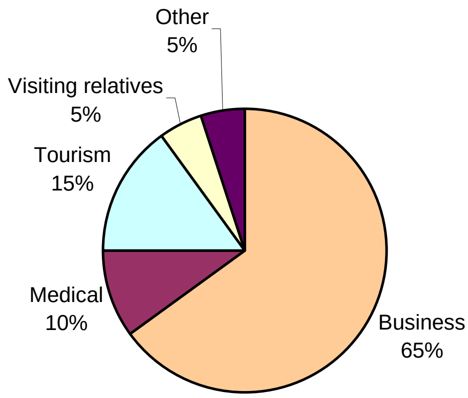
Naturally, there is also a sizeable intermediate group between business and leisure travellers, which can exhibit the characteristics of either group. This group is comprised of people visiting friends and relatives, and their characteristics depend on the reasons behind their travel (Doganis 1991, p. 208).

According to the Regional Airlines Association of Australia (1998), the majority of regional air travel is for business purposes (figure 4.1). Tourism is also an important source of earnings for regional airlines, with 15 per cent of their passengers being tourists. These figures are averaged across the hundreds of regional routes and each individual route will exhibit its own balance of passenger types.

Cyclical nature of air travel

The cyclical nature of air travel also influences the level of demand for regional air services. There are daily, weekly and yearly cycles that can be attributed to consumer preferences and general economic activity.

FIGURE 4.1 PURPOSE OF TRAVEL ON REGIONAL AIR ROUTES



Source: Regional Airlines Association of Australia 1998.

People, particularly those travelling for business, tend to want to fly early in the morning and / or in the evening, in order to gain a full day in their location. This is especially the case for same-day return trips. An example flight schedule shows how available flights cater to this demand (table 4.3). The departure times for Ansett and Airlink flights between Perth and Kalgoorlie on Mondays are clustered in the morning and evening.

Air travel also exhibits weekly patterns of demand. Business travellers often leave late Sunday or early Monday morning and return at the end of the week on Friday afternoon or evening, allowing them a full week to conduct business.

TABLE 4.3 SCHEDULED MONDAY FLIGHT DEPARTURE TIMES, PERTH–KALGOORLIE

Perth to Kalgoorlie		*Kalgoorlie to Perth*	
Ansett	*Airlink*	*Ansett*	*Airlink*
06:30	06:30	08:05	08:05
07:15	09:45	08:45	
18:10	17:45		18:05
		19:45	19:20

Source Ansett 1999 and Qantas 1999.

Leisure travellers often leave Friday evening after work to make the most of their time off. Table 4.4 shows flight timetables for Friday between Perth and Kalgoorlie. Ansett's timetable differs from that in table 4.3—with less morning flights and more flights offered in the evening.

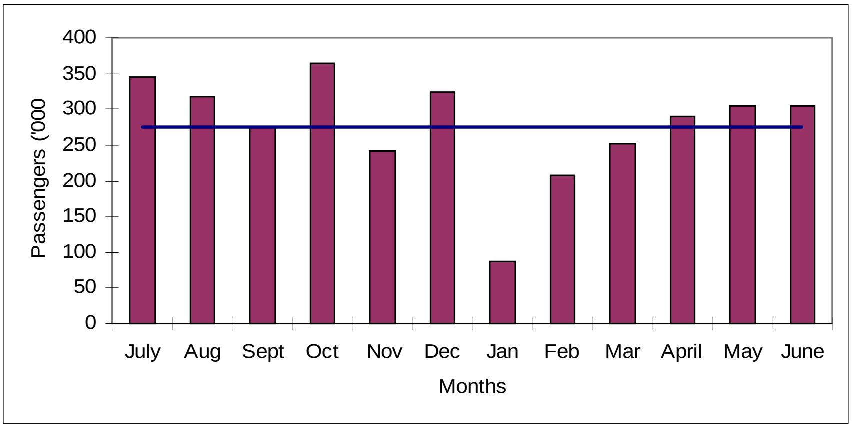
TABLE 4.4 SCHEDULED FRIDAY FLIGHT DEPARTURE TIMES, PERTH–KALGOORLIE

Perth to Kalgoorlie		*Kalgoorlie to Perth*	
Ansett	*Airlink*	*Ansett*	*Airlink*
06:30	06:30	08:05	08:05
13:00	09:45	15:00	
16:45	17:45	18:15	18:05
18:10		19:45	19:20

Source Ansett 1999 and Qantas 1999.

The airline industry also has a strong yearly seasonality. Figure 4.2 shows the pattern of business travel in Australia for the 1996–97 financial year, which includes all domestic trips for travellers aged 15 years and over, staying at least one night in the main destination. The lowest levels of travel are in January and February, with other months of the year showing much less variation. A pre-Christmas peak compensates for the following low period. Leisure travellers show a significant peak in January, when people are taking their summer holidays (figure 4.3). Travel is also reasonably high in August–September, when people typically travel north to escape winter.

FIGURE 4.2 BUSINESS TRAVEL BY AIR IN AUSTRALIA, 1996–97



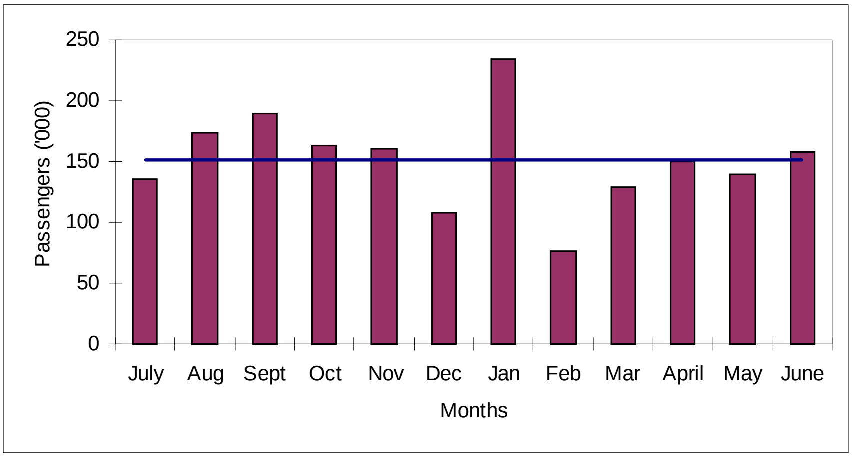
Source Bureau of Tourism Research 1997.

Total passenger movements in the regional aviation market in 1997 (figure 4.4) showed a small decline at the beginning of the year. This corresponds with the majority of regional passengers in Australia travelling for business purposes.

Economic influences

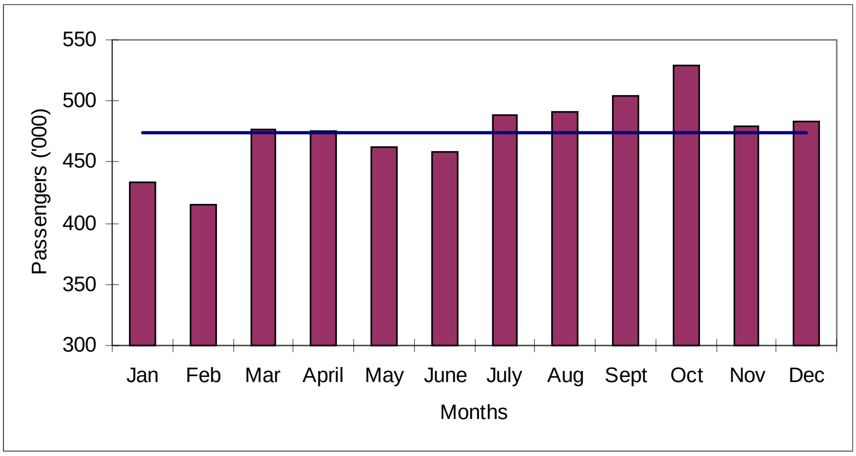
Demand for air services is closely related to the level of economic activity in the markets served. That is, higher levels of economic activity will lead to higher levels of demand for air services due to increased business activity and increased consumer spending.

FIGURE 4.3 LEISURE TRAVEL BY AIR IN AUSTRALIA, 1996–97



Source Bureau of Tourism Research 1997.

FIGURE 4.4 REGIONAL AIRLINE PASSENGERS, TOBS, 1997



Source Avstats 1998b.

The level of economic activity at a national level determines, in general, how often people will fly. The economic activity in particular regions will potentially determine the level of demand for air services in that area. Regionally, demand can move in the same direction as national economic trends, or in the opposite direction if regional influences are stronger and opposite. For example, if the economy of a region is contracting while the national economy is expanding, air travel demand will grow nationally while it may shrink in the region.

This trend is easily explained. As income rises, people spend more on all non-essentials, increasing expenditure on travel by all modes; and the high cost and more comfortable alternative of air travel replaces other modes for some existing travel (Doganis 1991, p. 220).

Income elasticities of demand for air travel measure the responsiveness of demand to changes in income. Each route will be different, but as a general rule, changes in demand will be larger, and in the same direction, as changes in income. Elasticities of demand for air travel are not easy to calculate. A number of income elasticities for air travel determined in the past indicated that airline industry expansions and contractions are more pronounced than that of the economy as a whole. Income elasticities for the airline industry in Canada have been found to be approximately 2 (Tretheway and Oum 1992). This indicates that for every one per cent expansion (reduction) in national income, air transport increases (decreases) by two per cent. BTCE work on elasticities of demand for international air travel to and from Australia (BTCE 1995) showed that income elasticities can vary widely for different regions. BTE (1986) found a real income elasticity of demand of 1.21 for air travel on intra-State routes in NSW.

Conclusions

The above discussion highlights the range of factors that influence the customer's decision to use a regional air service. Some of these—fares and some quality factors—can be directly influenced by the airline, while others—alternate modes of travel and socio-demographics of travellers—are largely outside the control of airlines. These non-controllable elements are important in decisions whether or not to provide an air service (see chapter 5).

Demand for air services is only one side of the picture; a further set of factors act on airlines to influence the services they supply. These are examined in the following section.

SUPPLY FACTORS

The cost incurred in providing air services is the basic force acting on the supply of regional air services. In order to make a profit, an airline tries to produce a service at minimum cost. Cost minimisation is dependent on costs of the factors of production, efficient airline management and a number of general characteristics (or economies) present in airline operations. However, before these are examined in turn, it is useful to know the structure of airline costs.

Structure of airline costs

Airline costs can be broken down into a number of standard categories used for reporting purposes internationally. Airline cost categories are the same whether the airline comprises a single aircraft operating over one regional route or a fleet of jets operating a myriad of international routes.

The broadest categories are non-operating and operating items.

Non-operating items are those costs and revenues not directly associated with the operation of the airline's own air services. These include (Doganis 1991, p. 108):

- gains and losses arising from the retirement of property and equipment;
- interest paid on loans as well as interest received from bank and other deposits;
- all profits and losses arising from an airline's affiliated companies;
- losses and gains arising from foreign exchange transactions or sale of shares; and
- direct government subsidies or payments.

Operating costs are those costs incurred in the day to day running of an airline and include salaries, fuel, maintenance, equipment, administration, rent and fees. Table 4.5 shows the operating cost categories used by the majority of major airlines around the world, and is based on those required by ICAO.

TABLE 4.5 AIRLINE OPERATING COSTS

Direct operating costs (DOC)	*Indirect Operating Costs (IOC)*
Flight operations	Station and Ground Expenses
Flight crew salaries and expenses	Ground staff
Fuel and oil	Buildings, equipment, transport
Airport and en route charges	Handling fees paid to others
Aircraft insurance	Passenger services
Rental/lease of flight equipment/crews	Other passenger service costs
Cabin crew salaries and expenses (sometimes IOC)	Passenger insurance
Maintenance and overhaul	Ticketing, sales and promotion
Engineering staff costs	General and administrative
Spare parts consumed	Other operating costs
Maintenance administration (sometime IOC)	
Depreciation and amortisation	
Flight equipment	
Ground equipment and property (sometimes IOC)	
Extra depreciation (in excess of historic costs)	
Amortisation of development costs and crew training	

Source Doganis 1991, p.111.

Operating items can usefully be divided into direct and indirect operating costs. Direct operating costs are those costs associated with, or dependent on, the type of aircraft being operated, and which would change if the aircraft type was changed. On the other hand, indirect operating costs are all those costs that remain unaffected by a change of aircraft type, because they are not directly dependent on aircraft operations.

Direct costs

The cost of flight operations is the largest single element of operating costs. It includes the costs of flight crew, which covers their salary, superannuation and stop-over allowances. These costs are usually attributed as a per-hour cost by aircraft type.

Fuel and oil together comprise a large component of flight operating costs. The fuel cost is usually shown as a cost-per-hour by aircraft type, which averages elements that affect fuel consumption such as wind direction, altitude and aircraft weight. Fuel use is greatest during take-off and landing, and when aircraft are operating at less than optimally efficient speeds. As a result, fuel costs would tend to be relatively higher per hour when aircraft are used for short journeys.

Airport and en route charges can be substantial. These charges are designed to cover the cost of navigation aids and meteorological information in the case of en route charges, and the cost of infrastructure and services at airports. In Australia, en route charges are based on the maximum take-off weight (MTOW) of the aircraft and the distance flown. Airport charges are now location-specific and represent a fee for service or use of facilities. They often include a weight-based charge for landing and some charges per passenger. In addition to these charges, there may be charges for parking aircraft or using air bridges at major airports.

Insurance of flight equipment is a relatively small component of the flight operations costs. This cost is usually in the order of 1 to 6 per cent of the full replacement price of the aircraft and will vary with the perceived risk.

Maintenance and overhaul costs cover the costs of maintenance staff, parts and administration for routine maintenance, maintenance checks and all repairs. Again, the level of this cost will vary from airline to airline and between aircraft types. Larger airlines tend to have in-house maintenance facilities that are not cost-effective for smaller airlines.

Depreciation and amortisation are usually undertaken for 10–15 years or longer for large aircraft and 8–10 years for smaller, short-haul aircraft. Costs are attributed per hour for particular aircraft types based on the annual depreciation and the annual utilisation of the aircraft. For older aircraft commonly used in regional aviation, depreciation is likely to be smaller, as much of the cost of the new aircraft will have already been written off.

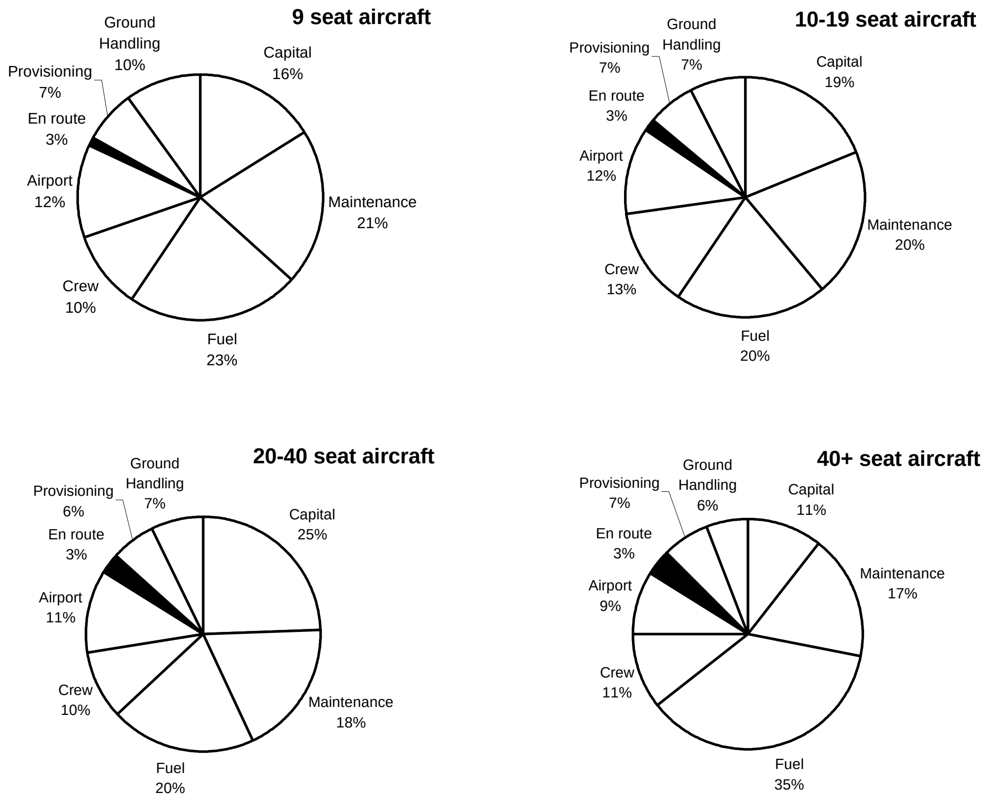
The costs of passenger services are considered to be indirect by some airlines and direct by others. This item includes cabin crew costs and provisioning costs.

As the number of cabin crew varies with the type of aircraft used, cost of passenger services will be considered a direct operating cost in this study.

The variance in shares of the direct cost elements across aircraft of different sizes can be seen in figure 4.5, where four categories of aircraft sizes are shown.

The aircraft direct operating cost breakdowns were produced using Aerocost 2 (BTCE 1997) with a range of common aircraft types operating on actual regional routes. Three routes were simulated for each aircraft type, chosen to represent a short, a medium and a long distance for the aircraft. The distances over which these aircraft operate are related to their size, so the larger aircraft were operated on routes with significantly longer distances than the smaller aircraft. This affects the results for some of the cost items. In particular, fuel costs are a higher proportion of total costs for the longer distances flown.

FIGURE 4.5 INDICATIVE AIRCRAFT DIRECT OPERATING COST BREAKDOWNS



Note These charts represent indicative operating costs. They are derived from aggregated data for each class, and typical routes for the aircraft sampled.

Source Aerocost 2 (BTE estimates).

Capital, maintenance and fuel costs are the main contributors to direct operating costs for all aircraft sizes, totalling around 60 per cent of the DOCs. Some clear relationships are evident between aircraft size and particular cost components. Maintenance and ground handling costs both reduce in significance relative to the overall costs of operating a route as aircraft increase in size. This reflects the fixed nature of these costs compared with items such as en route charges that are directly related to the size of the aircraft and become a more significant cost component in larger aircraft.

The capital cost component, attributed to operations on the basis of flight time and annual utilisation, fluctuates in figure 4.5 because of the variation in distances and the assumed utilisation of different size aircraft. Small aircraft are assumed in Aerocost 2 to have much lower levels of annual utilisation, so a larger proportion of annual costs are attributed to each flight. Assuming similar utilisation levels, the per-hour capital cost would be directly related to aircraft size, as larger aircraft are generally more expensive to purchase.

Airport charges represent around 10 per cent of DOCs for all aircraft types shown. This only reflects the sample of routes chosen for these simulations and can be a more or less significant proportion of costs depending on the particular airport.

Indirect operating costs

Indirect operating costs include station and ground expenses covering items such as facilities at the airport (in particular, the airline's home base airport where the greatest expense is incurred) and the salaries of ground staff. Ticketing, sales and promotion costs are generally a large component of indirect costs.

General and administrative costs are usually a small component of operating costs as many of the items which could fall into this category are better attributed to the particular activity they support. For example, administration costs for maintenance operations fall under the maintenance and overhaul component of costs, while marketing administration costs can be attributed to ticketing, sales and promotion. This category covers administrative costs that cannot easily be attributed to specific functions.

Any cost that cannot be included in one of the above categories falls into the other operating expenses item.

Figure 4.5 shows only *direct* operating costs. Indirect operating costs, by definition, do not depend on the aircraft operated. Information collected from regional airlines indicates that indirect operating costs made up between 10 and 33 per cent of their total operating expenses. The BTCE (1993) found that 44 per cent of total operating costs for domestic airlines were considered to be indirect. The lower indirect costs for regional airlines makes sense intuitively, reflecting smaller expenditure on advertising campaigns, administrative staff and head office facilities.

Determinants of airline costs

The costs faced by airlines are influenced by a number of factors. These include cost economies in operations, the cost of input factors and management decisions.

Cost economies

Economies of scale are realised when increases in total operations decrease unit costs. For airlines, increasing operations can comprise increases in the number of services in a particular route network, the number of aircraft or the number of routes operated.

Adding more flights or more seats per flight to an existing route network results in lower per-seat costs. This is because fixed costs associated with operating the service and terminal facilities can be spread among more passengers. Economies of traffic density, as this is known, have been found overseas to flatten out once the minimum efficient traffic density level is reached.

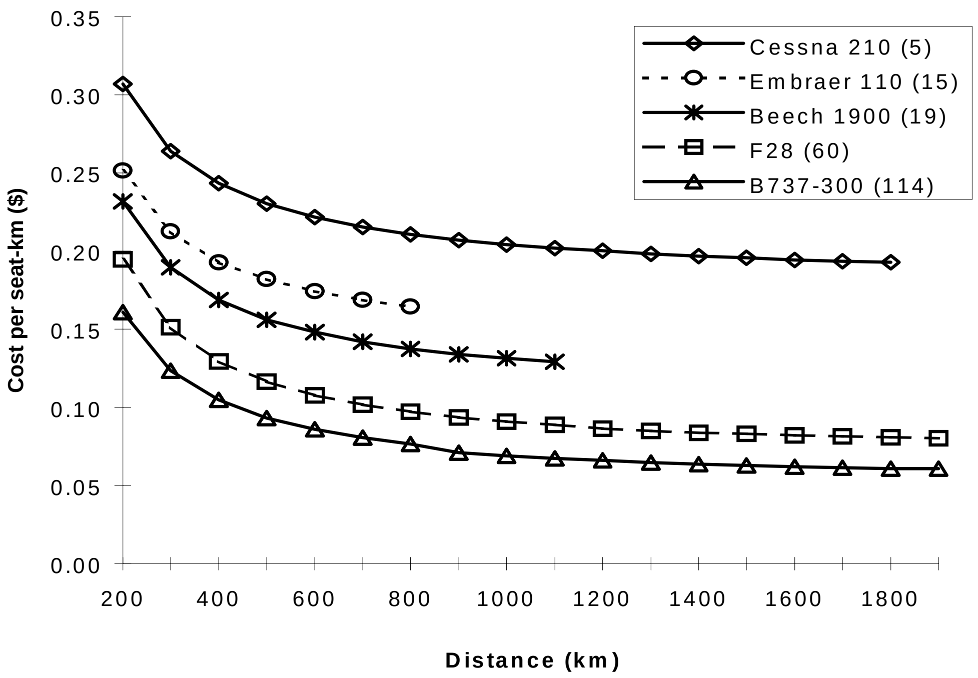
Gillen, Oum and Tretheway (1985) found significant economies of traffic density in the Canadian market at all points up to the largest domestic carrier, Air Canada, which operated around 40 million revenue tonne-kilometres per point served at the time. This is approximately the level at which Ansett was operating in 1991–92. Regional airlines in Australia fall below this level of traffic density into the sphere of operations where economies are expected to exist. This is significant because it has implications for industry structure. If an airline is to successfully compete in a market, it must either achieve an equal density to that of its competitors or increase its route density to the minimum size necessary to capture all available density economies (BTCE 1993), otherwise the other airlines will have a cost advantage.

There is some evidence that a minimum efficient number of aircraft for an airline does exist; however, after this point there are no real cost advantages from increases in the number of aircraft operated (Tretheway and Oum 1992). The Commonwealth Treasury (1985) reported empirical evidence suggesting that the minimum efficient size for an airline's fleet was quite modest—perhaps around five aircraft. Treasury saw these economies of scale as relatively unimportant. It was indicated in chapter 3 that firms surviving in the long run (five years) average around seven aircraft; however, there are airlines operating with less than five aircraft.

Roughly constant returns to firm or network size exist. Adding or dropping cities from a network does not raise or lower unit (per passenger) costs. This is because fixed costs tend to increase proportionally with the increase in network size (Tretheway and Oum 1992, p. 9).

Cost per seat generally declines as aircraft size increases. This is because the fixed components of aircraft operating costs can be spread among more passengers, assuming demand exists to fill the extra seats available. Figure 4.6 shows indicative direct operating costs for a range of aircraft types (of an average age for the type) used in regional aviation services in Australia. Small aircraft, such as the 5-seat Cessna 207 and the 15-seat Embraer 110P1 (Bandeirante), have higher unit costs (per seat-kilometre) than larger aircraft such as the 34-seat Saab 340A or the 114-seat B737-300.

FIGURE 4.6 COST PER SEAT-KM FOR DIFFERENT AIRCRAFT SIZES



Note 1. Parenthetical figures indicate number of seats.

Note 2. Results for the Saab 340 A, with 34 seats were effectively the same as for the F28 with 60 seats. The Saab has not been shown on this graph for clarity.

Source Aerocost 2 (BTE estimates).

Older aircraft will, in general, lie above the trend line. This is a reflection of aircraft technology, which results in older aircraft being generally more expensive to run. Table 4.6 shows the years in which the most commonly used aircraft types in the regional aviation fleet in Australia were manufactured. Survey results indicate that the average age of aircraft used in regional aviation is between 15 and 20 years old.

TABLE 4.6 YEARS OF MANUFACTURE FOR REGIONAL RPT AIRCRAFT TYPES

Manufacturer	*Aircraft model*	*No. of RPT aircraft*	*Years manufactured*
British Aerospace	146-100/200 146-300	15	1983–98 1988–98
De Havilland	DHC-8-100 DHC-8-200	19	1983–98 1993–98
Saab	340A 340B	23	1984–89 1989–98
De Havilland	DHC-6-320	11	1968–88
Fairchild	SA227-CC/DC (Metro 23)	14	1992–98
Embraer	EMB-110P1/P2	15	1978–89
Piper	PA-31-350	53	1978–86
Cessna	402B 402C	26	1972–78 1978–85
Cessna	210	7	1957–85
Cessna	310	8	1954–80

Source Avstats 1998b, AirCharter World 1999, Wilson 1987.

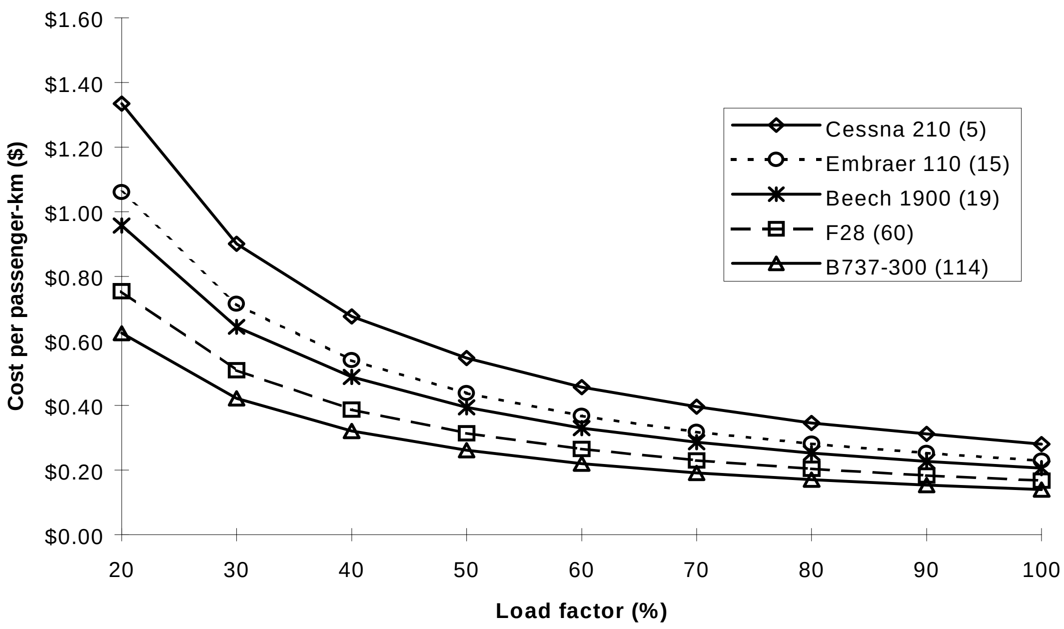
Cost per kilometre flown declines as the stage length increases. Significant amounts of fuel are burnt in take-off and landing, and some flight preparation costs, such as baggage handling, aircraft cleaning and advertising, will be the same regardless of the distance flown. When a flight is longer, these fixed costs can be distributed over a larger number of kilometres, lowering the per-kilometre cost. It should be noted that aircraft designed to fly longer distances will be more costly to fly over short distances (200–300 km or less) than aircraft designed for those distances. For example, propeller aircraft can be cheaper per-seat than large jets over short distances. Figure 4.6 shows the declining direct operating costs for a range of aircraft types as the distance flown increases. All of these aircraft are relatively expensive on a per seat-kilometre basis over distances up to 200 km and then costs begin to flatten out.

Cost per passenger declines as the percentage of seats filled on the aircraft increases. This is, once again, due to the ability to spread the fixed costs. Figure 4.7 shows indicative direct operating costs per passenger-kilometre for a range of aircraft types operating a 300 km route with various load factors. Unit costs decline rapidly as load factors increase up to about 25 per cent and continue to decline, at a slower rate, for higher load factors.

All of these cost economies show how particular factors in airline operations can affect the per-unit cost of production. These general relationships can be used to compare the prices needed to cover costs by different airlines and / or on different routes.

FIGURE 4.7 COST PER PASSENGER-KM FOR DIFFERENT LOAD FACTORS

Note 1. Parenthetical figures indicate number of seats.



Note 2. Results for the Saab 340 A, with 34 seats were effectively the same as for the F28 with 60 seats. The Saab has not been shown on this graph for clarity.

Source Aerocost 2 (BTE estimates)

Factor costs

The cost economies all assume other factors affecting costs remain equal. However, the amount paid for particular input factors can be far from equal between airlines. One important and variable input factor cost is airline finance.

Airlines require large capital outlays on aircraft and equipment, and also require large operating funds. As a result, the cost of finance is important in determining the costs faced in the industry. Three elements are examined here for the airline industry in general—operating leverage, financial leverage and cash flow.

Operating leverage

Operating leverage is a measure of how earnings increase as output increases (Tretheway and Oum 1992). Operating leverage is the ratio of fixed costs to total costs and as this ratio increases (that is, as the proportion of fixed cost increases) variations in sales will produce much larger variations in net income (Cooper and Ijiri 1983).

Airlines have a fairly high operating leverage, as in the airline industry the costs of operating a service are to a large extent fixed. An additional passenger on a particular flight will not cause a proportional increase in the cost of operating the flight. The carrier is committed to operating the service, so additional revenue from these passengers represents profit to the carrier. This means that slightly higher than expected patronage will cause a large increase in profit and slightly lower patronage can cause large losses. The down-side risk to airlines with high operating leverage can be large. The widespread use of discounted fares to lift aircraft load factors exemplifies this.

Larger airlines can be expected to have higher operating leverage than small airlines, as their fixed costs will be proportionally higher due to greater expenditure on advertising, terminal facilities and staff. High operating leverage signifies that increasing load factors, even by a small amount above the break-even level, provides large gains in profitability.

Financial leverage

Financial (or capital) leverage is the relationship between debt and equity financing for a firm. Financial leverage is large when most of the capital is in the form of fixed commitments (debt) and only a small proportion is in the form of common stock or shareholder's equity (which receives all income after costs and fixed commitments are met). When this is the case, small fluctuations in net income tend to produce large variations in earnings per share. Similarly, small losses are magnified into large losses to shareholders (Cooper and Ijiri 1983).

The long-term debt to equity ratio for the Australian transport and storage industry has declined steadily from 1.5 in 1991–92 to 0.7 in 1995–96 (ABS 1996). This may be due to the expected cyclical nature of the ratio. During periods of upturn there are improvements in the ratio (it becomes smaller) because improved revenue provides the means for funding investment internally rather than through borrowing. It is also possible that this is part of a longer-term trend or a reaction to the large borrowings in the 1980s. It is not possible to draw any definitive conclusions from the data as they are too aggregated, and data specific to the regional aviation industry, or even the aviation industry as a whole, are not available.

Several years ago, within the airline industry, there was considerable variation in the degree of financial leverage, although most major carriers were considered to have moderate financial leverage (Tretheway and Oum, 1992). Since then the levels of debt to equity funding have fallen. The Qantas and Ansett groups (which include the subsidiary airlines) now have ratios around 0.7 (Qantas 1998 and Ansett 1998). Across general aviation businesses, long-run debt to equity ratios ranged from 0.2 to 1.1 based on 1992-93 data (BTCE 1996). Around the same time, the Qantas Group had a debt to equity ratio of 2.45 and the Ansett Group had a ratio of 0.79 (Qantas 1998 and Ansett 1998). Since all of the trends indicate the debt to equity ratio falling significantly in recent years, it is expected that regional aviation ratios will have fallen also. Regional airlines are expected to have ratios lower than the domestic carriers and higher than the general aviation sector. The ratio is also likely to be a function of the size of the firm. Small firms will not have the ability to borrow significant amounts, while the larger regional airlines will be more willing to accept higher risk and have higher debt to equity ratios.

Cash flow

Cash flow represents earnings before depreciation, amortisation and non-cash charges, and indicates the company's ability to pay dividends to shareholders or owners. Typically, the major earnings for a regional airline are through ticket sales. This has to be balanced against outlays. Capital outlays can be controlled through different forms of aircraft acquisition.

Traditionally, airlines owned their aircraft, while now it is becoming more common for airlines to lease aircraft. Avstats aircraft owners' data indicates that over 25 per cent of the regional airline fleet is leased. This is the lower bound of the proportion of leased aircraft, as those leased from one airline to another are not included because they could not be identified in the data. This proportion is slightly higher than for Qantas (information for Ansett was not available) which has operating leases on 19.1 per cent of its fleet (finance leases are included with owned aircraft) (Qantas 1998).

When an aircraft is owned, the cash outlay occurred when the aircraft was purchased and the depreciation of the aircraft is covered over its operating life through the revenue from passengers. However, depreciation is an accounting charge and does not require outlays of cash.

When an aircraft is leased, there is no large initial outlay of cash; instead the cash is paid throughout the lease period for the aircraft. This requires airlines to match revenues and outlays each year. In this case, an airline is more likely to experience severe financial problems, or even to go bankrupt, in years when it experiences a downturn and has negative cash flows.

Two of the types of aircraft leasing available are finance leases and operating leases. Finance leases are usually long-term leases (ten to twenty years), where the leasing company intends to pay off the full cost of the aircraft through the lease. The aircraft is usually purchased specifically for the particular airline and there are penalties for returning the aircraft to the leasing company before the end of the agreed lease. An operating lease is generally short term (from one year to several years) where the airline does not get to specify the exact configuration on the aircraft. The leasing company intends to lease or sell the aircraft to someone else at the end of the operating lease and therefore does not need to recoup the full costs of the aircraft during the short lease.

The advantages offered by finance leasing include the possibility for a small airline to take advantage of volume discounts from the manufacturers passed on by the lessor. Also, the airline may not be required to make a deposit or any pre-payment (pre-delivery payments are often required by manufacturers many months before delivery of a new aircraft) (Morrell 1997).

Operating leases provide flexibility for airlines. Lessees can usually return the aircraft to the lessor on short notice with little or no penalty. This allows the airline to respond rapidly to market conditions. Also, the lessor, not the airline, bears the risk of the aircraft becoming obsolete when using short-term leases (Morrell 1997).

There are clearly benefits for small airlines in leasing aircraft. However, this can make reliability of cash flow a more important issue for the company.

Management decisions

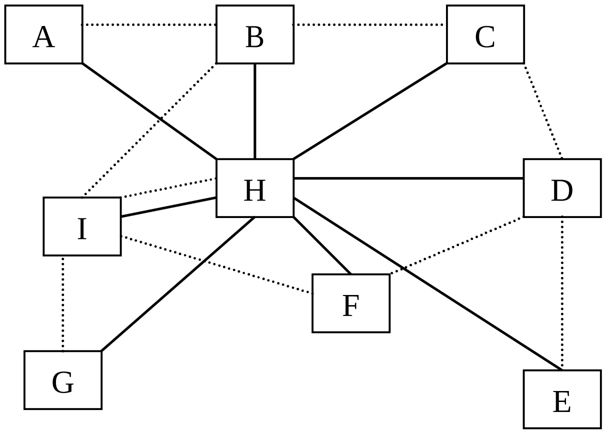
The third important factor in determining the supply of regional aviation services and the prices charged for the services are management decisions. There is flexibility within regional airline operations to make management decisions concerning routes, networks and aircraft allocation that can have a large impact on passenger demand and costs. Other management decisions, particularly those seen as part of the airline's marketing strategy, are primarily related to quality of service issues. In general, providing a high quality of service will cost the airline more.

Route and network issues

In an effort to increase aircraft utilisation, traffic density, load factors and flight frequency, changes are occurring in the way airline route networks operate throughout the world, and these improvements are increasingly being utilised by regional airlines. Hub and spoke networks are replacing traditional linear route systems. Figure 4.8 shows a linear network system (dark lines). In a linear system, airlines would fly one aircraft from A to B to C to D and another aircraft would fly D to F to I, and so on. Anyone travelling from A to D or E would have a long flight with several stages. From the airline’s perspective, this system is less than optimal as load factors on segments can be variable, but the aircraft used must be able to cope with the heaviest demand encountered, leaving significant spare capacity on other sectors of the trip.

In a hub and spoke system, an airline operates flights to and from one central 'hub'. The paler lines show this, with H as the hub, in figure 4.8. In this case, no city is more than one stop from any other in the network. Airlines are able to increase load factors by directing passengers from their origin to one central location and allowing them to transfer to other aircraft to get to their final destination.

FIGURE 4.8 HUB AND SPOKE AND LINEAR ROUTE NETWORKS



Source Tretheway and Oum, 1992, p. 67.

In Australia, where large cities are relatively few and widely dispersed, the development of hub and spoke systems is somewhat limited. Regional airlines commonly use capital cities as hubs. There are also some regional centres that act as hubs. Dubbo serves as a hub for western NSW—a connection point for Air Link passengers going through to Sydney with Hazelton and a consolidation point for Hazelton's passengers from central NSW. Cairns serves as a hub for flights to Cape York Peninsula destinations, where connecting flights can be made to Brisbane or other coastal Queensland destinations. These hubs and the linear 'milk-run' routes can be seen in the maps in appendix 1. The route and network structures in the Australian regional aviation industry were discussed in chapter 2.

The decision to enter into alliances with domestic airlines can provide cost advantages to regional operators. Increased load factors through the on-carriage of passengers is one benefit. Since the flight onto which these passengers transfer would operate anyway, most of the fare paid by these transferring passengers is profit to the airline. The extended market coverage offered by an alliance is attractive to passengers. The extent of alliances in the regional aviation industry and the subsequent benefits were examined fully in chapter 3.

Aircraft assignment

The efficient assignment of aircraft to particular routes, thus improving aircraft utilisation, is an important cost minimisation strategy and determinant of carrier productivity. This spreads the capital or lease cost of the aircraft, which is significant, over more hours of operation, providing a smaller per passenger-kilometre cost.

CONCLUSION

The analysis of factors influencing supply and demand for air services provides an insight into airline operations. Airline management requires the supply of air services, over which the airline has control, to be matched with the demand for such services, over which airlines have much less influence. To be successful, an airline must produce unit revenues that cover unit costs and provide an acceptable level of accounting profit. To achieve profitable matching of supply and demand, airlines must understand the nature of the demand they are facing and manage costs.

Airline supply and demand are not independent of each other. On the contrary, each affects the other. Aircraft types and speeds, departure and arrival times, frequency of service, fares, in-flight service and other features of service will influence demand for an airline's services. Conversely, density of passenger demand, seasonality, purpose of travel, distances travelled and other demand aspects will impact on costs.

Airlines use the factors they know about in supply and demand to determine what services to provide and what to charge for those services. In the following chapter, the way this price setting mechanism works in a competitive environment is examined. Supply and demand relationships are used to analyse Australia's regional aviation industry to assess whether it is operating competitively.

CHAPTER 5 COMPETITION AND CONTESTABILITY

The level of competition experienced in the regional airline market and its contestability, that is the degree of ease with which firms can enter and exit the market, are vital determinants of the market structure of the industry and the conduct and performance of individual firms. As a result, contestability and competition also have implications for the cost and level of service customers receive. This chapter examines these two economic theories and applies them to the regional aviation market to describe the relationship between market structure and the conduct of firms.

The regional aviation market can be viewed at two levels. Firstly, it can be understood to be the regional airline industry as a whole—thus the ability of operators to enter and exit the industry and the number of operators comprising the industry are of importance. However, the industry itself is comprised of a number of markets. Each route is a market. The contestability of individual routes, and the competition faced, may differ greatly. In this chapter, demand for aviation services is characterised as demand for travel between city pairs. Nevertheless, the issues confronting operators are similar, whether they are outsiders considering entering the regional aviation industry or insiders expanding their regional network.

COMPETITION

The nature of competition in a market affects economic efficiency, the distribution of income and market growth. The neo-classical theory of market behaviour views efficiency in resource allocation as related to the number of firms in an industry. Lack of competition can reduce economic efficiency and the supply of goods. Concentration of economic power in a market may also result in influential lobby groups, while initiative and innovation may be stifled.

The desirable form of market structure, however, varies between markets.

Theoretical market structures

Four theoretical market constructs are examined in this chapter. Naturally, practical situations will involve market structures, and hence outcomes, along the whole spectrum between perfect competition (many producers) and monopoly (one producer).

Perfect competition

A perfectly competitive market is a theoretical construct that does not exist in the real world but is useful in explaining the forces underlying the real world behaviour of firms and markets. It describes a market where many small firms compete in the supply of a single homogeneous product to many buyers.

There are a number of conditions which must be satisfied if such a market is to exist. No firm is able to individually have an impact on price—as all products are the same and a consumer is indifferent as to the supplier. No collusion can occur. As a result, price is equivalent to marginal revenue. All firms in a perfectly competitive market aim to maximise profit. Finally, entry to, and exit from, the industry is unconstrained and costless. For these conditions to be satisfied information must be perfect.

A perfectly competitive market will result in an efficient outcome, where productive and allocative efficiency requires that:

- services of a given quality are produced at the lowest feasible cost;
- price for a service is set equal to both the marginal cost and the average cost; and
- optimal price-quality options are chosen.

Monopolistic (imperfect) competition

Changing one assumption in the model of perfect competition derives the model of monopolistic competition. Instead of assuming only one homogenous product is sold, it is assumed that there are a number of similar but differentiated products. As in perfect competition, the assumption of free entry into and exit from the market still applies, and firms aim to maximise profit.

Monopolistic competition describes the market situation where large numbers of firms each sell products that are close substitutes. This situation provides a basis for non-price competition among market participants. Competition applies not only to the price charged, but also to the quality of the product, labelling, advertising and sales promotion. Purchasers have reasons to prefer one firm’s products to another, and may even demonstrate brand loyalty.

A market with this structure will not result in an efficient outcome. The unit cost of the product to the purchaser is slightly higher than would be expected under perfect competition, as the firm has a small amount of monopoly power and is not a price-taker. The ability to raise prices is restrained by the ability of new firms to enter the market if profits are sufficiently high. Less will be produced than in a perfectly competitive market and production will not occur at the lowest cost point, as costs are incurred in activities such as advertising.

Oligopoly

An oligopoly refers to a market dominated by a few large producers. There is no longer complete freedom of entry into the industry. Instead, entry barriers exist and help to explain why only a few firms are present in the market. Supernormal profits can exist in both the short and long run.

An oligopolistic market does not provide as clear-cut an outcome as the other models of market structure. The outcomes of this market depend entirely on how the participant firms act and react to each other. Potential outcomes include:

- Keen competition drives the market to a perfectly competitive solution (Bertrand competition).
- Firms set output and prices independently of each other and as a result each lowers price and raises output in an attempt to take more market share (Cournot competition). The outcome remains a higher price and lower output than a perfectly competitive market.
- One firm acts as a leader in price setting and others follow. The leader extracts higher profits and all benefit from a relatively stable market.
- Firms collude and all achieve monopoly profits until the agreement breaks down and a round of fierce price competition ensues.

Monopoly

In the case of a monopoly, only one firm produces in the market. The only assumption in common with a perfectly competitive market is that the firm is a profit maximiser. The entry barriers to the industry are extremely high, causing other firms to remain outside the industry. Without the threat of entry by more efficient firms the monopoly firm is not a price-taker, rather its actions can affect the price.

In both the long and short run a monopoly firm makes profits in excess of those needed to maintain the business (monopoly profits). Under monopoly, theory suggests that prices are higher, and output lower, than under perfect competition.

Competition and the Australian regional aviation industry

Where along this spectrum of market structures does Australia's regional aviation industry fall?

From the market description in previous chapters (table 2.4 in particular), it is clear that the Australian regional aviation industry comprises a number of separate markets (city-pairs). The fare on any city-pair is influenced by both the cost of service provision and also the level of competition, both from other airlines and other modes of transport. As chapter 4 noted, the substitution between air and surface transport is by no means perfect. For the business traveller, to whom time is important, travel by road or rail will be a substitute in a small number of cases, as it is the total time from A to B that is important. Air and surface travel are considered as part of a package that involves travel to, and from, the terminal, as well as waiting times at terminals. For leisure travellers, time is less of a consideration; however, on longer trips surface transport is also less than a perfect substitute, as it requires that the travel time to the destination becomes part of the leisure activity. Over shorter distances the transport forms become increasingly substitutable.

City-pairs with only one air service operator and no feasible land-based transport alternative are indicative of a monopoly market. Other routes appear to be serviced by oligopolies—a small number of firms provide slightly differentiated services with limited substitution by land-based transport. If either of these situations holds true, the Australian regional air traveller may potentially be facing higher prices and experiencing lower levels of service than optimal.

Natural monopolies

A natural monopoly occurs when a market is unable to profitably support the existence of more than one supplier. The producer faces increasing returns to the scale of production, and more than one incumbent would cause cost economies to be lost and result in wasteful duplication. In itself, the market is lucrative. However, as two firms are unable to both make a profit, the result is a market that cannot generally be protected against entry. But it is also a market where competitive entry provides short-term losses to those firms involved.

The small size of the Australian regional aviation market and the existence of many single-operator routes with potential for surface transport to offer a substitute product, can be regarded as indicating that many regional air routes are natural monopolies.

BOX 5.1 GOVERNMENT RESPONSES TO NATURAL MONOPOLIES

Government has a role in monitoring or regulating natural monopolies to protect the interests of consumers. Regulating a monopoly to eliminate inefficiency requires setting price equal to marginal cost, and letting profit maximisation do the rest. Unfortunately, this ignores the fact that a monopolist may make a loss at such a price—the efficient level of output is not profitable.

There are a number of different approaches to this problem. One solution is a kind of second-best pricing policy which requires the monopolist to produce at a point where price equals average costs, allowing the firm to break even. The problem facing the regulators is to determine the true costs to the firm. Additionally, breaking even is not a good long-run investment for a firm, and so a second approach is commonly taken.

This approach is to operate the service at price equals marginal cost and provide a subsidy to keep the firm in operation. A number of regional air routes in Australia receive subsidies from the Commonwealth Government, State Governments and utilities such as Australia Post.

There are two ways of testing this conclusion. The first is to examine whether the market produces a monopoly profit and whether firms on single-operator routes benefit from economies of scale. Studies in the United States and Canada indicate that Australian regional airlines operate within traffic densities where economies exist (Gillen, Oum and Tretheway 1985). The incidence of mergers within the regional airline industry is also indicative of the presence of economies of scale. However, these economies are insufficient to generate a monopoly.

The second method is to examine the factors precluding entry by competitors, including competition from surface transport. In the absence of strategic or institutional barriers to entry, the presence of only one incumbent firm is indicative of a natural monopoly. In some cases there are institutional or strategic barriers to market entry which are not indicative of a natural monopoly. These are elaborated below. Although not completely prohibiting entry to the market, these do act as a hurdle which may limit the ability of some companies to commence regional air transport services and indicate that not all single-operator routes need be regarded as natural monopolies.

There is one natural barrier to entry that has been used to indicate the existence of a natural monopoly—passenger density. Determining when a market is competitive and when it is a natural monopoly is crucially dependent on the size of the minimum efficient scale of operation, that is the level of output that minimises average cost relative to the size of demand (Varian 1993, p. 412). The existence of a minimum efficient scale places another restriction on the ability of air routes to sustain direct competition.

The volume of traffic required to sustain more than one operator will vary. There are several instances where annual passenger volumes of less than 5000 are sufficient to support more than one operator—Coffs Harbour–Coolangatta, Brisbane–Port Macquarie, and Cairns–Mt Isa. This can be partially explained by other sources of revenue, such as freight, on low-density, yet competitive, routes. A second explanation is that airlines provide services on a network basis, and as such, will support non-performing stages that are important network links. Alternatively, there are non-regulated single-operator routes with over 50 000 passengers such as Albury–Melbourne. Thus, using a rule of thumb cut-off based solely on route density to determine whether a route is a natural monopoly or best served by multiple operators, is problematic.

One previous report placed the threshold for competition at around 25 000 passengers per annum (BTCE 1988 p. 69). IC (1992) argued that this was too high and identified numerous competitive routes with densities less than 15 000; but no cut-off point was identified, recognising that many remote routes may be too small to sustain competing operators. A practical example of a rule of thumb threshold is given by regulated routes in NSW, where generally a single-operator services routes below 40 000 passengers per annum, while larger routes have two operators providing competitive services (NSW Department of Transport 1999). In Western Australia and Queensland, subsidies are paid to support certain non-commercially viable routes. An examination of these routes indicates predominantly very low densities, but an exception is a route with density of over 15 000.

The above examples clearly demonstrate that observing cut-off densities as a guide to route competitiveness or viability has its limitations, as real routes also experience differences in service frequency, aircraft size, load factors and, importantly, demand elasticities. The fact that routes form part of larger networks is also ignored by this static analysis. These factors influence revenue, which in turn affects the decision to compete on an air route.

In summary, the perceived benefits to airlines of increased size and the existence of some natural barriers to entry, including low passenger density, indicate that some regional air routes may be natural monopolies. However, route density alone is not a reliable identification guide.

Extent and level of competition

The presence of two or more operators on a route does not fully indicate the extent of competition. The situation where two airlines servicing a route share common ownership has already been examined. However, there are other factors that also affect the extent of competition experienced on multi-operator routes.

Competition between operators can be price and/or service related. Two airlines providing an air service between points A and B are basically offering identical products. Although both airlines may charge the same price for the journey, they may use non-price mechanisms (service quality) to differentiate their services. Generally, however, higher quality service is more costly.

The degree to which the industry is dominated by a small number of large firms can be shown using a concentration ratio. As noted in chapter 3, 97 per cent of passengers travelled on an airline associated with one of the two domestic airlines, reflecting a highly concentrated industry. The concentration on individual competitive routes can also be examined by calculating each operator's market share on the basis of passenger numbers. Table 5.1 summarises the levels of competitiveness across the 68 routes for which information was available.

TABLE 5.1 MARKET SHARES ON COMPETITIVE ROUTES

		Market share of dominant airline (%)				
Competing airlines	*Routes*	*50 or less*	*51–59*	*60–69*	*70–89*	*90+*
2 airlines	55	3	13	11	18	10
More than 2 airlines	13	2	5	1	3	2

Note 1. The number of routes in this table differs from that in table 2.4 because although direct operations by domestic airlines are included, in measuring market concentration a domestic airline and its subsidiaries are treated as one.

Source Avstats 1998b and BTE estimates.

Table 5.1 highlights the high market concentration on competitive routes. Almost half the routes serviced by more than one airline had a dominant airline carrying over 70 per cent of the route's passengers. In such a situation it is difficult to say that the airlines are strongly competing, as the dominant airline certainly has advantages in terms of market power that places it in a better position to react strongly against any price competition from other incumbents. It may also benefit from a higher profile in the marketplace. It is also not apparent if these competing airlines are offering similar schedules or if the route has been split between them in a way agreeable to all parties, such as a peak and non-peak service provider or services on alternate days.

There are two further factors clouding this assessment of the level of competition in the regional aviation industry. Firstly, there are a number of routes where a 'semi-regular' charter airline may operate alongside a single RPT carrier, in effect introducing an element of ghost competition into the system that is not apparent from RPT data. Secondly, some RPT airlines charter aircraft to fly some of their services. Again, this workload is not reflected in RPT statistics and its inclusion may impact on the measure of market concentration. Overall, these factors are unlikely to have a large impact on the extent of competition across routes.

Destructive competition

It is possible for competition to have a negative effect on the quality of service offered by regional airlines. This is termed 'destructive competition'. Price competition can occur to the point where airlines are making a loss on their flights and are trading their way through using capital or borrowings in the belief that prices will return to sustainable levels. In such a situation, expenditure cuts may be made to allow operations to continue. But there is a point beyond which expenditure cuts affect the safety of services. Cuts to maintenance staff, reduced quality of spare or replacement parts or reduced aircraft downtime during inspections and maintenance can all reduce expenditure without ostensibly reducing service to passengers.

Dempsey (1990) highlighted the increased risk factors of American airlines due to destructive competition following industry deregulation. Industry trends show increasing average aircraft age and pilots with less experience. He noted that these problems are greatest among small airlines in the commuter industry. In Europe and the United States, the development of 'no-frills' low-cost regional airlines, which have cut many of the service quality factors the traditional airlines promote, has been an indication of one potential future direction for Australian airlines.

There are many factors that contribute to destructive competition. Destructive competition can be the result of a new entrant to the market or changes in demand in an existing market, but it can also arise due to competition from other transport modes, particularly over short distances. Broader economic factors, rising interest rates or falling route density, can also cause similar cost-cutting actions which makes it hard to pinpoint the existence of destructive competition.

A House of Representative Inquiry (1995) into aviation safety in Australia found

> …there is a prima facie case in support of the destructive competition hypothesis…too many aeroplanes chasing too little business for too little return… (p. 58).

The low barriers to industry entry, excess capacity, price competition and oversupply of pilots contributed to the pressure for operators to cut corners.

In Australia, there is potential for destructive competition to exist in regional aviation. Some signs of cost cutting, with attendant safety risks, were identified in a survey of members of the regional airline industry conducted by BASI (1999). Although it found that, overall, the safety health of the industry was good, 57 per cent of respondents identified reasons for avoiding some regional airlines. Flight crew and maintenance staff fatigue was recognised as an issue, as was the influence of commercial pressures in declaring aircraft serviceable. These issues may be symptomatic of destructive competition.

CONDITIONS FOR ENTRY

The structure, conduct and performance of the market are significantly influenced by the conditions of market entry and exit. These conditions determine both the scope for entry and exit and the type of new entrant that might survive. The potentially negative outcomes of both monopoly and oligopoly markets can be modified by the extent (or existence) of freedom of entry and exit from the market. In terms of the regional aviation industry, deregulation in many States and the freeing up of licensing requirements on specific routes have been aimed at reducing the barriers to industry entry. This section focuses on industry entry, but for each potential barrier to entry there are frequently also issues concerning market exit and some interaction occurs between them.

There has been some debate about what exactly constitutes a barrier to entry. Bain (1956) defined barriers to entry as any advantage that incumbent firms hold over those that may potentially produce in the market. Stigler (1968) offered an alternative narrower definition based on asymmetric costs between incumbents and potential entrants. That is, a barrier to entry is a cost of production borne by a firm seeking to enter, but is not borne by incumbent firms.

In practice, difficulties facing firms wishing to enter the regional aviation industry, or even a particular regional route, take the form of any advantage (cost or non-cost) held by incumbent firms. Entry barriers may be the result of the nature of the industry (or route) itself, or they may arise from the conduct of those firms already operating in the industry (or on the route), factors specific to new entrant firms, or from government regulation.

Natural barriers

Natural barriers to entry result from the established market position of incumbent firms and the high establishment costs faced by entrants. Some examples of natural barriers are ownership by the incumbents of superior production techniques or accumulated capital that reduces the incumbents' costs of production and make it difficult for entrants to compete. Specific natural barriers to entry are examined below.

Economies of scale

Chapter 4 indicated that economies of scale—decreasing unit costs arising from an increase in operations—may exist for regional airlines. Scale economies can form a barrier to entry to the regional aviation industry by favouring large airlines and limiting the number of service providers who can operate profitably within the market.

Are there substantial economies arising from aircraft size in the regional aviation industry? Given the same route and a fixed load factor, larger aircraft involve lower passenger-kilometre costs. Using the BTE's Aerocost 2 model, a theoretical example can be generated. A route distance of 300 km results in direct operating costs ranging from 28 cents per seat-kilometre (for a 5-seat Cessna 210) to 17 cents per seat-kilometre (for a 60-seat Fokker-28), assuming a 100 per cent load factor. If these scale economies were significant over the route distances commonly operated by regional airlines, aircraft sizes would be expected to be similar on routes where there are competitors. This is not the case, as there are many routes with competition between airlines with aircraft of greatly varying sizes (table 5.2 highlights one of these routes). This indicates that, in practice, aircraft size is not a barrier to new entrants on many routes. Rather, aircraft size is overshadowed by a number of other factors that come into play when matching aircraft to routes—cyclical demand patterns, desirable load factors, utilisation levels of existing aircraft, or service frequency.

TABLE 5.2 AIRCRAFT SIZES ON THE ADELAIDE–KINGSCOTE ROUTE, 1997

Airline	*Aircraft type*	*Seats*
Albatross	Piper PA-31	10
Emu Air	Cessna 300	5
	Cessna 400	10
	Piper PA-31	10
Kendell	Cessna 400	10
	FCH Metro	19
	SWE Metro	19
	Saab 340	35
Southern Sky [a]	Cessna 400	10

a. Southern Sky operated on this route for only part of 1997.

Source Avstats 1998b.

Chapter 4 also indicated that some minimum level of operation is necessary to take advantage of cost economies. In practice, the existence of a minimum efficient size would be born out by the restriction of entry to the industry by airlines below this size. However, economies of fleet size are not apparent. Over half of the regional airlines operating in 1997 had less than five aircraft—the median fleet size was four (excluding Airlink). Furthermore, examples of directly competing airlines of very different sizes can also be noted:

- Kendell (23 aircraft in 1997) and O'Connor Airline (2 aircraft in 1997) on Adelaide–Mount Gambier;
- Skywest (8) and Rottnest Airlines (1) on Cue–Perth; and
- Flightwest (20) and Norfolk Jet Express (1) on Brisbane–Norfolk Island.

Economies of traffic density come about through the ability to spread the fixed costs of the network across more units of output and can be achieved by providing more frequent services and/or larger aircraft. Chapter 4 indicated that Australian regional airlines were all operating below the minimum efficient scale of traffic density.

In summary, economies of scale do not seem to provide cost savings to a degree that would impact on the structure of the Australian regional aviation industry.

Economies of scope

Economies of scope refer to declining per unit output cost through the provision of a range of related services rather than provision of each of the individual services on their own. For regional airlines, the most obvious example would be combining RPT and charter or air training services within the one company so as to spread administrative costs and improve asset utilisation. This is a common situation, particularly among smaller firms. The risk reduction benefits of this strategy are discussed later in this chapter.

Viewing each route as an individual service, economies of scope may be achieved by offering services over a number of routes. Larger firms gain similar asset utilisation and cost advantages in this manner.

Sunk costs

Costs, which once incurred are irretrievable, are known as sunk costs. In respect of the regional aviation industry, a new firm entering an industry or an incumbent firm expanding its operations may incur sunk costs. The sunk costs may be incurred in either the purchase of goods (such as aircraft or terminal facilities) or services (eg advertising). Large sunk costs form a substantial barrier to entry, as once incurred, exit from the industry will result in a substantial financial loss. The spectre of large sunk costs can deter investment or even lock investment into a poorly performing business.

Although entry into regional aviation markets can entail substantial capital outlays—for aircraft and airport facilities—it would not appear to contain any large sunk elements. Terminal space at airports can be leased, as can aircraft. Aircraft, in particular, are relatively mobile from market to market and between businesses. As such, there need be relatively few sunk costs and it is access to aircraft and airport facilities (considered below) that appears to be a greater barrier to entry.

Starting up an airline or expanding to include a new route has to be publicised to potential passengers. Such advertising can be costly and is a sunk cost. This cost is particularly large when there are well known incumbents on the routes in question and can be a considerable barrier to entry.

Absolute cost advantages

Industry incumbents can hold absolute cost advantages due to superior production techniques or reduced input costs. However, the cost structure faced by airlines, as presented in chapter 4, does not leave many areas where this could lead to substantial gains.

One area where absolute cost advantages can be reaped is in the purchase of fuel. The purchasing power of large airlines or large airports can have a substantial impact on the fuel price, which forms a fifth to a third of direct operating costs. Anecdotal evidence points to Australia-wide variations in prices paid for fuel, between companies and across geographical locations, being as high as 300 per cent. Although airlines may face less variation in fuel prices within the same route, the ability to reduce fuel costs can give one airline an absolute cost advantage over another.

Other absolute cost advantages would tend to be in areas such as customer service, advertising, and ticket availability, which, although important to the operation of an airline, are not major cost components. As such, any advantages would be small and the period it would take a new entrant to develop the same level of 'know-how' may be relatively short, thus reducing the total value of the advantage.

Availability of finance

Access to finance (at an affordable rate) is vital to businesses such as airlines with high operating costs and high levels of turnover. It is particularly important in the start-up stage of a company and in any planned expansion. A credit stream enables troughs and peaks in profit levels to be smoothed over.

Tirole (1990) suggested the availability of finance as a potential barrier to entry. New entrants may have trouble finding finance for their investments because of the risk to the creditors. This risk arises firstly because entrants are relatively unknown, and secondly because of the potential for an incumbent with a strong financial base to inflict losses on entrants in protecting their market. The antagonistic reaction of incumbents is more likely in the case where they are protecting significant sunk costs (Street, Spence and Smith 1993).

Whether these problems are insurmountable and form a barrier to entry is disputed. Incumbents in the industry were once new entrants that faced the same requirements for finance. This argument supposes that, as the initial outlays and risks are similar, new entrants are not disadvantaged. In support of this line of argument, it was found in the BTE survey of regional airlines that lack of finance was not a barrier to future growth, including expansion into new routes. However, at different stages of the economic cycle, the availability of finance at an affordable rate to new entrants may well be constrained.

Resource constraints

Resources other than finance, predominantly air and ground staff, aircraft and airport access, may be barriers to entry, if in short supply, as they are essential industry inputs required by a new entrant.

Difficulty in employing or contracting suitable pilots does not appear to be a barrier to entry to the industry or new markets. Industry incumbents did not recognise lack of pilots as a restriction on their operations. *Plane Safe* (1995) indicated that an oversupply of pilots was a more common situation. The requirement to attain certain levels of flying hours as a prerequisite to upgrading qualifications makes gaining employment in the regional aviation industry highly competitive. The Australian and International Pilots Association agreed that oversupply remained the case and believed that there were no particular difficulties, even for small airlines or those operating in remote locations, in attracting suitably qualified pilots. Indeed, the desire for career progression often saw pilots starting out in very small airlines (1-2 planes) and working their way up through a Chief Pilot position, where management and administration experience was gained, to an airline with a larger fleet and more advanced aircraft.

For an AOC to be issued CASA must be satisfied with the experience of the nominated Head of Aircraft Maintenance. A lack of qualified aircraft maintenance engineers would be a barrier to industry entry. In May 1999 there were 5669 licensed aircraft maintenance engineers Australia-wide. Airlines did not identify any difficulties in recruiting such employees, and the ability to contract out some or all of the maintenance operations further reduces the likelihood of the availability of trained engineers restricting industry entry.

New entrants into aviation markets, however, may face the twin problems of aircraft and airport space scarcity.

The availability of aircraft on the purchase (new or second-hand) or lease market can act as a barrier to entry or as a constraint on the growth of incumbents. Delays in receiving aircraft can impact on the time of entry into the market and restrict the ability of airlines to react to external changes. An example of this need to plan ahead can be seen in the actions of airlines that expected deregulation to occur in New South Wales. To be prepared for this eventuality, a number of operators have placed orders for, or even accepted delivery of, new aircraft.

The aircraft market is an international one and the time taken to source and receive a particular type of aircraft can vary greatly—depending on the aircraft type, the location of the aircraft, and the method of purchase / lease. The state of the economy is also an important factor affecting aircraft availability. Both new and second-hand aircraft tend to be more quickly available in poor economic times. Discussions with aircraft dealers indicated that the purchase of new aircraft could take several months—particularly for large aircraft for which there were waiting lists. However, second-hand aircraft are more quickly available, reducing the impact of waiting times for aircraft as a barrier to industry entry. For common aircraft types, delivery could be achieved within days if leased and weeks if purchased. Bringing in aircraft from overseas entails a longer delay; as well as the extra transport time, there are Australian registration requirements. Finally, the firm size also impacts on the ability of airlines to gain aircraft quickly, through their ability to access finance (as discussed above). This may restrict the choice of some smaller companies to smaller, leased aircraft.

The potential delays are avoided by the tendency of existing airlines to service new routes with their existing fleet, and also by those entering the industry tending to come from other areas of the aviation industry, so already possessing suitable aircraft. Access to aircraft is one factor that limits the speed with which a regional airline can enter a new market.

Access to airport services (runways, gates, baggage handling and terminals) can create significant entry barriers. Airport services are often not allocated using pricing techniques, hence incumbents are positioned to take maximum advantage of whatever administrative allocation process is used. Access to airports can also be a strategic barrier when incumbent airlines have the ability to influence the access of other airlines (see strategic barriers below). The allocation process for airport facilities varies considerably due to factors such as demand for services and ownership structure. Current infrastructure is leased to the current airlines. New entrants would need to build new infrastructure or reach an agreement to use the existing infrastructure of another airline (baggage handling, ticket counter etc). Alliances between airlines usually enable sharing of such facilities.

The ability of new market entrants to access airports varies across the range of airport sizes and locations. On the whole, access to regional airports does not provide a barrier to industry entry. The existence of common-user facilities typically enables access for even the smallest airlines.

The airport with the clearest access limitation is Sydney (Kingsford Smith). It was served by 13 regional airlines in 1997, which made up a third of the airport's aircraft movements. At that time, access to Sydney airport was controlled by a $250 surcharge for landing during peak hours (8–9 am and 6–7 pm) and a smaller charge for landing in the surrounding shoulder periods

(7.30–7.59 am, 9.01–10.00 am, 5.00–5.59 pm and 7.01–7.30 pm) (Senate Rural and Regional Affairs and Transport References Committee 1999). As this charge applied equally to industry incumbents and new entrants, it did not comprise a barrier to entry, although it did benefit operators using large aircraft over those using smaller aircraft.

Unsatisfied demand, however, remained in peak hours indicating that the charge differential did not spread demand as desired (Productivity Commission 1999 p. 189). On 29 March 1998, a slot management system commenced (Senate Rural and Regional Affairs and Transport References Committee 1999). Regional councils in NSW support the slot system. This system remains in current use.

In short, the system relies on a set of rules that guide preference in allocating slots to operators wishing to use Sydney airport. A 'ring fence' protects the number of slots allocated to regional operators. If a regional operator gives up a slot (or fails to use it at least 80 per cent of the time) it does not go into the general pool, instead remaining a regional slot. If no regional operator takes up the slot after two years, only then is it returned to the general pool – an unlikely situation for desirable slots. The actual level of allocation of slots to regional airlines is not an issue when identifying barriers specific to new market entrants.

Slots are allocated twice a year. This is firstly done on historical precedent and then the remaining slots are divided equally between new entrants and incumbent operators. Within the allocation of the regional slots there is a system of precedence:

1. Services that replace defunct services receive priority over other services.
2. Services to airports without existing regional services are given priority over services to airports that have existing services (based on day of service).
3. Large aircraft gain priority over small aircraft.
4. Full-year services have precedence over those not proposed as ongoing services.

Does this system make market entry difficult for new operators? Considering the demand for the peak period slots and the initial allocation on the basis of historical usage, new operators wishing to provide a peak service do appear disadvantaged. The system of precedence in allocation of the remaining slots will also make it more difficult for a new operator wishing to compete over an existing route to gain a favourable slot. However, when State Government regulation of regional air routes is taken into account, slot allocation issues at Sydney airport become less important as a constraint on market entry.

Level of risk

Risk is a measure of the likelihood of the actual return on an investment deviating from the expected return. Risk can form an entry barrier to investment in an industry if the level of risk is high in relation to the expected rate of return. Economics (portfolio theory) assumes that investors prefer high returns and yet are risk-averse. Setting up even the smallest airline involves a substantial investment, although much is relatively easily liquefied; so an adequate rate of return is required to justify this investment. The aversion to risk and the desire for high returns must be balanced when investment decisions are made—the higher the risk on investment (that is the variability of outcome), the higher the expected returns investors will require to be persuaded to hold it.

BTCE (1988 p. 76) found that 'the provision of intra-State aviation services is characterised by a high level of risk, with high levels of operator failure.' So where is the regional aviation industry today on the risk / return scale?

The turnover of operators in an industry is one indicator of risk. Over the nine years from 1990 to 1998, a total of 111 operators provided regional aviation services. Of those operating at the beginning of 1990, 35 per cent were still operating at the end of 1998. During this period, 73 companies withdrew from the industry (although 13 of these moved into charter operations and 20 disappeared as a result of a merger / takeover). This indicates a fairly high level of industry entry and exit (turnover) which is indicative of a high-risk business.

Regional airlines are taking actions to minimise their exposure to risk. Diversification, that is, extending the range of goods and services offered by a firm, is one method. Having a second string to a company's bow—typically charter services—can reduce the risk facing the company. Many companies have moved in and out of RPT services while maintaining a solid charter business. Firms that maintain a relatively large network undertake another form of diversification. By operating a number of routes, the risk to the total investment can be reduced; because when one route performs badly, it may be that another is doing well. This diversification does pay, but only as long as the performances of the assets in a portfolio do not coincide: in as far as the assets returns move together there will always be some remaining risk that cannot be diversified away. Such a strategy does not reduce the risk faced on a particular route or in a market segment; it does, however, reduce the risk exposure of the firm as a whole.

The foregoing description paints a picture of the industry as relatively risky, albeit with the availability of strategies to spread that risk. Those at the smaller end of the operational scale take less advantage of the strategies to reduce risk and so face a relatively higher risk of failure than does the remainder of the industry. Companies that rely on routes with widely fluctuating passenger levels also face higher risks than those with a stable demand pattern.

If the risk on investment is high, particularly for the typically small-sized new entrants, why is there a relatively strong level of entry to the industry? The regional aviation industry has a feature that clouds the expectation that risk will form a barrier to entry. In a survey of those in the general aviation industry conducted by the BTCE (1996) relevant participants were asked their primary reason for starting a low-capacity RPT business. A personal interest in aviation was cited by 52 per cent of respondents, with good commercial prospects seen as important but less strongly so (19 per cent). It should be noted that an interest in aviation was much more important to participants in other general aviation fields. Nevertheless, the preponderance of operators in the RPT industry for predominantly non-financial reasons indicates that the safety of their investment may not have been a high priority. Thus, many would have been willing to make relatively high risk/low return investments that the general investor may have rejected. When company structure is considered, it is apparent that as the legal structure becomes more complex (eg. moving from sole partnerships to private companies), the importance of commercial prospects increases (up from 4 to 20 per cent) (BTCE 1996). Simultaneously, the role of a personal interest in aviation is of lowered importance (down from 84 to 61 per cent).

Nevertheless, viewed independently, the RPT segment of the business remains high risk. However, the high level of entry to the industry indicates that risk does not form a major barrier to entry, perhaps because of non-financial reasons for industry involvement among the smaller firms facing particularly high risks.

Demand for services

One natural barrier to entry not commonly mentioned is the level of passenger demand for services. This is closely related to the discussion earlier in this chapter examining the argument that some regional routes are natural monopolies and, as such, can only support one operator.

The survey of regional airlines conducted by the BTE found that many airlines viewed the small regional populations as an inhibitor to airline growth. The often slow growth rate of populations, and even population decline in the smaller centres, can be a significant barrier to market entry. However, the populations in larger regional centres (such as Dubbo, Wagga Wagga and Cairns) are growing more rapidly, and so are less likely to restrict operator entry. Routes which service tourist regions are not so much affected by the levels of regional populations, being influenced more by domestic and international economic trends.

Strategic barriers

Incumbents can create barriers to entry by adopting operating strategies that deliberately block the entry of new players. Such strategies are legal and do not go as far as collusion to force competitors out of markets. These strategies are discussed below.

Passenger market segmentation

All air passengers are not the same. As discussed in chapter 4, there are travellers to whom time is critical (typically business travellers) and others to whom the scheduling of flights is not of great concern (leisure travellers). This allows segmentation of the passenger market and price discrimination. Its existence indicates a level of market power in airlines that allows a level of full-fare payment to persist but tough competition should be able to reduce fares to the minimum level.

When a market can be split, it also allows an airline to focus on a specific client group—understanding its service requirements and developing information on the group's price elasticity. This can be a barrier to a new entrant who does not have the advantage of that knowledge but may need to attract some of those passengers away from the incumbent.

Incumbents will also act to protect their market share from potential entrants by creating customer loyalty. A new operator will need to put significant resources into market research, advertising and promotional packages with the aim of luring sufficient customers from the incumbent operator. Such expenditure is non-recoverable and potentially large and its level may be hard to predict at the outset. Such a strategy increases the risk facing a new entrant and hence is a barrier to entry.

As many routes do not offer a choice of airline, the level of passenger loyalty is hard to gauge. Even on routes with competitors, the differences in service price / quality trade-offs make the dominance of one of these airlines difficult to tie clearly to customer loyalty. However, an indicator of the airlines' perception of the importance of passenger loyalty can be seen in the uptake of domestic airlines' frequent flier schemes by regional airlines. In 1999, 17 regional airlines were partners in these loyalty schemes. The potential for passenger loyalty schemes to act as barriers to entry has been recognised by the United States' General Accounting Office which noted that these schemes

> can make competitive entry more difficult for other airlines, especially in markets where one airline has a substantial share of the market. (*The Avmark Aviation Economist* 1999, p. 13)

Longevity of an airline can also be partially attributed to passenger loyalty, received as a result of value for money service. Of those airlines operating at the end of 1997, 65 per cent had been in the industry for more than five years. Indications are that passenger loyalty may be important in dissuading new entrants.

Ancillary service ownership or control

Incumbents can undertake business strategies that give them control of vital ancillary airline services. The larger regional airlines take advantage of horizontal integration offering ground handling, catering, and engineering services. Two examples of control of engineering services are Country Connection Airlines and Hazelton. Country Connection Airlines' sister company, South West Aviation, is based in regional NSW and has the capability to maintain all general aviation aircraft as well as to undertake aircraft painting (Country Connection Airlines 1999). Hazelton operates an engineering shop in Sydney that caters for 410 flights per week (*Aircraft & Aerospace Asia-Pacific* 1999 p. 35). Small airlines (including new entrants) need to purchase such services, and they may well have to strike a deal with a competitor.

Passengers are also a resource sought by new entrants. Customer loyalty can be taken a step further, where it is more appropriately described as customer 'capture'. Methods used by regional airlines include:

- control of feeder airlines (AirNorth Regional operates a subsidiary Air Tiwi, while Air Link is closely associated with the larger Hazelton);
- alliances and code sharing with the two domestic airlines (chapter 3);
- control of the marketing/distribution channel (computer reservations systems, ownership of travel agents, and the payment of booking incentives and overriding of commission by an airline).

Airline hubs

Airlines can compete at airports as well as over specific routes. An airline's dominance of an airport (measured by the operator's percentage of passengers originating at the airport) can act as a barrier to entry to new airlines wanting to offer services through that airport. When that airport is a hub, dominant airlines will be able to channel passengers to increase load factors over the routes they service. A new airline would need to compete on a number of identical routes in an attempt to draw passengers away.

An examination of the major hub airports for regional airlines shows that of the 15 airports with connections to ten or more other airports, two were serviced by only one regional airline (Townsville and Coolangatta) and a further two were serviced by two regional airlines (Gladstone and Rockhampton). Dominance at a hub can restrict entrants to several, typically high-density, routes.

Institutional barriers

Government policies can result in barriers to industry entry. Unlike natural and strategic barriers to entry, these are outside the sphere of influence of the industry and cannot be controlled by either the incumbents or the potential entrants.

Governments can control industry entry by requiring licensing and approval processes.

An Air Operators Certificate (AOC), obtained from CASA, is a prerequisite for the provision of commercial air services that involve any aircraft operating in Australian territory, or an Australian registered aircraft conducting commercial operations anywhere in the world. This is required for reasons of passenger safety—ensuring the airline is technically and financially able to offer the service passengers demand and expect. Through certification, industry members gain assurance that minimum standards are maintained and the public perception of industry safety is enhanced. An important aim of the process is to ensure that the applicant accepts their role and responsibilities in the maintenance of aviation safety. CASA must be satisfied with the appropriate experience of key personnel before certification is authorised.

There are a number of steps to certification, involving the provision of information to CASA and also inspection by CASA. In particular, the airline must provide evidence of having the essentials necessary to conduct the proposed operation—aircraft, facilities, staff, and finances. CASA charges for certifying operators on a cost-recovery basis, currently at the rate of $75 per hour. The process will take a minimum of three months under ideal circumstances where an applicant is fully prepared for certification. For a start-up airline, the cost of obtaining an AOC for RPT operations is variable and is influenced by the type and size of its proposed operations. In addition to CASA charges, considerable airline staff time may be involved in achieving certification.

For an entrant coming from outside the aviation industry (with no prior knowledge of this system) certification can become a time-consuming and costly process. The high real cost of the AOC could act to dissuade entry, however, an AOC is a prerequisite for all in the industry, and so is not a barrier to entry in the true sense.

Each State and Territory also has its own licensing system for RPT operations. This involves minimum cost and time and, in general, does not represent an entry barrier.

There are, however, some exceptions where the licensing system is used as a barrier to entry. Where entry to routes is restricted, the guiding rationale is to raise access—ensuring those in regional Australia can access quality air services at a reasonable price. In New South Wales, the licensing system is used to restrict entry to specific intra-State routes (chapter 3). The lobbying in New South Wales for the removal of restrictions can be seen as an indicator of intentions to contest some, or all, of the recently deregulated routes. Eight regional airlines provided submissions and/or evidence to the NSW Standing Committee on State Development inquiry—the majority in favour of deregulating the market to some extent. Queensland imposes aircraft type restrictions on licences for two routes out of Cairns.

Subsidies are the other form of Government intervention and are combined with restricted entry to the routes in question. Both the Queensland and Western Australian State Governments subsidise specific air routes, while the

Commonwealth Government also supports regional access to air services through the RASS scheme (chapter 2). The intention of subsidises is to ensure regional access to air services. Properly designed subsidy schemes should only apply to routes unable to support even one operator. Subsidies should not form a permanent entry barrier, as these routes are regularly opened to tender. Chapter 6 looks more closely at subsidised routes.

Summary

The available evidence suggests that the Australian regional aviation market has some potential entry barriers. Investment risk and the need to access both finance and aircraft may limit entry, particularly by small and unestablished firms. Entry is also limited by route-specific characteristics such as density. These natural entry hurdles are exacerbated by the potential strategic behaviour of incumbent firms. The importance of enabling customers to both recognise the airline and easily place reservations can act to enforce the oligopolistic industry structure or give those within this framework a clear advantage. Overcoming customer loyalty can require initially large sunk investments in advertising by potential entrants. The presence of barriers to entry indicates that incumbent operators do have some level of market power that they can exert to reap higher returns on their investment.

The flip side of entry is exit from the industry and this gives guidance to the major pressures industry participants encounter. An analysis of the reasons for exit from the regional aviation industry over the period 1990-1998 was undertaken using information from *Australian Aviation*. Financial problems and poor load factors were the predominant reasons given. Estimates indicate that, of those leaving the industry, 27 per cent moved into other fields of the aviation industry, 30 per cent were taken over by or merged with other airlines, while in 43 per cent of cases the firm ceased to exist.

CONTESTABILITY

Baumol, Panzar and Willig (1982) argued that under certain specified market conditions it is possible for a monopolist, or group of oligopolists, to behave in a perfectly competitive manner. This is the perfectly contestable market. Perfect contestability, unlike perfect competition, does not have implications for the number of market participants. Importantly, contestability theory indicates that the structure of an industry is dependent on cost and demand conditions.

As in perfect competition, the perfectly contestable market has no barriers to entry. In these circumstances the monopolist or oligopolists face the real possibility of entry by a profit-taking firm. One way to prevent this from happening is by setting price equal to marginal cost, as would happen in a perfectly competitive market. Only normal profits will then be earned and no incentive for entry will exist.

The threat of entry is enough to simulate the positive features of a market experiencing perfect competition. Incumbents will produce at the greatest output at which they remain financially viable. This is a second-best output, as although marginal benefit does not equal marginal cost, it is as close as is possible without government subsidies to the monopoly. Under perfect contestability it is possible for an efficient monopolist to exist.

A further condition for perfect contestability is that entry must be instantaneous, or at least fast enough to allow the entrant to duplicate the incumbent's cost conditions before an incumbent has time to act. If this is not the case, monopolists or oligopolists can react by reducing their prices to marginal cost levels each time a potential entrant attempts to enter the market. Once this potential entrant has been driven away, prices can be reset at the original higher level.

This second condition is a sticking point in identifying contestable markets in aviation as a real world phenomenon. Fares can be adjusted almost instantaneously as the incumbent learns of a potential competitor's plans. The barriers to entry discussed above give the incumbent time to alter fares, if that is to be their strategy. So the use of strategic barriers to entry ensures that this condition for perfect contestability is not present in the aviation industry. Grimm (1992) explored the applicability of contestability to the Australian domestic aviation industry, but found that it did not describe the market well.

CONCLUSION

Two concerns arising from the market structure of the regional aviation industry are the level of single-operator monopoly routes and the high market concentration on multiple-operator routes. These factors indicate the potential for these industry participants to reap excess profits. On the other hand, the frequent entry and exit from the industry, and the evidence of destructive competition within the industry, points to the opposite.

The ease of entry into the industry is one important factor in determining if the industry is competitive or whether the incumbent firms are being protected from competitive pressures. An examination of potential entry barriers shows the strongest natural barriers to be the risk involved in such an investment, the ability to access the necessary operating finance and aircraft, and perhaps more importantly, the small size of passenger demand on the majority of regional air routes. Incumbent firms can also act strategically to protect their market. As a result, incumbents, and particularly those operating within the alliance framework, have a clear advantage and so can work against entry to the industry.

The result of these barriers is that entry by companies with aviation industry experience is favoured. New entrants are in most, if not all, cases, operating in some area of the aviation industry, and so have already passed some financial and asset-based barriers. Although contestability theory appears not to hold in the aviation industry, entry barriers similarly limit the pool of potential entrants.

Chapter 6 looks at the outcome of the apparent restriction in competition in some segments of the market by examining the impact on relative and absolute fares.

CHAPTER 6 PRICING

The degree of competitive pressure experienced on an individual route is influenced by supply and demand factors, as well as by the number of other service providers. However, it is difficult to judge the relative importance of these factors in price setting merely by a qualitative discussion of the factors in isolation, and observance of the range of market outcomes.

The area of particular interest is the impact of competition on fares—*are flights on multi-operator routes cheaper than on monopoly routes?* Some form of quantitative analysis is needed to evaluate the degree to which competitive pressures can restrain fares.

Chapter 5 provided a discussion of competition and contestability and this is augmented to assess the impact that competition has on fares on regional routes. The analysis is carried out by modelling fares using supply, demand and competition variables.

DETERMINANTS OF MARKET STRUCTURE

When assessing the impact of market structure (level of competition) on air fares it is important to know whether the competitive structure of a market is itself jointly determined with the fares and traffic in a market (structure is endogenous) or is determined only by other factors (exogenous). The quantitative method for testing contestability, and therefore the statistical results, will vary depending on whether market structure is assumed to be exogenous or endogenous.

In the long run, technology and demand are the key determinants of market structure. Technology determines the competitive costs, while demand determines how many firms of an efficient size can coexist in the market. In such a case, market structure would be endogenous, that is it is jointly determined with the volume of travel. However, there are cases where different market structures may persist despite similarities in technology and traffic volume. These are:

- when average costs are constant over a wide range of outputs allowing many viable scales of operation; and

- when the structure in particular markets imposed by earlier regulation has not been eroded. This is particularly important in the case of recent deregulation and was noted by Bailey, Graham and Kaplan (1985).

Most of the aviation price setting studies in the literature treat market structure as exogenously determined although they do not directly test for this (eg. Call and Keeler 1985, Morrison and Winston 1986). Two studies were found that tested the endogeneity of market structure for cases in the United States (Bailey, Graham and Kaplan 1985; Graham, Kaplan, and Sibley 1983). Neither found support for an endogenous market structure and both concluded, on the basis of the empirical evidence, that the market was not contestable. One note of caution is that both these studies were conducted not long after United States' regulation was relaxed, and therefore should be treated cautiously as a true reflection of deregulated markets.

Testing for endogeneity requires that the market structure be examined as a function of demand variables. The determinants of demand on a route typically include travel distance, income and population at origin and destination centres, and nature of the destination. In the case of population and income, having this information solely for the city pair would not be a true representation of reality for some routes, such as Ayers Rock to Cairns. This particular route has a large number of foreign tourists and having just the population/income of Ayers Rock and Cairns would not be sufficient to represent the demand. To do so would require population and income information for the main tourist source countries. In addition, price and income elasticities for individual routes are unavailable and are misrepresentative when viewed nationally. As a result, the ability to test for endogeneity of market structure on Australian regional airline routes is restricted by both data availability and accuracy concerns.

In view of the precedent set in other studies and the restricted ability to test for endogeneity, in this study market structure is explicitly treated as exogenous. This decision is supported by the belief that economies of scale are not important in regional aviation (chapter 5), which means that the viability of a range of scales of operation can result in many market structures.

FARE SETTING

Before testing the relationship between fares and level of competition, the economic principles used in fare setting need to be understood so as to recognise the full range of factors which impact on fare levels. This builds on some of the analysis of costs presented in chapter 4.

In practice, there are a range of ways in which prices can be set, but these have developed from two theoretical strategies. Firstly, firms in a perfectly competitive market will charge a price equivalent to the marginal cost of production (chapter 5). Price is set on the basis of costs incurred in providing the service (cost-based pricing). A monopoly, on the other hand, chooses its price and output simultaneously and operates where price is greater than marginal cost. The price charged by the monopolist will be based on the market demand—that is, consumers' willingness or ability to pay (market-based pricing). Thus, in the absence of other constraints on firm behaviour, the price will be higher, and the output lower, if a firm behaves monopolistically.

Variations on these strategies include cost plus a mark-up, charging at, or below, competitors' prices, and entering negotiations with consumers. Such systems make use of rules of thumb rather than accurate assessments of marginal revenue and costs.

BTCE (1996 p. 119) surveyed operators of low capacity RPT services and found that 40 per cent set prices at what the market will bear, 35 per cent set prices at or below competitors prices, 21 per cent used a cost plus mark-up system, while 4 per cent negotiated with customers to set price. However, the need to cover the average cost of production forms a minimum acceptable price level for long-term operation. This information indicates that regional operators may favour market pricing and suggests that routes with single operators may charge significantly higher fares than when competitors restrain what the market will bear.

The economic arguments in favour of cost-related pricing hinge on the twin issues of equity and efficiency. At this point, it is useful to examine economic efficiency as it relates to the Australian regional aviation industry. This gives guidance as to what is required in setting an optimal price.

Efficiency in fare setting

Air fares set at an efficient level will allow total revenues to exceed total costs by a 'normal profit', reflecting the opportunity cost of capital in the long run. Applying these pricing rules to airline service, the average price (average fare level or yield) would be set equal to average marginal cost. Excessive profits (exceeding the opportunity cost on capital) indicate that investment (at the route or industry level) is too small and new entrants would be expected. Profits below normal reflect over-investment and some players can be expected to exit. Accordingly, if price equals average cost, investment is at the optimal level.

The efficient pricing rules must also be applied in individual markets: price must equal marginal and average cost for each flight on each route. An important implication is that cross-subsidisation is inconsistent with economic efficiency.

The efficiency of the regional aviation market should be considered in terms of whether the available price-service combinations adequately meet the demands of consumers and the extent to which fares reflect the underlying cost structure of air service provision.

There are factors within the industry that promote the attainment of allocative and technical efficiency. The cost relationships highlighted in chapter 4 provide a profit incentive for airlines to move towards technical efficiency in terms of matching aircraft to route conditions. The trend to segment the passenger market (chapter 5), offering numerous combinations of price and service quality (be that through service frequency, aircraft size or otherwise), can result in a fair approximation of allocative efficiency.

FARE DIFFERENTIALS IN THE REGIONAL AVIATION INDUSTRY

Fares are commonly directly examined to identify relationships with route characteristics. Table 6.1 shows average fares per kilometre for monopoly and competitive routes, and for each jurisdiction. The fare data was collected in October 1998. The use of a per-kilometre fare partially adjusts for the impact of stage length—one of the largest contributors to cost. Multi-operator (competitive) routes clearly have slightly lower fare levels (particularly discount fare levels) than do those offered by single operators. However, this difference may be due to the presence of competition or equally be the result of the characteristics of competitive routes—on average longer, denser and served by larger aircraft—which are indicative of lower per-kilometre costs and hence fares.

Full economy and discounted fares on the regional routes show considerable variation between States. Full economy fares per-kilometre are the highest in Queensland, New South Wales and the Northern Territory, while the lowest discount fares are found in Western Australia and South Australia. Unlike the case of monopoly and competitive routes, there is no observable relationship between increasing route distance, route density, aircraft size and average fares per kilometre. For example, Queensland has a longer stage length, larger aircraft size and higher route density than South Australia, but average full and economy fares are considerably higher than those for South Australia.

There are a number of possible explanations for the highlighted differences between Queensland and South Australian fares and the relationship between fares and route characteristics in the other States. Airlines may be able to source inputs at differing costs or face different operating costs in different geographic regions. Fuel prices certainly vary; however, many of the larger operating costs would not be expected to differ greatly. Variation in load factor is a further possible explanation for the differences between States. This would reflect different levels of asset utilisation and the degree to which aircraft, density and service frequency are matched. There were, however, no clear differences in average load factors between States. There remains one other important factor that has the potential to influence fares—the elasticity of passenger demand on each route. Elasticity is a measure of the responsiveness of demand to changes in price. Low elasticity of demand (such as on business routes or those used by some international tourists) provides

TABLE 6.1 AIR FARE COMPARISONS FOR ROUTES OPERATING IN 1997

Routes	*Average full fare ($ per km)*	*Average discounted fare ($ per km)*	*Average distance (km)*	*Average aircraft size (seats)*	*Average route density (passengers)*
All routes	0.58	0.39	427	30	40 180
Monopoly	0.59	0.44	350	22	9 772
Competitors	0.54	0.27	596	46	106 081
NSW	0.64	0.44	272	23	25 894
NT	0.62	0.55	319	25	21 241
QLD	0.69	0.43	403	31	49 319
SA	0.43	0.33	337	16	27 005
WA	0.42	0.29	524	36	27 678
Inter-State	0.50	0.28	660	40	69 391

Note 1. This table has been developed using information pertaining to the 227 air routes used in the modelling later in this chapter.

2. The fare data was collected in October 1998 and applied to routes operated in 1997.

Source Avstats data, Sabre 1998, and BTE estimates.

potential to charge higher prices. Price elasticity of travellers is not apparent from an examination of available route characteristics, but may explain the differences in fare levels between States. States where regional routes carry more business travellers, or less price-sensitive international travellers, may reflect lower elasticity through higher fares.

This analysis remains partial in nature and is unable to take full account of the interrelationships between various route characteristics and fares. To determine how these factors inter-relate, a model of air fares is required. The remainder of this chapter examines relative air fares using an econometric model.

MODELLING CONTESTABILITY/COMPETITION

Determining marginal cost and marginal price

Ideally, measuring the efficiency of air fare setting should involve identifying the relationship between marginal cost and marginal price. However, the task of direct estimation of the production function is not so simple as marginal cost and marginal price data are not readily available.

Cost-based fare determination poses questions about the cost incurred in the production of a specific increment of output, such as a seat on a particular aircraft on a single-sector flight. The non-incremental nature of increases in aircraft size makes many costs difficult to calculate. Some cost categories are easier to allocate than others. The allocation of costs such as fuel can be done fairly accurately. However, difficulties are encountered in allocating the capital costs of aircraft across periods of fluctuating demand, say peak and off-peak times of day, during which the opportunity cost of the aircraft also changes. Similarly, allocating specific parts of general administration costs to an individual flight is problematic. For example, should airline advertising be equally shared across all passengers? Further difficulties arise when joint services are produced, such as freight capacity on a passenger service. Data of this detail for the broad spectrum of regional air routes ares not available and so a proxy for marginal cost is needed.

Avoidable cost has been used previously to proxy marginal cost, since it is typically easier to measure (BTCE 1995, p. 41). These are costs that would not be incurred if a given aircraft did not undertake a particular trip, and comprise DOCs and the variable elements of IOCs, such as ground handling and passenger reservations. IOCs are independent of the aircraft type or route distance, and so there are similar difficulties in estimating this as were faced in estimating marginal cost directly.

The analysis of airline operating costs (presented in chapter 4) suggested that direct operating costs (DOCs) represent between 67 and 90 per cent of total operating costs for regional carriers. Consequently, a pricing methodology equating fares with DOCs per seat would fail to recover the total cost of air service provision.

Ramsey pricing principles can be used to guide the estimation of indirect operating costs (IOCs). These principles suggest that IOCs are inversely proportional to the individual passenger’s own-price elasticity of demand. However, precise or even close estimates of price elasticities are generally not available at the individual route level. Nevertheless, this provides support for the inclusion of demand considerations (as indicators of cost) in price determination, so maintaining cost-based pricing.

Problems are also encountered in directly estimating marginal price for each flight sector. With constant returns to scale, however, marginal price equals average price—the fare paid for a seat on the aircraft. However, regional airlines offer a range of fares from business-first class to full economy class and a range of discounted fares with conditions attached to the ticket. Sophisticated revenue management systems are used by airlines to calculate the average yield based on the range and number of discounts offered. This is effectively the average price of a seat on a particular route and is a closely guarded business secret.

Developing a model

The difficulty with determining marginal cost and marginal price for particular air services means that a different method for analysing competitive pricing is required. As in most studies of aviation competition, econometric models are used to relate available variables, which represent particular cost and operating relationships, to the available fare information.

Beginning with the work of Bailey and Panzar (1981), a large literature has developed, quantitatively examining the impact of airline competition on fares. The most basic form of the fare equation treats the fare, usually an average fare on a route, as a function of actual and potential airline competition and some control variables representing supply and demand factors. This allows the net effect of competition on fares to be analysed. The general form of the fare equation is:

Fares= f(costs, demand, competition)

Drawing on the discussion of airline cost structures in chapter 4, the per-passenger cost of air service was found to depend primarily on five factors, which can form variables in the fare equation. These factors are:

- Distance travelled: Assuming all else equal, the total cost for a given aircraft increases with greater distance, but at a decreasing rate of increase; thus, cost per passenger-kilometre is lower the longer the flight.
- Aircraft size: Assuming all else equal, per-seat cost is generally lower the larger the aircraft.
- Load factor: Assuming all else equal, average cost is affected significantly by aircraft utilisation. When load factors are high, per-passenger cost is low, and vice versa.
- Density: Assuming all else equal, increases in the route density will also cause average cost per passenger to fall.
- Frequency: Assuming all else equal, increases in service frequency increase asset utilisation and should lower the per-passenger cost.

Demand variables include the route density (also a cost variable) and price elasticity of demand, both reflecting route characteristics.

Competition variables, at their simplest, include the number of airlines on the route, the number of new entrants on a route, a competition dummy or an index measuring market structure (such as the Herfindahl index[1]). These are included in order to test the effects of market concentration on fares. There are also a number of competition variables used in more complex specifications of the fare equation where specific competition factors are of interest. Airport dominance (measured, for example, by a carrier's percentage of passenger originations at an airport) has been used in recognising that competition in airline markets occurs not only on routes but also at airports (Morrison and Winston 1986 p. 45). Evans and Kessides (1994) showed that, in the United States, air fares are higher in the city-pair markets served by carriers with extensive inter-route contacts. This indicates that airlines may avoid initiating

1 The Herfindahl index measures industry concentration. It is developed by taking a size measure for each firm (such as the value of sales or employment) expressed as a proportion of the industry total, these are then squared and summed for all firms in the industry. The largest value the index can take is 1, when the industry consists of only one firm.

aggressive pricing actions on a route to protect fare levels on other jointly contested routes from similar actions by others. A variable indicating multi-market contact can be included in the fare equation. The presence of price leaders among airlines is a further competition variable which can be incorporated into a model of air fares as it results in likely cooperation in fare setting (Morrison and Winston 1986, p. 67).

A model can never be a completely accurate description of reality. Even the most complex model using all the variables discussed above may be of little practical use. Therefore, some amount of abstraction or simplification is necessary in model building. Having simplicity in mind, and noting elements specific to Australian regional aviation (such as the lack of large-scale hubbing or airport dominance), together with the other assumptions of constant returns to scale and market exogeneity, a general model was tested.

Average fare = f(distance, density, average aircraft size, number of competitors)

These variables were carefully chosen to represent costs, demand and competition while avoiding specification errors arising from too close a relationship between model variables. The close relationship between frequency, load factor, aircraft size and density meant that the inclusion of frequency and load factor, in addition to the other two variables, was unnecessary. As constant returns to scale in the regional aviation industry are assumed, the equation does not include a network variable. Nevertheless, the impact of network effects on price was tested and the results are examined towards the end of this chapter.

A translog functional form is used to estimate the price equation. This is a flexible form that generally provides a good second-order approximation of the cost function of a firm. The characteristics of this functional form reflect the non-linear nature of the relationship between price and costs.

The unknown cost function can be written as an exponential regression model:

$$cost = \beta_1 \text{ x } distance^{\beta_2} \text{ x } density^{\beta_3} \text{ x } average\ aircraft\ size^{\beta_4} \text{ x } e^{\mu}$$

By taking the natural logarithms on both sides, this can be transformed to a model that is linear in parameters (β_1, β_2, β_3 and β_4) and linear in the logarithms of the variables (cost, distance, density and aircraft size). This allows estimation using an ordinary least squares regression:

$$ln(cost) = ln(\beta_1) + \beta_2\ ln(distance) + \beta_3\ ln(density) + \beta_4\ ln(size) + e$$

To test whether more competitors on a route reduce fares, in other words whether airlines are making supernormal profits on the monopolistic routes, a variable reflecting competition must be included.

From the general form of the fare equation above:

$$average\ fare = cost \text{ x } number\ of\ competitors^{\beta_5}$$

The null hypothesis is $\beta_5 = 0$; that is, average revenue equals average cost and the number of firms in the market does not have an effect on price. The alternative hypothesis is $\beta_5 \neq 0$; and average revenue is greater or less than average cost (depending on the sign of β_5) and competitors have an impact on price.

Therefore the fare equation becomes:

$$ln(fare) = ln\beta_1 + \underset{(+ve)}{\beta_2\, ln(distance)} + \underset{(?)}{\beta_3\, ln(density)} + \underset{(?)}{\beta_4\, ln(size)} + \underset{(-ve)}{\beta_5\, ln(competition)}$$

Based on the cost relationships discussed in chapter 4, the expected signs of these variables are given under the equation. Effects of route density and aircraft size economies seem to interact, and as a result, *a priori* expectations about the effect on average cost have not been formed. For example, average cost per-passenger will decline up to a certain point as density increases and then may increase if additional infrastructure, such as a new aircraft, is needed to accommodate extra passengers. Similarly, economies in aircraft size might be lost if the addition of a new flight or aircraft causes load factors to fall, thereby increasing the average cost per-passenger.

The cost relationships discussed above also suggest possible multicollinearity between route distance and aircraft size and also between route density and aircraft size.

Data collection

Two forms of fare (price) data were collected—full economy fare and best discount fare—through a survey carried out predominantly in October 1998. Average fare data were unavailable, but the use of full-fare and best discount fare allows the range within which average fare will fall to be identified. For routes with multiple operators fare data were averaged.

Full economy fare: This is typically the price paid by business passengers and offers the most flexible travel arrangements. The level of passengers paying this fare on any one flight or across particular route types can be expected to differ. For example, on the predominantly business Sydney-Canberra sector, a high proportion of passengers could be expected to be paying full-fare. On the other hand, on a route such as Sydney-Port Macquarie, which encompasses a holiday location, very few passengers may actually be paying the full economy fare—instead taking advantage of reduced fares by booking well in advance. The full economy fare can also be viewed as a theoretical construct, used by airlines in yield management calculations to maintain desired revenue streams.

Best available discount fare: This is defined broadly as the cheapest advance purchase fare available for purchase by an Australian citizen and is generally not aligned to specific flight numbers or events. Those travelling on this fare usually have to meet strict travel requirements—book 14 or 21 days in advance, pay for a return ticket, stay away a Saturday night and face reduced ability to alter flights after payment is made. On average, a discount of 35 per cent on the full-fare was received—although 23 per cent of the regional routes did not differentiate their fares. A discount of 50 per cent or greater was available on just over one-third of the routes. Chapter 4 provides a detailed examination of discount levels available on regional air routes. Where a discount fare was not offered by the airline the full economy fare was substituted.

On routes for which operators received subsidies, the price charged does not reflect the cost of operations, as these are partially covered by the subsidy. To ensure that the price-demand relationship is correctly measured for all routes, those that are subsidised have been excluded from the analysis. This set of non-subsidised routes provides a point of comparison to estimate the marginal or average cost of providing a seat on the subsidised routes.

The need to match route information from the 1997 calendar year, discussed below, and fare information collected in 1998–99 meant that some routes had to be excluded from the analysis. Routes that no longer operated when the fare data were collected were removed. Routes were also excluded where a significant change in the operations occurred (and potentially a significant fare change), such as a change of operator resulting in new scheduling or new aircraft types. For stable routes, the fares are not expected to have changed substantially between the end of 1997 and late 1998, so results should not be distorted.

The cross sectional analysis used in this study is problematic if fares vary greatly across the year. The level of fare fluctuations was measured using monthly fare data on 75 regional routes collected by the BTE. Analysis of these data for a one year period (July 1998–June 1999) indicates that full economy fares were very stable, with an average increase over the year of 1.5 per cent. Only one route showed a fall in price, and nearly 59 per cent of routes showed no fare change. This is supportive of a point-in-time analysis. Best discount fares were more variable, showing an average movement across the year of over 20 per cent. The lowest fare levels were reached in May and the highest in September, while for the remainder of the year best discount fares tended to be stable. The period when fare data were collected for use in this study provides a level of best discount fare indicative of the majority of the year.

An examination of airline economics pointed to three factors that are considered to reflect airline costs and for which data are readily available. These are route density, route distance and aircraft size.

Route density: This refers to the number of passengers flying between two ports, reflecting the demand for flights. Traffic on board by stage (TOBS) data, which provides a count of the number of revenue passengers on a route sector, were collected on approximately 480 regional routes in operation during 1997 by the then Commonwealth Department of Transport and Regional Development. The number of passengers travelling on particular routes (one way, in either direction) ranged from 17 to over 800 000 for the year.

Any routes for which airlines did not report passenger density information for the whole period of operation, and for which a full data set was unable to be constructed from the available fragments, were removed from the final data set. It was necessary to use TOBS data, rather than more representative uplift-discharge data, as this enabled directly competing Qantas and Ansett flights to be included in the analysis. Qantas and Ansett passenger levels are only reported in terms of TOBS. Incidentally, TOBS data better reflects the necessary aircraft size for a particular flight stage. A separate analysis using UD data, and including only routes with no service directly provided by a domestic, was carried out to check the validity of using TOBS data as a density measure. The findings are discussed below.

Distance: This is the air distance flown by the aircraft. This figure was calculated from the great circle distance between the two points and is expected to proxy running costs of the aircraft.

Average aircraft size: An average aircraft size was calculated for each route by dividing the total passenger numbers by the number of flights and taking account of the load factor (a measure of how full the aircraft is). As well as indicating costs of operation, this is a partial indicator of service quality—making the assumption that a large aircraft is preferable to passengers than a small aircraft. On routes with only one operator, this average aircraft size will reflect the actual operating situation. However, where there is more than one operator and if these use different size aircraft, an average aircraft size will not be accurate for particular flights. An example is the Sydney–Canberra route where Ansett operates Boeing and/or Airbus jets with 114–144 seats, Qantas operates Boeing jets with 114–137 seats and Eastern Australia and Kendell operate De Havilland Dash 8 turboprops and the Saab 340 turboprops respectively, both of which carry close to 35 passengers. An average aircraft size on this route is 57 seats. However, as airlines charge similar prices on each route, regardless of the aircraft flown, the average aircraft size should represent the level of average cost to all operators.

Average aircraft size is calculated directly from the route density information so it is clear that these two pieces of information are related. There is also a relationship between distance and aircraft size based on technical limitations and trade-offs. Small aircraft cannot fly long distances, and while large aircraft can fly short distances it is not the most efficient operating range for these aircraft, so they will cost more to run. The relationship between average aircraft size and these other variables shows that aircraft are not necessarily chosen purely in order to provide the most profitable service. Other considerations include the broader operational requirements of the airlines, increasing utilisation of existing aircraft across a given route network and quality of service factors such as flight frequency and passenger desire for bigger aircraft.

IC (1992) used a dummy variable for aircraft size ('14 seats and less' and 'more than 14 seats') in modelling air fares, in recognition that there are a number of discrete levels at which aircraft become more expensive to operate. However, the inclusion of routes of longer distances when examining all regional routes (as opposed to intra-State routes) and the increased size of regional aircraft since 1992 means that there are now several distinct points of cost increase. In this case a linear variable, rather than a dummy variable, better represents costs.

Along with these cost factors, information on the extent of competition on each route was also collected.

Number of airlines on route: The number of operators servicing a route indicates the level of competition experienced. On a number of regional routes, Qantas and/or Ansett also offer services. On some of these, and many others, their subsidiaries also offer services. In terms of competition, Ansett and its subsidiaries were treated as a single competitor, as were Qantas and its subsidiaries, as operating decisions are not made completely independently in these airlines.

Not all routes with information available could be used, as some had exhibited elements of instability over the period under examination that made the data unrepresentative of the route as a whole. Routes serviced infrequently—less than an average of one flight per week—were not included. Less frequent operations than this were generally due either to non-reporting of information or an operator testing a market and withdrawing. The inclusion of such routes was felt to distort the true pricing situation on stable routes. This left 227 routes with full information that could be used. This set was considered to be as representative of the Australian regional aviation industry as possible (with the exclusion of Tasmania).

ECONOMETRIC ANALYSIS OF AIR FARES

The econometrics program SHAZAM was used to apply an ordinary least squares regression analysis to the data to estimate the translog function described earlier. The equation was examined for both the best discount fare and the full economy fare. In addition to the Australian regional aviation market as a whole, individual state markets and subsidised routes were examined in detail. Diagnostic tests of the econometric models indicated that assumptions of the ordinary least squares estimation were not violated. Specification error was tested using Ramsey's regression specification error test which checks for omitted variables, inclusion of irrelevant variables and the suitability of the functional form. This test found no evidence of specification errors.

Australia-wide analysis

The model shows that the price is primarily related to the distance flown. The results are shown in table 6.2. Distance was found to be significant and positively related to the air fare. Distance represents direct operating costs and indicates that covering these costs is certainly a major consideration in price setting. An elasticity of less than unity confirms the existence of economies of stage distance, that is the tendency for per-kilometre fares to decrease as distance increases.

TABLE 6.2 COEFFICIENTS IN THE ECONOMETRIC MODEL OF REGIONAL AIR FARES

Dependent variable	*β1 constant*	*β2 distance*	*β3 density*	*β4 aircraft size*	*β5 competitors*	*(N=227)*
Full-fare	1.09	0.64	0.05	-0.02	0.04	R^2= 0.82
	(7.28)	(27.08)	(2.81)	(-0.49)	(0.67)	F=260.23
Discount fare	2.61	0.52	0.004	-0.08	-0.10	R^2= 0.69
	(16.65)	(20.73)	(0.26)	(-1.92)	(-1.54)	F=122.5

Note 1. t-statistics are shown in brackets.
2. All variables are in natural logarithms.

Source BTE modelling.

The other two variables used to explain cost—route density and average aircraft size—displayed the expected multicollinearity, which makes their coefficients imprecise, while the t-statistics showed that these variables were slightly significant at best. Route density was significant and positive in the full-fare equation and insignificant in the discount fare equation. Aircraft size was insignificant in both the equations. Multicollinearity partly explains the different significance levels across the two fare models, but does not affect the predicted dependant variable.

The variable of most interest is the number of competitors. The parameter estimate was insignificant at the 95 per cent confidence level, and thus should be rejected as a valid contributor to the setting of price. This was the case for both full economy fares and discount fares. Based on empirical data, the hypothesis that, overall, the Australian regional aviation market is pricing its services competitively cannot be rejected.

The model did give a counter-intuitive finding in the case of the full fare—indicating that fares (per seat kilometre) are marginally higher on routes that have more than one financially independent operator. Possible reasons for the 'positive effect' finding on competition may come from a wide set of possibilities ranging from:

- (in support of a competitive industry)—the contested routes are by and large the denser ones, operated by the larger regional airlines, which by virtue of offering more *sophisticated* services to the market incur commensurately higher costs (which need to be recovered); to

- (in support of an uncompetitive industry)—operators on contested routes tacitly collude to set prices.

However, it is more likely that the full economy fare is the incorrect dependent variable to use in the market structure equation. The model was run again, this time using 'best discount' fare as the dependent variable. The best discount fare might better reveal the extent of competitive pressures on price, as the full economy fare tends to represent a benchmark fare against which other fares are pegged (these other fares being the ones most frequently purchased). Hence, it seems reasonable to hypothesise that the more competitive a market, the deeper a discount fare the competing airlines will be required to offer.

The model chosen to explain variation in air fares proved to be an acceptable representation of reality. The variable of greatest interest, competition, showed the expected negative relationship to price, indicating that as competition increases price decreases. However, this variable was found to have a statistically insignificant relationship with price, meaning no conclusion can be drawn regarding the influence the level of competition has on air fares.

This finding of the insignificance of competition is in contrast to overseas studies, predominantly in the United States (such as Morrison and Winston 1986), that indicated fares on monopoly routes were significantly higher than on routes experiencing competition. It does, however, confirm the South Australian based findings of Starkie and Starrs (1984) and Duldig (1996) that fares on monopoly routes and multi-operator routes are not significantly different.

Work in the United States by Bailey, Graham and Kaplan (1985) and Call and Keeler (1985) found market concentration to be significant and positively related to air fares. Chapter 5 (table 5.1) indicated the Australian regional aviation market to be highly concentrated. To test for the significance of market concentration on fares, a dummy representing market concentration was used in place of that for competition. This treated routes where the dominant airline carried more than 70 per cent of paying passengers as a highly concentrated market and one that could be expected to have similarities to a monopoly market. Modelling, however, indicated that market concentration was not significant in the setting of air fares. The Herfindahl index (which provides a measure of market concentration) was not directly tested as an alternate variable in the model, but the outcome of using a market concentration dummy variable indicated that the index would also prove insignificant.

The model above examines the Australian industry as a whole, whereas subsections of the industry may well behave differently. To provide a check on the industry-wide model, analysis of a number of market segments was undertaken. It must, however, be recognised that the model is based on imperfect data. Full economy fares and discount fares were used as a proxy for the average fare charged on a particular route. Similarly, average aircraft sizes were used rather than actual size, and the TOBS measure of density is a proxy for the true origin–destination density. Alternate indicators of competition and service quality are examined, as is the impact of the use of UD data rather than TOBS as a measure of route density. The results are discussed below.

State/Territory analysis

State/Territory estimates of non-subsidised routes with the exclusion of Tasmania and Victoria, are presented in tables 6.3–6.7. Victoria was excluded as the data set only had three intra-State routes. In the case of Tasmania, there had been major changes to domestic aviation with the withdrawal of Airlines of Tasmania, which made the routes unsuitable for inclusion. Table 6.8 presents the results of modelling all inter-State routes.

TABLE 6.3 INTRA-STATE AIR ROUTES—NEW SOUTH WALES

Dependent variable	*β1 constant*	*β2 distance*	*β3 density*	*β4 aircraft size*	*β5 competitors*	*(N=56)*
Full-fare	1.15	0.71	0.06	-0.20	0.15	R^2 = 0.88
	(4.47)	(18.37)	(2.17)	(-2.95)	(1.43)	F = 96.5
Discount fare	3.26	0.43	0.02	-0.21	-0.06	R^2= 0.73
	(13.05)	(11.40)	(0.89)	(-3.16)	(-0.55)	F = 35.3

Note 1. t-statistics are shown in brackets.
2. All variables are in natural logarithms.

Source BTE modelling.

TABLE 6.4 INTRA-STATE AIR ROUTES—QUEENSLAND

Dependent variable	*β1 constant*	*β2 distance*	*β3 density*	*β4 aircraft size*	*β5 competitors*	*(N=53)*
Full-fare	1.86	0.57	0.001	0.03	0.07	R^2= 0.95
	(8.34)	(19.58)	(0.05)	(0.41)	(0.88)	F=110.2
Discount fare	2.63	0.53	-0.43	0.04	-0.12	R^2= 0.82
	(6.25)	(9.64)	(-0.82)	(0.33)	(-0.81)	F = 25.1

Note 1. t-statistics are shown in brackets.
2. All variables are in natural logarithms.

Source BTE modelling.

TABLE 6.5 INTRA-STATE AIR ROUTES—SOUTH AUSTRALIA

Dependent variable	*β1 constant*	*β2 distance*	*β3 density*	*β4 aircraft size*	*β5 competitors*	*(N=12)*
Full-fare	0.71	0.56	-0.01	0.39	-0.09	R^2= 0.98
	(1.77)	(5.64)	(-0.46)	(3.61)	(-0.87)	F = 75.6
Discount fare	2.64	0.47	-0.01	0.04	-0.33	R^2= 0.97
	(6.2)	(4.4)	(-0.29)	(0.38)	(-2.9)	F = 50.2

Note 1. t-statistics are shown in brackets.
2. All variables are in natural logarithms.

Source BTE modelling.

TABLE 6.6 INTRA-STATE AIR ROUTES—WESTERN AUSTRALIA

Dependent variable	*β1 constant*	*β2 distance*	*β3 density*	*β4 aircraft size*	*β5 competitors*	*(N=33)*
Full-fare	0.398	0.61	0.12	-0.03	-0.17	R^2= 0.82
	(0.82)	(6.50)	(2.10)	(-0.17)	(-0.56)	F = 31.5
Discount fare	2.15	0.47	0.12	-0.22	-0.26	R^2= 0.69
	(5.04)	(5.60)	(2.22)	(-1.51)	(-0.95)	F = 15.2

Note 1. t-statistics are shown in brackets.

2. All variables are in natural logarithms.

Source BTE modelling.

TABLE 6.7 INTRA-STATE AIR ROUTES—NORTHERN TERRITORY

Dependent variable	*β1 constant*	*β2 distance*	*β3 density*	*β4 aircraft size*	*β5 competitors*	*(N=24)*
Full-fare	1.84	0.62	-0.08	0.13	0.08	R^2= 0.98
	(9.58)	(24.05)	(-2.47)	(1.75)	(1.06)	F=235.8
Discount fare	3.07	0.61	-0.08	-0.11	-0.14	R^2= 0.94
	(10.67)	(15.94)	(-1.60)	(-1.05)	(-1.30)	F = 76.5

Note 1. t-statistics are shown in brackets.

2. All variables are in natural logarithms.

Source BTE modelling.

TABLE 6.8 INTER-STATE AIR ROUTES

Dependent variable	*β1 constant*	*β2 distance*	*β3 density*	*β4 aircraft size*	*β5 competitors*	*(N=46)*
Full-fare	2.06	0.55	-0.05	0.12	0.12	R^2= 0.83
	(4.71)	(7.42)	(-1.58)	(1.47)	(1.06)	F = 47.5
Discount fare	2.83	0.52	-0.08	-0.07	-0.03	R^2= 0.86
	(9.04)	(9.72)	(-3.44)	(1.25)	(-0.35)	F = 66.2

Note 1. t-statistics are shown in brackets.

2. All variables are in natural logarithms.

Source BTE modelling.

The general conclusions drawn above appear consistent with individual State and Territory results. That is, the level of competition on a route appears insignificant in the determination of the air fare for both full economy fares and discount fares.

The only exception to this is South Australia, where the competition variable was significant in the model of discounted fares. Competition was, however, found to be insignificant in the full-fare model. Considering that the true average fare falls somewhere between the full and best discount fare, the significance of the competition variable is not conclusive. The small sample size further clouds this finding of significance.

In New South Wales, where the number of operators on certain individual routes is regulated, the model shows, once again, that the number of competitors is insignificant in the determination of the fares in both the full economy case and for discount fares. This can be interpreted to mean that the regulation of operator numbers on specific New South Wales routes is not causing fares to be relatively higher than where entry is unrestricted, as is potentially the case with a protected monopoly. In this way, the regulation is not disadvantaging travellers in New South Wales through artificially inflating air fares. Indeed, it may be reducing some of the problems arising from destructive competition. However, the extent to which regulation is merely supporting a natural industry structure indicates that it may be creating additional costs for the broader community.

As the sample size is smaller for these analyses, the multicollinearity problem between aircraft size and route density found in the analysis of all routes became more serious, particularly in the cases of the Northern Territory and Western Australia. In the case of inter-State routes and South Australian routes there was also multicollinearity between distance and aircraft size. This indicates that there may be good matching of routes and aircraft size. On inter-State routes, in particular, this is logical as these routes tend to be serviced by larger operators with fleet sizes that allow such matches. It must be noted that multicollinearity does not affect the predicted dependent variable; that is, the total effect of all the independent variables on the dependent variable.

The comparison of air fares presented in table 6.1 indicated that there might be some characteristics of specific jurisdictions—not apparent from the density, distance and aircraft variables—which influences the level of air fares. To test for this, the model was run several times, each time including a dummy variable representing a particular State or Territory. This tests whether air fares in particular jurisdictions are different to those in the rest of the country. This variable was insignificant in the case of New South Wales, South Australia, Western Australia and the Australian Capital Territory for both the full economy fare and the best discount fare, but significant for Queensland only in the model of discount fare. This is not conclusive of the existence of jurisdiction-specific factors that are influencing price (otherwise not included in the model), as the true average fare is somewhere between the best discount and the full economy fare.

Analysis of subsidised routes

Both Queensland and Western Australia provided subsidies for certain air routes to ensure an affordable air service when otherwise not commercially viable. When setting subsidies jurisdictions do not have information reflecting Australia-wide routes, and instead some subsidies are based on information gleaned from other routes in the same jurisdiction or on estimated costs for operating on that route. The Australia-wide model allows air fares for these routes to be determined on the basis of the route characteristics (where these were available). Table 6.9 provides a comparison of fares charged and the fare predicted by the model as that which would be charged if no subsidy was provided.

As well as excluding routes where full route characteristics were unavailable, it was necessary to exclude a number of other subsidised routes from this analysis. Some subsidised routes are largely for the transport of freight rather than passengers, such as the route linking Port Augusta (SA) to Birdsville (Qld). As the model has been built to represent passenger routes, it is not used to model freight routes. Where freight revenue is earned, the model will overestimate the fares necessary to operate a certain size aircraft viably on a route of that distance and density.

The results of this modelling proved interesting. The full economy fare charged on the majority of routes turned out to be around 11 per cent lower than that predicted by the model. Thus, the subsidy can be seen as a wedge between the fares that would be charged on a similar route operating commercially and the fares actually charged on these subsidised routes. An even more marked difference (45 per cent) was found between the actual and predicted best discount fares. There were exceptions that did not match this expected pattern.

TABLE 6.9 ESTIMATING AIR FARES ON SUBSIDISED ROUTES

	Full economy fare ($)			*Best discount fare ($)*		
Subsidised route	*Actual*	*Model*	*% Difference*	*Actual*	*Model*	*% Difference*
Queensland						
Barcaldine–Brisbane	306	321	4.9	293	342	16.7
Barcaldine–Longreach	97	82	-15.8	93	116	24.2
Bedourie–Boulia	105	102	-3.2	101	158	56.8
Bedourie–Birdsville	105	103	-2.1	101	159	57.5
Blackall–Longreach	89	106	19.6	85	142	67.5
Brisbane–Roma	180	223	23.7	172	244	41.9
Boulia–Mt Isa	131	133	1.6	126	195	55.0
Birdsville–Windora	149	162	8.9	143	226	58.3
Cairns–Horn Island	321	338	5.3	350	321	-8.4
Cunnamulla–St George	132	148	12.1	127	210	65.7
Cunnamulla–Thargomindah	100	104	4.3	96	163	70.0
Cloncurry–Julia Creek	77	87	13.2	73	138	88.7
Charleville–Roma	105	148	40.8	101	180	77.7
Charleville–Quilpie	98	119	21.7	94	174	85.2
Hughendon–Townsville	133	160	20.6	128	220	72.0
Longreach–Winton	85	108	27.0	82	160	94.8
St George–Toowoomba	142	164	15.6	136	225	65.3
Quilpie–Windorah	99	120	20.8	95	177	86.2
Western Australia						
Derby–Fitzroy Crossing	88	110	24.8	176	170	-3.2
Fitzroy Crossing–Halls Creek	87	119	36.4	174	197	13.0
Geraldton–Kalbarri	200	91	-54.6	380	138	-63.6
Halls Creek–Kununurra	125	148	18.4	250	218	-13.0
AVERAGE DIFFERENCE			11.1			45.8

Source BTE modelling.

In six cases, one of the predicted fares was lower than the fare charged, indicating that the actual fare may be much closer to one fare type than another. This leaves one route (Geraldton–Kalbarri) where for both fare levels a lower fare was predicted. This cannot be interpreted as meaning a subsidy is unnecessary, instead there may be specific factor(s) that make this route different from those from which the Australian model is built.

Testing other variables

In developing the final model described above, a range of variables were considered for inclusion. Some of these were tested within the final model, but were excluded as the particular variables were found to be insignificant in both the full-fare and discount fare models and did not add to the predictive capacity of the model. These variables are discussed below.

Alternate transport

Competition can be experienced from other airlines, but may also come from other forms of transport, especially on short air routes. Two forms of the model were run incorporating a measure of the availability of alternate transport. Alternate travel times were identified for two-thirds of the 227 regional air routes in the full model. The discussion below concerns the findings from an examination of this subset of air routes.

Firstly, the travel time (in hours) by the fastest alternate mode was examined. This was found to be insignificant for both the full-fare and discount fare models and did not add to the predictive capacity of the model.

The second form used a dummy representing an alternate transport time of three hours or less (dummy=1) or more than three hours (dummy=0). The three-hour point allows a return journey within the one day, with time spent at the destination point allowing for a business meeting. More than this time indicates an overnight stay may be necessary and then two transport modes become less of a substitute. Total air travel time is much more than the time in the air; instead it is the total time between the origin point and the intended destination. It includes travel to and from the airport and time spent at the airports, which may add an hour or more to the actual time spent in the aircraft. The dummy was insignificant for both the full-fare and discount fare models and did not add to the predictive capacity of the model.

From this modelling it appears that the presence or absence of an alternate form of transport has no discernible impact on the setting of fares. A recent indication that in specific cases the competition from alternate transport may affect fares is the case of Flight West flights on the routes Brisbane–Bundaberg and Brisbane–Hervey Bay. These are now being offered as set price (a 60 per cent discount on the highest fare), no-frills services to better compete with the faster ‘tilt train’ now servicing the same route (Davis 1999 p. 9). The continuance of this price structure in the long term may indicate real intermodal competition that was not identified among the routes examined in this study.

Domestic airlines

There is broad interest in the impact the two domestic airlines may have on fare prices. A domestic airline has an extensive route network and this may influence the fares, while their size may also present them with advantages that allow a lower fare to be charge. The model was estimated with a dummy variable representing the presence of domestic airlines only (in the place of the competition variable used in the final model) but this was insignificant. Recognising the close link between domestic airlines and their subsidiaries another estimation was made where domestic airlines and subsidiaries were represented by a single dummy variable. Again, such a variable was insignificant and did not improve the fit of the model.

Dummy competition variable

The final variation on a competition variable tested was a dummy variable where 0 represented a single operator route and 1 the presence of a competitor. The final model, described above, used the number of competing airlines to represent the level of competition. The presence or lack of competition was not found to make a significant difference to the level of the air fare.

Service frequency

A number of other variables, including service frequency, have the potential to represent elements of operating costs. Service frequency is derived from aircraft size and route density and using it in combination with both or either of these factors caused insurmountable multicollinearity problems. The model was then estimated with a service frequency variable instead of aircraft size and density. The number of competitors was found to be insignificant as before, although the fit of the model was reduced.

Fleet size

Airlines with larger fleets theoretically are able to benefit from economies of scale and as a result may be able to charge lower fares. To test this, the model was estimated for a group of routes serviced by small airlines (a fleet of less than 10 aircraft) and for another group serviced by large airlines (a fleet over 30 aircraft). The results were consistent with the results from the model for all routes. Economies of scale, in the form of fleet size, did not appear to play a significant role in the setting of fares.

Effect of network size

Larger network size is generally expected to enable airlines to charge lower prices. To test this theory in the Australian context, the model was estimated for a subset totalling 130 routes comprising those serviced by airlines with a large network and those serviced by airlines with a small network (routes serviced by airlines from both groups were excluded). A dummy variable of 1 represented those where the operator served less than thirty ports and a dummy of 0 represented airlines that served more than thirty ports. This dummy was not significant at the 95 per cent confidence level, which suggests that the constant returns to scale assumption (supporting the decision to treat market structure as exogenous) holds for Australian regional aviation.

ESTIMATING THE PRICE LEVEL

The econometric modelling allows conclusions to be drawn concerning *relative* prices. However, to reach conclusions on the competitiveness of regional airlines it is necessary to additionally know where the price level sits in relation to costs. This allows the level of profit—be that super-normal, an acceptable level of operating profit, or even failure to cover costs—to be gauged. Profits in a competitive industry are expected to provide an acceptable return on investment, certainly above the 4-6 per cent level of the long-term bond rate, and will increase with the perceived riskiness of the investment.

As discussed earlier, data problems calculating yield and per-passenger average costs mean that the actual costs faced by the airlines cannot be easily compared to the average fares charged. However, good estimates of costs and fares have been developed, which enables a broad assessment of the profitability of the industry as a whole to be made.

Aerocost 2 was used to calculate indicative direct operating costs over a range of distances for a number of aircraft types commonly used in regional aviation services in Australia. This is similar to those costs presented in figure 4.6. The number of cost elements and factors which can vary for specific operators or specific routes means that, although the indicative direct operating costs provide a reasonable estimate, there will be considerable variation around it. All parameters other than distance were held constant, so variability in costs (such as fuel costs, airport charges, and in-flight provisioning costs) have not been taken into account. Importantly, the estimates are based on a 100 per cent load factor, so there is further potential for lower load factors to increase costs. Additionally, any costs (or revenue) arising from freight carried are also not included. As a result, particular routes or operators may face costs considerably different to the estimated ranges.

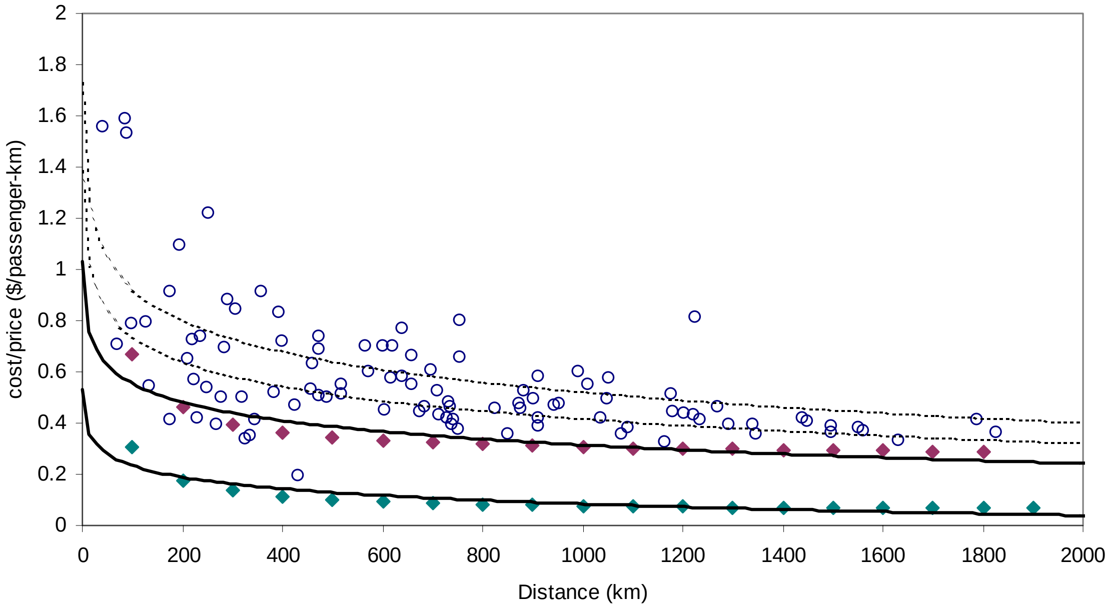
This estimation does, however, provide a set of upper and lower bound direct operating costs for regional airlines. The Boeing 737-300 had the lowest per-seat-kilometre operating costs of the aircraft used on regional air routes. Although this aircraft is only operated by domestic airlines, its cost structure in a competitive environment could provide the basis for a fare level which competitors strive to match. The indicative upper bound of the direct operating costs faced by regional airlines in Australia is the per-seat-kilometre cost of operating a Cessna 200 series aircraft.

Direct operating costs, however, are only one part of the total operating costs airlines face. Indirect operating costs were estimated to comprise the remaining 10 to 33 per cent of total operating costs (chapter 4). The cost levels modelled using Aerocost 2 were adjusted to include indirect operating costs. The minimal 10 per cent estimate of indirect operating costs has been added to the lower bound cost estimate. The upper bound has been adjusted upwards by 50 per cent to represent the 33 per cent indirect operating costs and to also make allowance for the older age of many of the aircraft in the Australian regional air fleet. Together, these provide an estimated band of unit costs (per passenger-kilometre) potentially faced by regional airlines operating services over a range of distances. This does not include any provision for an operating profit to provide a return on investment. Figures

6.1 and 6.2 indicate the range of unit costs as the area falling between the dark lines.

Figures 6.1 and 6.2, respectively, place actual full economy and best discount air fares charged (on a per passenger-kilometre basis) against the estimated operating cost range. These provide a broad indication of the level of profits in the regional aviation industry. It must be recognised that the cost estimates are only a rough guide to the actual costs faced in the industry, meaning that many of the points above the cost range may actually be within the error margin of the estimates. For clarity, only a subset of routes is included—those on which specific common aircraft types are operated. The inclusion of all regional air fare data confirms the apparent pattern, but obscures much of the detail observable in these two figures.

FIGURE 6.1 FULL-FARE PER-PASSENGER INDICATIVE COSTS AND REVENUES



Note 1. The dark line marking the lower bound of the cost range estimate is based on a Boeing 737-300 and the dark line marking the upper bound of the estimated cost range is based on a Cessna 210. These are indicative of the largest and smallest aircraft used in regional aviation services in Australia.

2. The dotted lines show a profit level 50 and 100 per cent (respectively) above the upper bound cost estimate.

3. The price per passenger-kilometre points are based on the surveyed fares for a range of aircraft of representative sizes (Cessna 200 series, Embraer 110, Beechcraft 1900, SAAB 340, Fokker 28, Boeing 737-300).

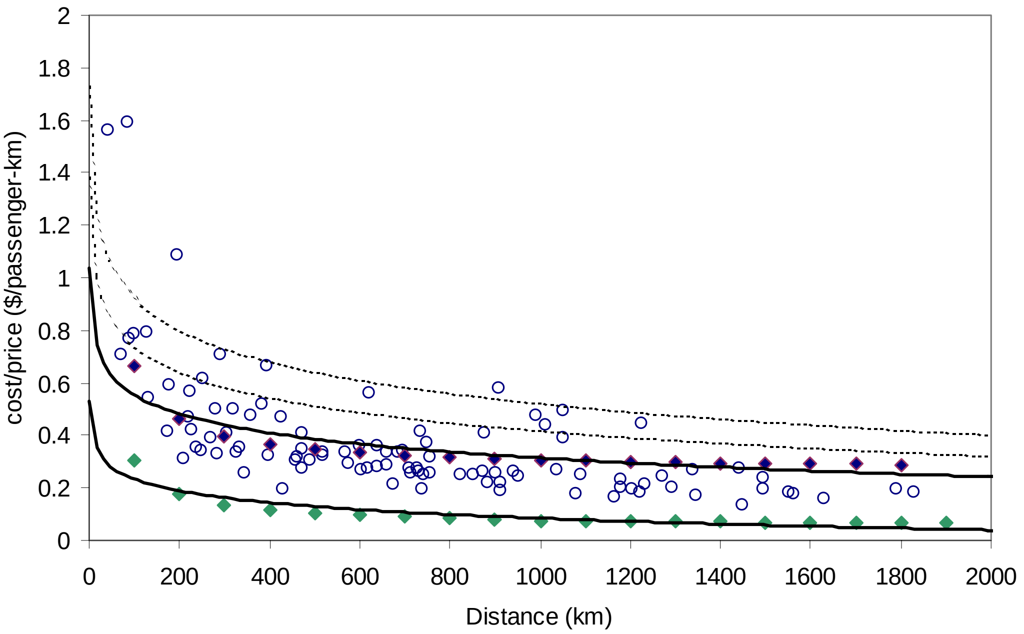
4. The distribution of prices shown is representative of the model dataset.

Source Aerocost 2, BTE estimates, Sabre.

Figure 6.1 shows the full economy fare for these routes. This represents the theoretical upper bound of the per-unit revenue the airline is receiving for these passenger services, where all passengers pay the full economy fare. Most of these fares are shown to lie above the cost range. The dotted lines show a level of 50 and 100 per cent respectively above the top of the estimated cost band. The fares appear to allow for a considerable profit above costs, in some cases more than 100 per cent but most commonly around the 50 per cent level.

Figure 6.2 shows the best discount fare available, representing the theoretical lower bound of the per-unit revenue received, where all passengers are able to take advantage of the best discount fare available. The majority of routes have fares that fall within the cost band; however, around a quarter of the routes have best discount fares falling above the cost range. Recognising that only a small proportion of customers could be expected to pay the best discount fare, this leaves room for profit taking.

FIGURE 6.2 BEST DISCOUNT FARE PER-PASSENGER INDICATIVE COSTS AND REVENUES



Note 1. The dark line marking the lower bound of the cost range estimate is based on a Boeing 737-300 and the dark line marking the upper bound of the estimated cost range is based on a Cessna 210. These are indicative of the largest and smallest aircraft used in regional aviation services in Australia.

2. The dotted lines show a profit level 50 and 100 per cent (respectively) above the upper bound cost estimate.

3. The price per passenger-kilometre points are based on the surveyed fares for a range of aircraft of representative sizes (Cessna 200 series, Embraer 110, Beechcraft 1900, SAAB 340, Fokker 28, Boeing 737-300).

4. The distribution of prices shown is representative of the model dataset.

Source Aerocost 2, BTE estimates, Sabre.

While the majority of routes appear to provide acceptable profit levels, there remain some where the gap between fares and estimated costs indicates significant profit levels. Examination of these routes suggests a number of specific reasons that may justify these higher prices.

The routes where discount fares fall above the estimated cost range reveals that they are predominantly short-distance routes. These short routes are mainly connecting segments in a longer route, and as such they face very low uplift–discharge demand. These routes, by and large, had significantly lower than average load factors, which increases the per-passenger cost. Also, those routes well above the cost range for the full economy fare, but with much lower discount fares, may have quite low yields if the majority of passengers travel on discount fares.

When the higher fares cannot be attributed to these factors which increase costs, the fare may represent the willingness to pay of the travellers. For very short routes with alternative transport modes, travellers will choose air travel only when the benefits are highly valued. These passengers are willing to pay higher prices because of this higher value. Without such passengers, it may be that airlines would not stop en route and offer short flight sectors.

Assuming that the actual average revenue per-passenger lies somewhere between the points on the full economy fare figure and on the best discount fare figure, a picture is painted of an industry which is at best making an acceptable profit.

While these figures provide an indication that regional airlines are not earning excessive profits, the findings should be treated carefully. The cost estimates shown provide only a *rough indication* of the kinds of costs faced by regional airlines.

CONCLUSION

Despite the difficulties in gaining data that adequately represent airline costs and prices, a robust model was constructed which allowed an examination of the variables important in fare setting. This model indicated the importance of distance (a proxy for direct operating costs) in fare determination. The model, however, demonstrated the presence of competition to be insignificant in determining price. As a result, the model provided no evidence to support an argument that monopoly segments of the Australian regional aviation market are pricing their services at a higher level than the multi-operator segments.

The high market concentration within the regional aviation industry was recognised as clouding the effect monopoly operators may have on price. The inclusion of a measure of market concentration in the model, however, did not significantly affect fares.

A simple, broad brush analysis comparing the position of the full economy fare and the best discount fare in relation to a band representing the range of indicative per-passenger operating costs over the same distance gives some insight into the profitability of regional airlines. This analysis showed full-fares to be slightly above the cost range and the majority of discount fares to fall within the cost range. This indicates that profits for regional airlines are unlikely to be excessive, particularly when the non-operating costs borne by regional airlines are considered. That is, fares are not excessively or unexplainably high. Indeed, the return to some operators appeared very low in relation to costs.

The following chapter examines these findings together with information in previous chapters to reach some conclusions about the competitiveness of Australian regional airlines.

CHAPTER 7 CONCLUSION

This study has examined the competitiveness of regional airlines through an analysis of industry structure, conduct and performance. In doing so, some clear indicators of competitive practices have been noted; however, the potential for non-competitive behaviour by industry participants was also recognised. In this chapter, the evidence is recapped and then balanced to reach an answer to the question posed in chapter 1: *are regional airlines competitive?*

INDUSTRY STRUCTURE

A competitive market has three features:

- many participants;
- ease of entry and exit; and
- no single participant has market power.

How does this compare with the observed structure of the regional aviation industry?

Market participants

At first appearance, the industry has many participants, typically comprising between 40 and 50 airlines of various sizes. There were 46 regional airlines operating in 1997.

This is, to some extent, misleading.

The domestic airlines have a strong involvement in the regional aviation market, through direct operation, ownership of subsidiary airlines and systems of alliances. Although, in 1997, they operated services directly on only 15 per cent of regional routes, airlines with which they had an alliance of some form operated on 83 per cent of regional routes (80 per cent of routes were operated only by airlines with alliances with Ansett or Qantas). The withdrawal of the domestic airlines from direct operation, particularly Ansett in recent times, has not resulted in any real change to this control of the industry—these routes have been passed to their subsidiary regional airlines to operate.

The depth of the reach of Qantas and Ansett into the regional aviation industry is most apparent when the carriage of passengers is examined. Allied airlines made up 54 per cent of the industry members but clearly dominated the transport task, carrying 97 per cent of passengers. This implies that regional air services are highly affected by the duopoly structure of the domestic industry.

A lack of competitive pressures is also apparent at the individual route level. Around two-thirds support only a single operator and the remainder, although being serviced by multiple operators (typically two airlines), tend to have one dominant firm. The scheduling of multiple-operator routes was not examined but the lack of head-to-head scheduling in even a small proportion of contested routes will further concentrate the market. This can have implications for the level of competition actually being experienced.

Competition from surface transport is strongest in the market for leisure travellers, but even then is only a directly substitutable service over shorter distances. There remain around 20 per cent of regional air routes under 300 km with no viable surface transport alternative.

The involvement of the two domestic airlines, the level of single operator monopoly routes and the high market concentration on multiple operator routes, as well as the limited direct competition supplied by surface transport, indicate the potential for industry participants to reap excess profits.

Entry and exit

The ease of entry into the industry is one important factor in determining if the industry is competitive, or whether the incumbent firms are protected from competitive pressures.

The industry has shown a turnover of participants; forty airlines (predominantly small) have entered the regional aviation industry over the past nine years and a similar number have exited. Even in the case of the long-term and stable industry participants, there is a process of ongoing change in terms of the aircraft used and routes serviced, which is indicative of the presence of competitive forces.

The presence of entry and exit from the industry does not mean there are no barriers, just that these are not so great as to be prohibitive to any new entry. Indeed, evidence suggests that there are entry hurdles that favour entry by companies with aviation industry experience.

The strongest natural barriers were assessed to be the risk involved in such an investment, the ability to access the necessary operating finance and aircraft and, perhaps more importantly, the small size of passenger demand on the majority of regional air routes. Risk and lack of finance may particularly limit entry by small and unestablished firms. Incumbent firms can also act strategically to protect their market. The importance of enabling customers to both recognise the airline and easily place reservations can act to enforce the oligopolistic industry structure giving incumbents, and particularly those operating within the alliance framework, a clear advantage.

As a result, new entrants are in most, if not all, cases operating in some other area of the aviation industry and so have already passed some financial and asset-based barriers. This close tie to other areas of the aviation industry is demonstrated by companies leaving the RPT industry—over the period 1990–98 27 per cent of these withdrew into other fields of the aviation industry.

Potential entrants

Contestability theory holds that the presence of potential new entrants can result in incumbents holding down prices to reduce the likelihood of further investment in their market segment. The threat of entry can simulate the features of a market experiencing perfect competition. Unlike the traditional structure–conduct–performance model, contestability theory predicts that concentration and new entry will not influence price, as potential entrants will already have exerted this influence.

Is the regional aviation market contestable? For this to be the case, there must be a pool of potential entrants with the ability to enter the market before the incumbents can react. It is clear that the potential for new entrants differs geographically, and that new entrants tend to have been operating elsewhere in the aviation industry. Thus, although there is a reasonable level of churn in the industry, the pool of potential entrants is limited. Furthermore, where Governments restrict entry to specific routes, these cannot be described as contestable.

Contestability theory's second requirement is that market entry is fast relative to the reaction time of incumbents. As fares can be adjusted almost instantaneously, and given the hurdles to industry entry, incumbents have time to react and 'instantaneous' entry is not a characteristic of the regional aviation industry.

Contestability theory does not accurately describe the regional aviation industry. The threat posed by potential entrants—who are limited in number and restricted in their ability to enter the industry at will—does not appear to drive an optimal market outcome.

ROUTE-SPECIFIC FACTORS

There are features of the routes served by regional airlines that will impact, to some extent, on the structure of the industry and the ability to demand higher fares. In particular, the cost structure of the industry where direct operating costs comprise 70–90 per cent of total costs means that operational choices heavily influence total costs. These choices are limited by route-specific factors.

Generally, low average route density places upward pressures on air fares. Low density limits the number of operators that can profitably service any one route —the industry exhibits some of the characteristics of a natural monopoly. Despite this, there are a number of low-density routes serviced by several operators; however these tend to be important to the airlines' networks as a whole. Nevertheless, this makes the various transition points from unaligned monopoly operators through to direct domestic airline operation unable to be accurately predicted solely on the basis of route density.

Density is not the only characteristic important in fare setting—the elasticity of demand is also important. Typically, the most important characteristics for airlines in gauging the demand elasticity are the split between business and leisure passengers, the cyclical demand for air services and regional and national economic trends. Favourable characteristics provide potential for profit taking.

Regional air routes have a short average distance that lifts the per-kilometre air fare. This is, in part, a reflection of the low level of hubbing in regional aviation in Australia. The short distance impacts on the cost-effectiveness of using large aircraft. A service quality/cost trade-off needs to be made by airlines and the position chosen may reflect the willingness to pay of passengers.

The type of aircraft, in particular, has a major influence on total costs for operating a particular route. To minimise costs, the aircraft used needs to be well matched to both the route's distance and density. The ability of airlines to achieve the ideal aircraft/route match is limited by the network they service—commonly made up of flight stages of various distances and varying densities—and the fleet they operate. An airline operating at minimum cost basis will be able to restrict the threat placed by other airlines. The impact of cost-based competition can be seen in the withdrawal of the high-cost domestic airlines from many regional services.

There are a number of route-specific factors that mean airlines are unable to minimise their marginal costs for each route—instead they must work to minimise their average costs across their route network. As a result, the per-kilometre air fare varies greatly between and within airlines, but alone cannot be taken as an indicator of excess profit taking in an uncompetitive industry. However, the ability to differentiate passengers provides the potential for higher average fares to be gained. The circumstances faced on each route and within an airline's network can mean a second best outcome in terms of price achieved.

THE PRICE STRUCTURE FOR REGIONAL AIR FARES

So, given the industry structure and the presence of some route characteristics, both of which provide potential for uncompetitive practices, how competitive is fare setting by the airlines?

Fare structure

This question can most simply be answered by looking at the fare structure. A competitive industry would see fares closely related to costs, and allow some margin for an acceptable profit.

Relative prices

Modelling allowed the relative prices between services operating on routes with and without direct competition to be examined. The level of competition was found to be insignificant in determining the air fare for Australia as a whole, for inter-State routes, and for States with significant intra-State aviation. That is, the model provided no evidence to support an argument that monopoly segments of the regional aviation market are pricing their services at a higher level than the multi-operator segments.

Given the incidence of dominant airlines on multi-operator routes, it was felt this might cloud the use of competition / no competition variables. A variable representing market concentration was used instead. However, this variable did not have any influence on fare levels either, although very few routes fell into the low level of market concentration group.

Absolute price

Comparing the full economy fare and the best discount fare in relation to a band representing the range of indicative per-passenger operating costs over the same distance gave some insight into the profitability of regional airlines. Full-fares tended to be slightly above the cost range and the majority of discount fares fell within the cost range. This indicates that generally profits for regional airlines are unlikely to be excessive, particularly when the non-operating costs borne by regional airlines are considered. That is, air fares are not excessively or unexplainably high.

The exception, where distinctly large profits appeared to be made even on the best discount fare, were some routes exhibiting very specific passenger characteristics—some mining and business routes. Both natural and strategic barriers to entry may be important in maintaining these higher air fares. These routes were either typically isolated or serviced by larger airlines—although in no way were all such routes charging fares clearly above the indicative cost of the service. The demand for air travel on these routes would be expected to be inelastic. It appeared that in some cases, airlines were taking advantage of this to gain a high return on servicing these routes. This result was not unexpected, as large airlines are best placed to both enter and then protect their market share on profitable routes; similarly, geographic isolation reduced the ability or desire of other airlines to incorporate such routes into their network.

High price routes were identified in all jurisdictions (except South Australia) and encompassed both monopoly service providers and multiple operators using a range of aircraft sizes. This creates particular concern in cases where subsidies are based on air fares charged on other routes in a jurisdiction. These other air fares will not always provide an accurate guide to the air fare which would be charged if a subsidised route were to be operated commercially on a cost-plus basis.

QUALITY OF SERVICE

In setting air fares, cost as well as quality of service must be taken into consideration. As with all goods and services, air passengers can be expected to be willing to pay more for a better quality service. Service quality indicators examined were aircraft size and frequency of service

Aircraft size was closely related to route distance, suggesting that its choice tended to be operational rather than a purely service quality decision. Nevertheless, the ongoing increase in average aircraft size in the regional aviation fleet is providing the passenger with increased levels of comfort and additional quality of service benefits.

Regularity of service is another quality indicator. Many routes did not receive a service for the entire year under examination, while of those with a continuous service, a significant proportion only had a once-weekly return service. Despite this service, frequency was not significant in describing air fares.

In cases where competition was present on routes, clearly service quality factors could be expected to play a part in attracting market share. However, the impact of this on air fares was not readily apparent in the modelling done.

THE COMPETITIVENESS OF REGIONAL AIRLINES

The strongly oligopolistic structure of the industry, the limited pool of entrants and the existence of barriers to entry show the potential for uncompetitive pricing practices. Route and network factors indicate that minimum costs may not be achieved and also highlight the ability of airlines to differentiate passengers and implement pricing structures which capture a proportion of the passengers’ willingness to pay.

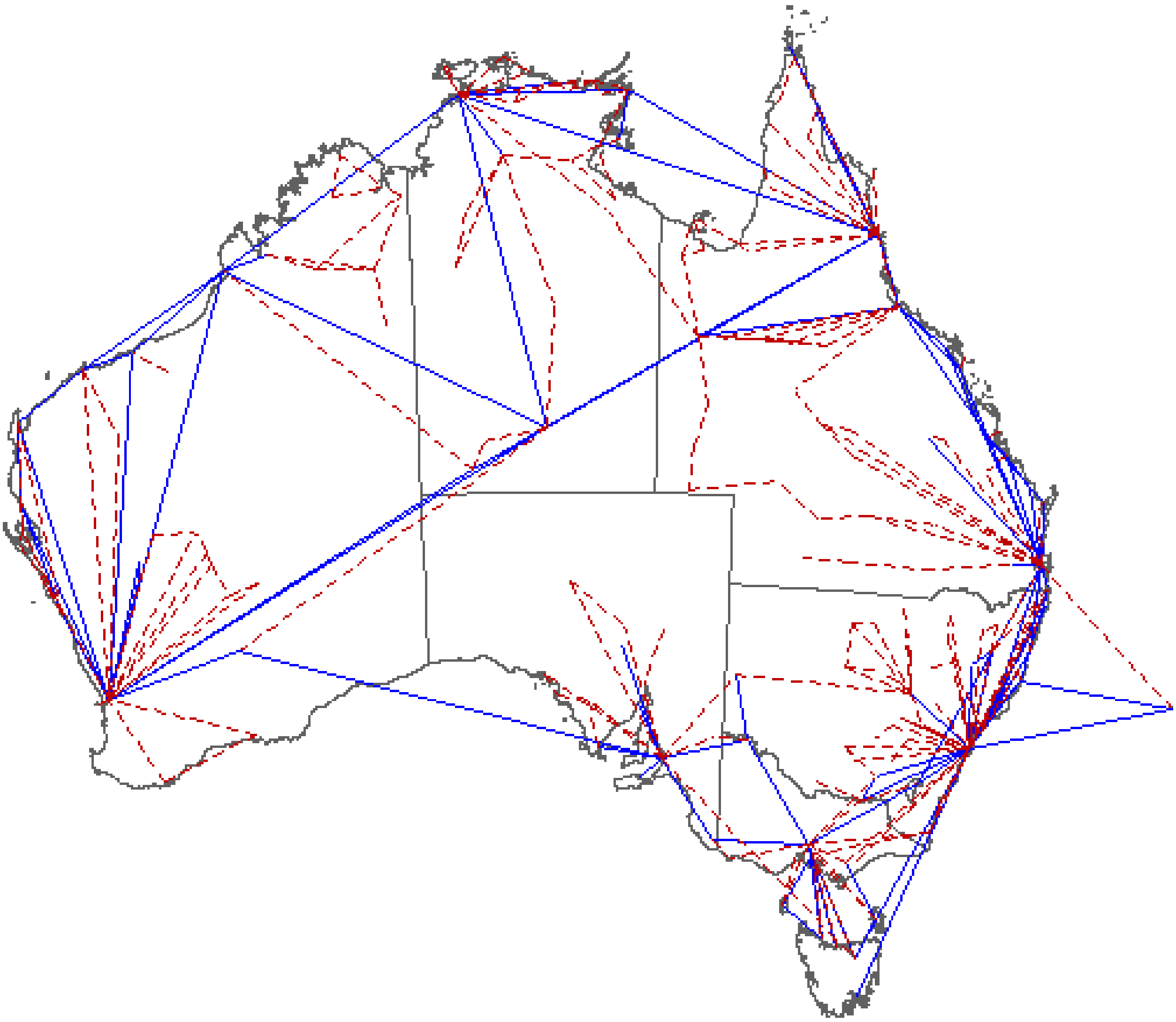
The extent to which the market takes advantage of these opportunities is difficult to predict. Modelling indicated no difference in the relative price between monopoly and multiple operator routes, or routes with and without a dominant firm. The structure–conduct–performance model indicates that such variables should be important in identifying non-competitive performance of firms. However, an examination of the absolute price level indicated discount price levels at around double the indicative cost level on as many as one-fifth of routes. These routes had identifiable and specific factors that would lead to the expectation that many passengers exhibited a highly inelastic demand for air services.

There was evidence of non-competitive behaviour by regional airlines, although it was not widespread within the industry. Equally important is the indication that the majority of the industry is pricing their services competitively, and some are probably making little profit on their investment. The high level of industry exit and high turnover of routes supports this finding. Given the reliance of many regional communities on the industry and the safety concerns that rise from cost cutting, continuity of service and the financial viability of operators are perhaps greater policy concerns than non-competitive behaviour.

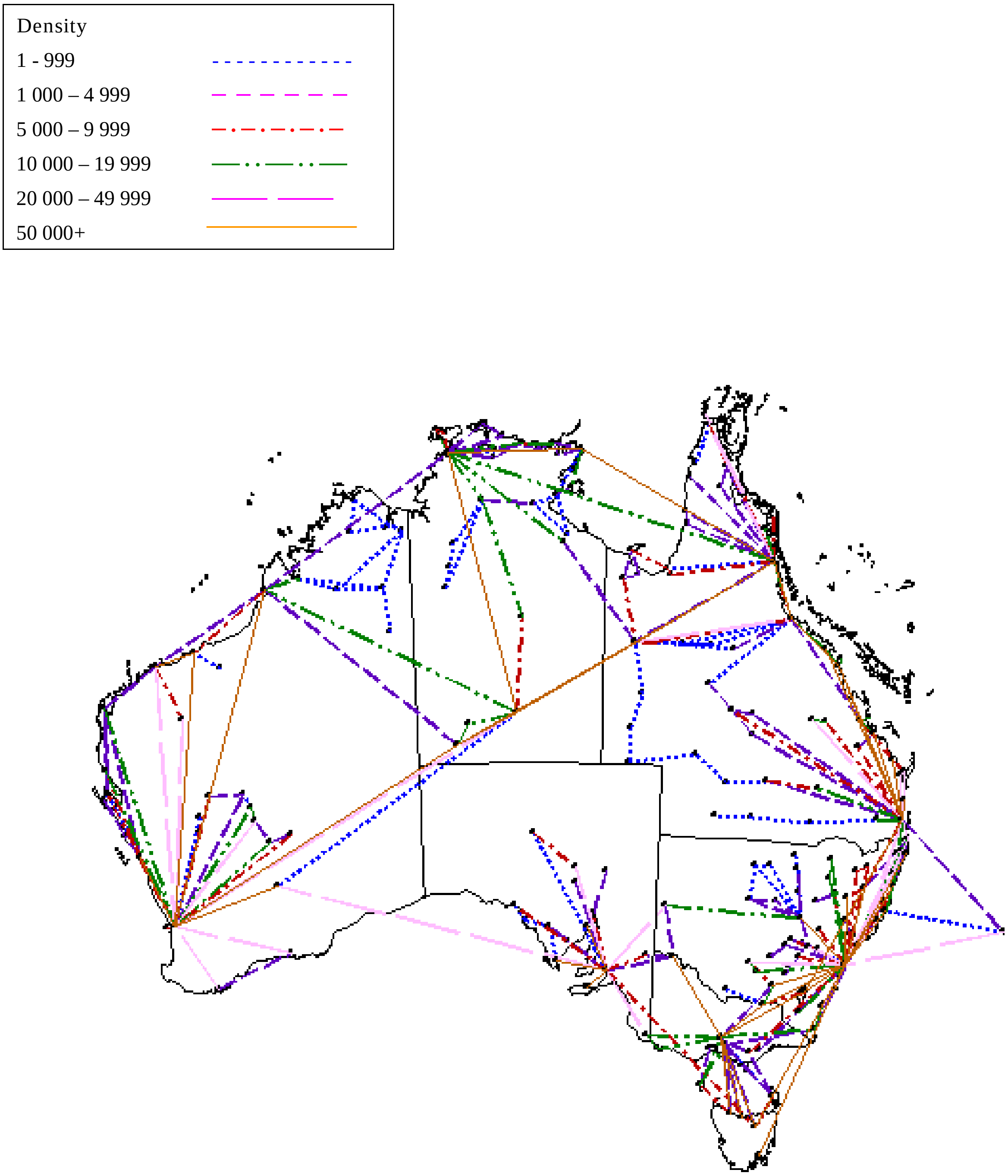
APPENDIX 1 REGIONAL AIR ROUTES

MAP 1 MONOPOLY AND MULTI-OPERATOR REGIONAL AIR ROUTES

Monopoly	- - - - - - - - - - -
Multi-operator	————————



MAP 2 REGIONAL AIR ROUTES BY DENSITY



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ABBREVIATIONS

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
AOPA	Aircraft Owners & Pilots Association of Australia
ASA	Airservices Australia
ATC	Air Transport Council
BASI	Bureau of Air Safety Investigation
BTCE	Bureau of Transport and Communications Economics
BTE	Bureau of Transport Economics
DoTRD	Department of Transport and Regional Development
IC	Industry Commission
IPART	Independent Pricing and Regulatory Tribunal

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