Registry's copy

d. Dec. 30, 1992

COMPETITION TRIBUNAL/TRIBUNAL DE LA CONCURRENCE

Court File No.: CT-88/1

IN THE MATTER OF an application by the Director of Investigation and Research under subsection 64(1) of the Competition Act, R.S.C. 1970, c. C-23, as amended;

AND IN THE MATTER OF a Limited Partnership formed to combine the operations of the Reservec and Pegasus computer reservation systems;

AND IN THE MATTER OF an application by the Director of Investigation and Research under section 106 of the Competition Act, R.S. 1985, c. C-34 to vary the Consent Order of the Tribunal dated July 7, 1989.

B E T W E E N :

The Director of Investigation and Research

Applicant

- and -

Air Canada
PWA Corporation
Canadian Airlines International Ltd.
The Gemini Group Limited Partnership
The Gemini Group Automated Distribution Systems Inc.
Covia Canada Corp.
Covia Canada Partnership Corp.

Respondents

- and -

Consumers' Association of Canada
American Airlines, Inc.
Attorney General of Manitoba
Alliance of Canadian Travel Associations
Bios Computing Corporation

Interveners

AFFIDAVIT OF MICHAEL W. TRETHEWAY

I, MICHAEL W. TRETHEWAY, of the Municipality of Richmond in the Province of British Columbia, MAKE OATH AND SAY AS FOLLOWS:

1. I am an Associate Professor of the Faculty of Commerce and Business Administration for the University of British Columbia and have been retained by the Director of Investigation and Research, Competition Act, to provide my opinion on the competitive effects of the following:

(a) a financial failure of PWA Corporation, or a merger of Air Canada and PWA Corporation;

(b) the proposed transaction between PWA Corporation and American Airlines, Inc.; and

(c) the variation to the Consent Order of July 7, 1989, proposed by the Director.

Now shown to me and attached as Exhibit "A" to this my affidavit is a copy of my report, dated December 30, 1992.

2. My qualifications to give expert evidence on these issues are set out in my curriculum vitae, which is attached as Exhibit "B" to this my affidavit.

3. The contents of the report attached as Exhibit "A" to this my affidavit and the opinions expressed therein are true to the best of my knowledge, information and belief.

4. I make this affidavit pursuant to Rule 65(1) of the Competition Tribunal Rules and for no improper purpose.

SWORN BEFORE ME at the City of Hull, in the Province of Quebec on the 30th day of December 1992.

MICHAEL W. TRETHEWAY

A Commissioner for the purpose of taking affidavits

Exhibit A

Statement

Statement of Michael W. Tretheway

in Support of the Director of Investigation and Research

Gemini 106 Application

30 December 1992

I. Statement of Identity and Interest

I am Michael W. Tretheway of 12471 Alliance Drive, Richmond, B.C V7E 6J2.[1] I am Associate Professor of Transportation in the Faculty of Commerce and Business Administration at the University of British Columbia. I have been retained as an independent consultant by the Bureau of Competition Policy, and this work is not part of my duties at the University. I have advised the Bureau in the past on aviation issues and have prepared testimony for the Bureau in its 1988 challenge of the formation of the Gemini Computer Reservation System.

I do not own stock in any Canadian or U.S. airline or computer reservation system, have no family member working for such an airline or system, and have not been retained by an

[1] My phone number is (604) 275-2418.

airline in any consulting role. I have not worked as an employee at any of the airlines in question.

I teach transportation courses at the University, including courses in airline management, transportation economics, urban transportation management, government and business, and business logistics. At the University I hold the positions of Director of Teaching and Curriculum Development and Director of the Summer Program in International Business Studies.

I have been conducting research into the transportation industries since 1976, and in air transport since 1977. I have published several often cited papers on topics in transportation economics in the *Rand Journal of Economics*, the *Review of Economics and Statistics,* the *Transportation Journal, Transportation Research,* the *Journal of Transportation Economics and Policy*, *Transportation Science,* and other learned journals. I am the author of a 1992 book on Airline Economics, as well as earlier studies of airline cost and productivity. I served as Director of Research to the 1990/91 Ministerial Task Force on International Air Policy, and have conducted contract research for Transport Canada, the Economic Council of Canada, the Canadian Transport Commission, and the Government of Alberta.

My research has concentrated on the areas of airline seat management, airline cost structures, airline productivity, airline corporate organization in the global era, and government policy toward air transport.

II. Introduction

During the era from roughly 1930 to 1976, the airline industry was constrained by pervasive government regulation, and typically, some degree of government ownership. Starting in 1976, the U.S. instituted a series of measures which loosened regulatory controls on the industry. In 1978, these changes were formalized by passage of the Airline Deregulation Act. By 1981, the U.S. industry was largely free of economic regulation. Canada deregulated its southern airline markets in a series of moves beginning in 1979,[2] and culminating with the passage of the 1987 National Transportation Act.[3] With economic forces no longer held at bay by the distortions of government regulation, the Canadian and U.S. industries began a transformation. In particular, forces favouring large carriers over smaller ones exerted themselves with the result that the U.S. and Canadian airline industries consolidated into a much smaller number of carriers.[4]

There is no reason to expect that these consolidation forces exist only in domestic markets. Instead, they reflect forces common to how all airlines provide services, and how consumers are willing to pay for these services. A number of airline economists expect that these forces will cross national frontiers. Currently, national government regulation and inter-

[2] The National Transportation Act deregulated "southern" Canadian airline markets. Specifically, the act deregulated all airline markets except those in the "designated area." The designated area is defined in the Act, and includes the sparsely populated northern areas. As an example, Edmonton, is in the south for airline regulatory purposes.

[3] A notable milestone was the 1984 New Canadian Airline Policy, which had the effect of deregulating the industry to a large extent.

[4] It is important to observe that while industry wide consolidation has occurred, the market share of the largest carrier in each of the U.S. and Canadian markets has remained largely the same: 20% in the case of the U.S. and just over 50% in the case of Canada.

government treaties limit the extent to which carriers can reap the advantages of larger size. (**Appendix 1** describes foreign ownership limits on carriers.) While these limits must be adhered to, carriers with foresight are already moving to make global alliances which give significant advantages to member airlines. This is inducing competitive responses by other carriers.

A significant change in circumstances since 1989 is the financial condition of Canada's two major air carriers, Air Canada and Canadian Airlines International Ltd. ("CAI"). As the era of complete deregulation in southern Canada began in 1988, these two carriers had weak but viable financial structures. They also had a formidable competitor in the form of Wardair. As the consolidation forces worked themselves out in Canada, the three carriers suffered revenue erosion, and eventually CAI purchased and amalgamated its competitor Wardair. The absorption of Wardair's debt and the heavy costs associated with merging two work forces, fleets and information systems, worsened CAI's financial position. Following this, the airline industry was hit by the reduction in air travel precipitated by the 1990/91 Gulf War, an effect which even spread to the normally steady business travel segment of the market. Simultaneously, the industry has been hit by a truly global recession. Unlike previous downturns in the postwar era, the current recession has been simultaneously experienced in North America, Europe and Asia. Even Japan has seen its steady postwar growth record broken. The result has been massive losses in the world airline industry. These losses are precipitating significant changes in the industry, the most important of which is varying degrees of consolidation across borders.

As Canada's airline industry reacts to the effect of years of unanticipated losses, the most fundamental question must be addressed. That question is whether Canada will be forced to accept a near monopoly in the domestic airline market.[5] Further consolidation will take place among the Canadian air carriers. The only question is whether the consolidation will be within the domestic industry, in which case Canada will end up with a near monopoly,[6] or whether domestic competition will be preserved by allowing consolidation to take place via equity alliances with airlines of other nations. Both Air Canada and CAI are attempting to do the latter, Air Canada with Continental Airlines, and CAI with American Airlines ("American"). However, the current structure of the Gemini hosting contract is preventing CAI from consummating the only offer it has to join in an alliance with a foreign carrier. The foreign alliance option would provide CAI with the financial viability it needs to survive, as well as preserve competition in the domestic airline industry. Without action by the Competition Tribunal, the question will be resolved by force or coercion, since the Gemini computer reservation system hosting contract prevents alternative competitive arrangements from being considered by the airlines, in particular by CAI.[7]

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[5] Here, the term near monopoly is being used to denote a firm with initial control of 96% of the total domestic market, when measured in (1990) scheduled passengers carried in the top 205 city-pair markets. The trunk carrier (Air Canada or CAI) is treated as including the domestic regional feeder carriers which it controls. Market share would be even higher if measured in terms of revenues or revenue-passenger-kilometres.

[6] This report will provide evidence that barriers to entry into the trunk airline industry are insurmountable.

[7] It should be pointed out that the Gemini hosting contract should be viewed as *potentially* constraining Air Canada as well. While Air Canada may choose a path where this constraint is not an issue, it is possible that at some point in the near future, among other options, it may want to transfer its hosting arrangement to Continental Airlines' hosting system called Shares, to some other carrier's hosting system, or back to its own internal operation.

This report will make the following claims:

- That circumstances in the airline industry have changed, requiring Canadian air carriers to undertake further consolidation. In particular, the financial condition of both carriers has deteriorated, and CAI is facing the prospect of failure.[8]

- That there are economic forces in the airline industry which favour large over small carriers and that recent political changes are allowing these forces to manifest themselves across national borders.

- That a pro-competitive solution to CAI's imminent financial collapse is at hand via an equity infusion from building an alliance with American. This transaction would be cost reducing and revenue enhancing for CAI.

- That the hosting contract between CAI and Gemini will prevent the pro-competitive alliance of CAI and American from taking place.

- If CAI is prevented by the Gemini hosting contract from pursuing this alliance, the result will be the near monopolization of the Canadian airline market, either by the forced merger of CAI with Air Canada, or by the failure of CAI.

[8] CAI has received loan guarantees from the Federal, Alberta and British Columbia governments, but these are only viewed as bridge financing to allow the carrier to complete its restructuring and alliance with American.

- That not varying the restrictive provisions of the CAI-Gemini hosting contract will result in a substantial lessening of competition in the domestic airline industry.

III. Economic and Political Forces Acting on Today's Airline Industry

The airline industry of the 1990s is not the same as the airline industry of the 1970s, or even the 1980s. The economic forces acting on the industry have changed, and forces previously held at bay by regulation and government ownership are now driving the industry. Before discussing the competitive consequences of a failure to grant the Director's Application, it is first necessary to describe the nature of the airline industry in the early 1990s. The critical role of the computer reservation systems is discussed, along with the globalization of the industry which is now underway.

A. Changed Financial Structure

Today's airline industry is one of inherently high financial volatility. Even 15 years ago, this industry had much greater financial stability. Three factors combine to create periods where airline cash inflows can fall short of required cash outflows. These are:

- *Increased use of aircraft leasing.* When airlines owned most of their aircraft, and financed these to an important degree through equity capital, cash outflows required to finance aircraft could be reduced in difficult times by postponing dividend payments. Today, when roughly half of aircraft are leased from third parties, there is a much reduced ability to postpone required capital service payments.

- *High seasonality of air traffic.* Airline traffic is highly seasonal, with the difference between peak (typically August) and trough (typically November) months being as much as a factor of two. The result is periods during the year where cash income will fall far short of required cash payments, as expenses are much more constant over the year (e.g., interest payments) than revenues.

- *Air Traffic is now pro-cyclical.* Whereas even 15 years ago, air travel was consumed primarily by business travellers and upper income leisure travellers, today it appeals to a mass market. The industry has shifted from being cyclical to being pro-cyclical. Oum, Gillen and Noble (1986) have estimated that for leisure travellers the income elasticity is 2.1 whereas that for business travellers is only 1.5.[9]

The result of these three factors is that even financially healthy airlines experience dramatic changes in revenues from month-to-month and year-to-year. Unfortunately, carriers have little ability to simultaneously match required cash outflows to the reduced revenues. During the transition to the new economics of this industry, some airlines have suffered from inadequate cash balances as periods of recession are encountered.

[9] The income elasticity indicates how consumer demand (i.e., airline traffic) responds when income grows by 1%. Thus an elasticity of 2.1 indicates that when incomes grow by 3%, then airline traffic will grow by 6.2%. Similarly, when income declines by 3% in a recession, traffic will drop by 6.2%.

B. Economies of Scale

Caves, Christensen and Tretheway (1984) distinguish between airline economies of traffic density and economies of network size. Under the latter, output is expanded by adding points to the network; under the former output expands by increasing service within a given network (within a set of points served). Gillen, Oum and Tretheway (1986) applied this concept to Canadian airlines, and developed it further by distinguishing between different types of airline traffic (scheduled, charter, freight). Caves, Christensen, Tretheway and Windle (1986) used data on a set of international airlines. The following table shows the conclusions of these studies with respect to economies of traffic density and economies of network size.[10]

	U.S. Data	Canadian Data	International Data
Economies of network size	.98	.99	.99
Economies of traffic density	1.17	1.49	1.63

While there are differences in the results, roughly constant returns to firm or network size exist for rather broad ranges of airline traffic. That is, adding or dropping cities from an airline's network does not raise or lower unit cost. In contrast, economies of traffic density seem to exist up to fairly large volumes of traffic. Adding more flights or more seats per flight on a given route will result in lower "per seat" costs. However, once the minimum efficient traffic density

[10] In the table, a value of unity indicates constant returns to scale. Numbers significantly greater than unity reflect the presence of economies of scale, and numbers significantly less than unity demonstrate returns to scale.

level is reached, the curve is flat over a wide range, indicating that there are no more gains associated with greater density.

This implies that once carriers have achieved the minimum efficient density, there will be no further pressures, at least from the cost side, for further consolidation. Gillen, Stanbury and Tretheway (1988) found that Air Canada had achieved the minimum efficient density, but that the smaller carriers in Canada had not. These carriers eventually merged together to form CAI.

These findings can be intuitively confirmed by evidence from the U.S. In spite of their small networks, the new entrant carriers which emerged in the initial years of U.S. airline deregulation, did not have a cost disadvantage relative to the incumbent carriers. If anything, they had a cost advantage. Similarly, Caves, Christensen and Tretheway (1984) found that while the former U.S. local service carriers had a markedly higher average cost than the trunks, they were able to compete (at least in terms of cost) on routes where their traffic density could be equal to that of the trunks.

C. Marketing advantages of large firms

Market equilibrium and therefore market structure is determined by the interaction of both supply (i.e. costs/production) and demand. In airline markets there are demand forces such

that consumers prefer large airlines over small ones, all other factors such as prices being the same.[11] In this context, large airlines mean those that serve a large number of points. In practice, there are at least three reasons why consumers prefer large airlines.

- *Large Airlines offer a higher quality of service.* Airline travel often requires passengers to connect from one flight to another. Consumers strongly prefer on-line connections (i.e., all flight segments on the same airline) over inter-line connections. Flights are better timed to facilitate the connection, the probability of lost baggages is lower, etc.

- *Information costs are lower.* A traveller knows that a large carrier can get him or her to just about anywhere in the country with a single phone call.

- *Frequent Flyer Programs benefit large carriers.* These programs reward the *individual* for patronizing a single carrier (even though the fare for business travellers may be paid by their employers). Tretheway (1989) pointed out that it is much easier to accumulate points with an airline that flies to a large number of destinations. A large network carrier's frequent flyer program is also more

[11] In a market with a truly homogeneous product or service, consumers would be completely indifferent between services provided by one firm versus those of another. Thus there could be no market side forces favouring large over small carriers. However, in many, if not most service markets, consumers do differentiate between services provided by different firms. While purchasers may be willing to substitute services of one firm for those of another, they are not completely indifferent. Economists would say that the firm's demand curve "has some slope." The more successful the firm is in differentiating the product, the higher the slope of the firm's demand curve. This in turn increases the profit potential for that firm, relative to other firms, *ceteris paribus*. The issue with marketing factors favouring large carriers is whether large firms are better able to differentiate their services than small firms are.

attractive to a consumer due to the wider choice of destinations when using the reward.

Large carriers have other marketing advantages as well. Travel agent commission overrides (i.e. volume based commission premiums) also favour large carriers, since their wide range of services make it easier for agents to achieve the necessary volumes.

Conclusion. While cost advantages from economies of scale do not accrue to carriers any larger than roughly the size of Air Canada or CAI, the marketing advantages of largeness continue to accrue to carriers even much larger than the size of the two Canadian airlines combined. Thus far, these economic forces have been kept in check by government regulation: domestic regulation at first, then international regulation. The loosening of domestic regulation allowed consolidation to take place within Canada. (This is described in **Appendix 2.** Consolidation of carriers across borders has been kept in place by international regulation, but as will be seen in the next section, the government attitudes which held international consolidation forces in check are now under review.

D. Consolidation forces are not unique to North America and are now crossing international frontiers.

There is no reason to presume that the economic forces favouring large carriers are unique to the North American market. Carriers throughout most of the world operate identical aircraft with generally similar operating procedures. Handling of passengers before, during and after the flight are similar. It has been regulatory forces which have kept consolidation in check elsewhere. Where regulation has been loosened, consolidation has occurred. **Table 2** gives a list of mergers which have occurred in other nations. Note that in all cases involving mergers of domestic carriers, there has been either defacto liberalization of economic regulation, or legislation announcing the intent to deregulate.

As additional nations liberalize economic regulation of their industries, and as blocs of nations deregulate regional markets, additional consolidation will undoubtedly occur. **Appendix 4** documents how government attitudes toward air carriers have been evolving, and how governments increasingly are viewing that air transport should be treated like any other industry: free from pervasive government regulation while still subject to "normal" (i.e., not industry specific) competition law.

Table 2: Non-North American Airline Mergers

Mergers/Acquisitions Involving Non-North American Airlines	
British Airways	- British Caledonian (merger)
British Airways	- US Air (proposed acq., but withdrawn in Dec. 1992)
Quantas	- Australian (merger)
Air France	- UTA - Air Inter (acq.) - Sabena (acq.)
KLM	- Northwest (acq.)
SAS	- Continental (acq.)
Ansett	- America West (acq.)
Hawaiian	- JAL (acq.)
Air NZ	- by Qantas, JAL, "AA" (acq.)
Cubana	- by Viasa (acq.)

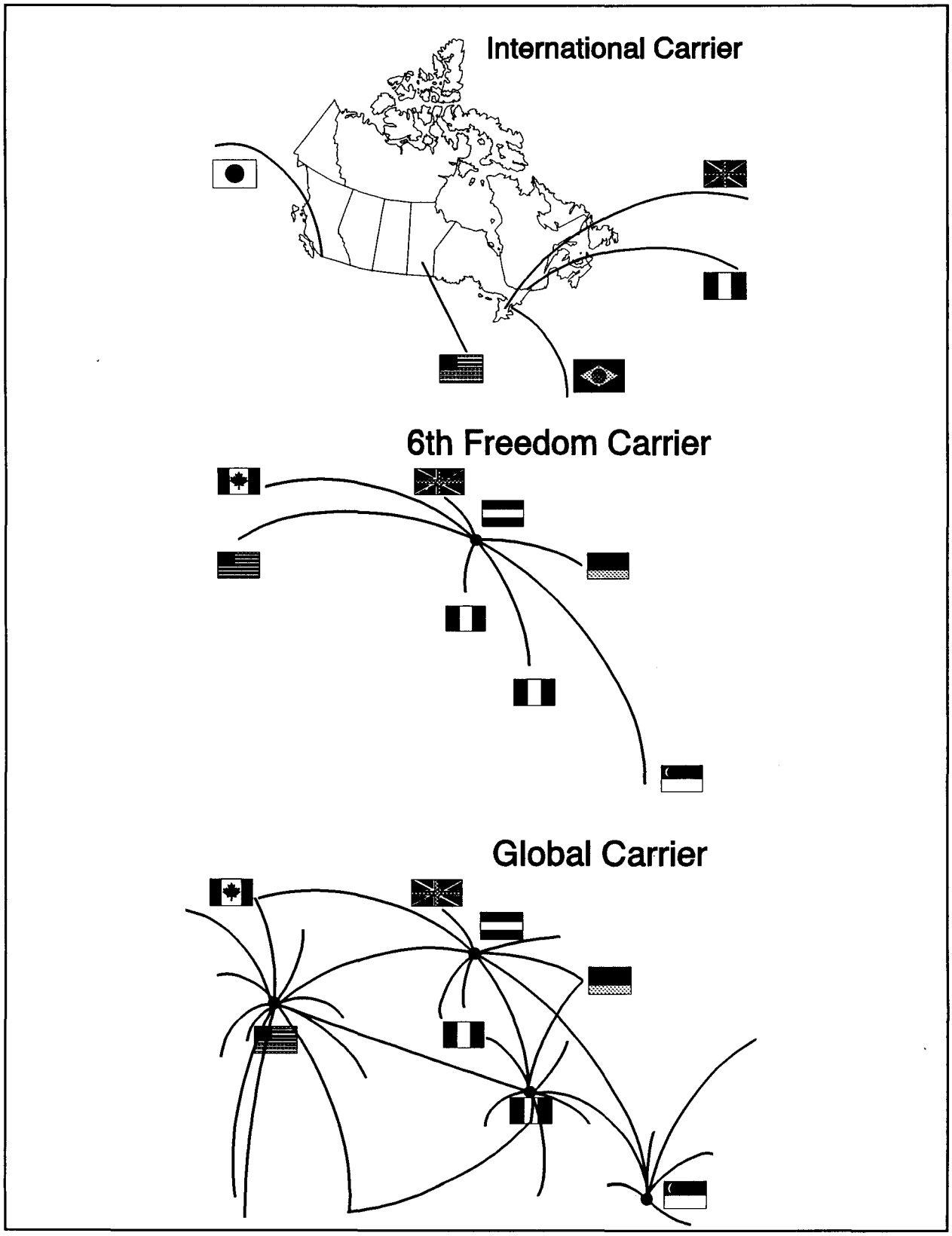
E. Globalization of the Airline Industry

The previous sub-sections argued that economic forces favour large over small carriers. As political changes took place within nations, domestic industries were freed of pervasive economic regulation. This resulted in industry consolidation in Canada, the U.S., Australia, France and the United Kingdom. These consolidation forces have not crossed borders until recently because national laws and international treaties have held the forces in check. Now that government attitudes are shifting away from protecting and supporting the airline industry, these consolidation forces are being set free, resulting in pressures on carriers to achieve the marketing mass needed to survive in a globalizing industry.

What is a "Global" Carrier? Before one can discuss globalization of the airline industry, the concept of a global carrier must be defined. Some carriers provide services on many continents, and might even completely circumnavigate the globe. Most of these are *international carriers*. (See top third of **Figure 1.**) They carry passengers between countries, but most of their customers either originate from or are destined to the carrier's home base. Canadian Airlines is an example of an international carrier. Most of its traffic on flights from Canada to the U.K. originate in Canada or Northern Europe. While they may carry some passengers from Japan to the U.K. via Canada, this is a relatively small portion of their business. Some carriers may have "fifth freedom" rights allowing them to transport passengers between "foreign" countries. (**Appendix 3** defines and discusses the different freedoms of the air.) But if the passengers they carry are predominantly from the home country, they should not be considered global carriers.

A few carriers go a step beyond in that they may primarily transport patrons to and from countries other than their home base. These are the *sixth freedom carriers*. (See middle of Figure 1.) They fly passengers from one "foreign" country to another via their home base. An example of a 6th freedom carrier is KLM in the Netherlands. While KLM carries a large amount of traffic to/from the Netherlands, an important part of its total business is carrying people across the hub: from Canada to Italy via Amsterdam, for example. An important aspect of the operation of a sixth freedom carrier is its hub and spoke nature. However, the operation is of a single hub. Single hubs have a good ability to provide regional feed traffic into the system from medium and sometimes small communities which are short air distances from the

Figure 1: International versus Global Carriers



hub. However, the further one gets from the hub, the more likely it is that the carrier is transporting point-to-point passengers and not able to pick-up regional feed traffic at the spoke ends. KLM may be effective in obtaining a share of Vancouver (Canada) originating passengers going to Europe (or beyond). But it is not likely to pick up regional feed traffic to Vancouver.[12] Sixth freedom carriers tend to serve only point-to-point traffic the further a station is from its home base, and forgoes the opportunity to capture traffic from regional centres surrounding the spoke end.

The term *global carrier* is reserved for an airline which can gather feed traffic from many points throughout the world, and channel that feed onto its long haul routes. (See bottom of Figure 1.) Regional feed traffic can be gather from many points in the world, and kept "on-line" to the consumer's ultimate destination - even if that destination is a smaller community elsewhere on the globe. Such a carrier would have the ability to carry (on-line) a passenger from origin to destination for a large portion of the world.

An analogy with the U.S. domestic market may help clarify the concept. A single hub carrier would be the domestic equivalent of a sixth freedom carrier. It carries traffic through its hub, with a very large portion of its total business being traffic connecting across the hub, but not destined to the hub. US Air's pre-merger single hub (Pittsburgh) operation would be an example,[13] and is similar in concept to KLM's operation of its Amsterdam hub. (See top

[12] I.e, the passenger originating in say Prince George, B.C., is more likely to fly to Europe on a Canadian carrier rather than a carrier such as KLM, as using KLM would require a connection, and the total airfare is less likely to be competitive.

[13] US Air subsequently developed other hubs and acquired hubs via acquisition of Piedmont and PSA.

half of **Figure 2** and compare to middle of Figure 1.) A full coverage multiple hub carrier like American Airlines would be the domestic equivalent of a global carrier.[14] (See bottom of Figure 2 and compare to bottom of Figure 1.) American has the ability to take a passenger from a very large number of places in the U.S. and keep him/her on-line to the ultimate U.S. destination. This is not possible with a single hub,[15] but by operating a multiple hub system, almost the entire market can be served.

At present, no true global carriers exist in the world, although much talk has been heard recently about their potential emergence. **Table 3** lists some of the recent cross-border airline acquisitions. These are consistent with the notion that some carriers are building global carrier systems.

Stages of Global Carrier building. Historically, airlines have been prevented from forming multinational enterprises. Appendix 1 discusses constraints on foreign ownership in the industry. Nevertheless, the advantages which accrue to large, global spanning carriers are giving rise to some carriers attempting to build global systems within existing government constraints. To achieve these advantages carriers have formed various types of alliances. Hundreds of examples exist of what have been termed *weak carrier alliances.* Typically these comprise various marketing agreements between carriers. Canadian Airlines and Lufthansa have

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[14] American operator hubs in Chicago (East-West northern tier), Dallas-Fort Worth (East-West southern tier), Raleigh-Durham (North-South east coast), Nashville (North-South midwest), and San Jose (North-South west coast). In addition it has a Caribbean hub in San Juan, and a hub in Miami which feeds the South American route system it purchased from Eastern Airlines.

[15] For example, the consumer flying from Seattle to San Diego is unlikely to fly on US Air via its Pittsburgh (6th freedom type) hub, but would be willing to do so via American Airlines' West Coast San Jose hub.

Figure 2: US equivalents of 6th freedom and global carriers

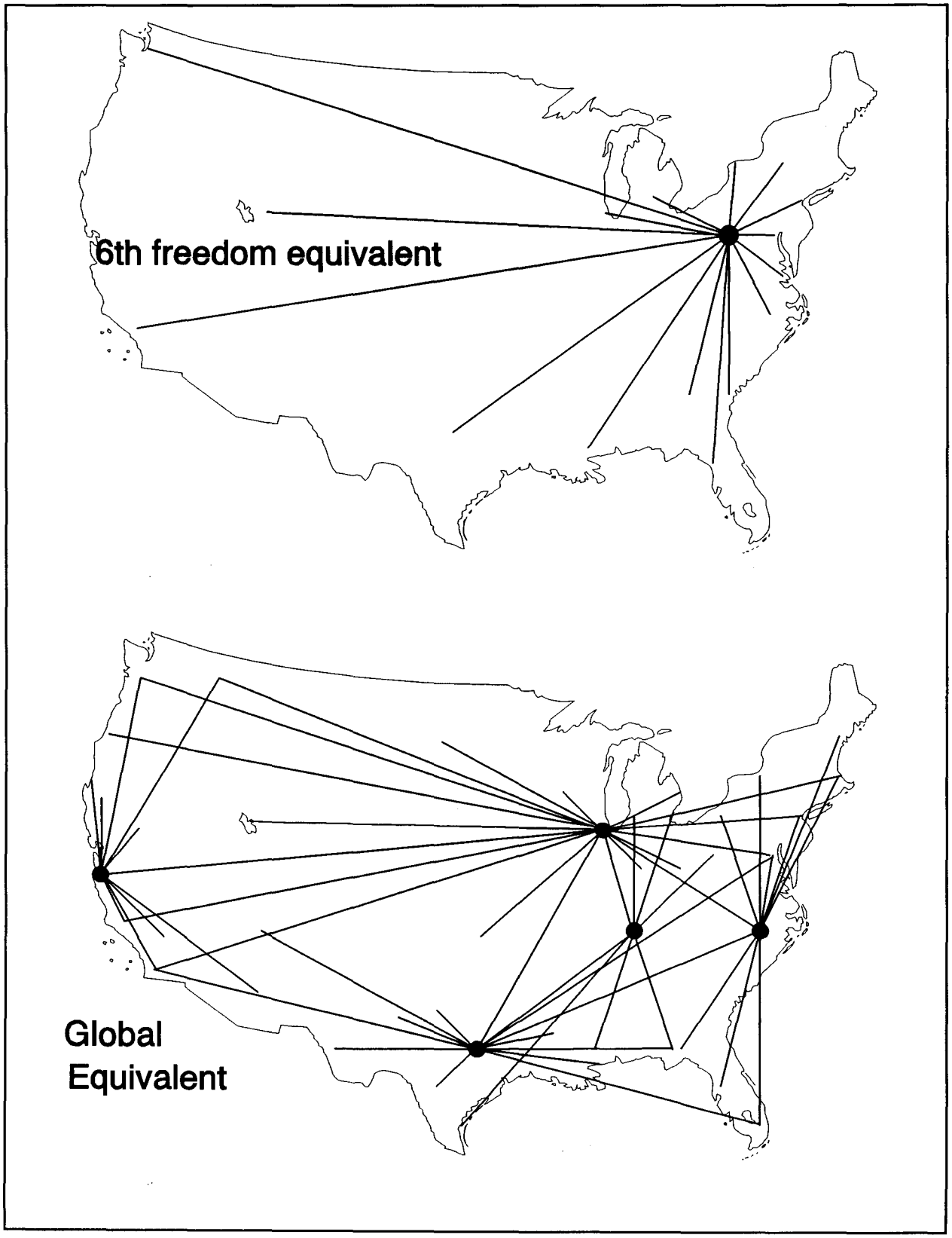

Table 3: Cross Border Airline Ownership

Cross Border Airline Ownership

Main Carrier	Acquired Carrier	Status
British Airways	US Air	proposed 44% stake (only 21% voting equity) - application withdrawn
British Airways	Duetsche BA	acquired controlling stake
British Airways	TAT (France)	acquired minority interest will control airline in 1987
British Airways	Qantas/Australian	proposed acquiring 25% stake
British Airways	Air Moscow	joint venture with Aeroflot
Air France	CSA (Czech.)	acquired minority interest
Air France	Sabena	acquired 35%
KLM	Northwest	acquired 49% of stock, 25% of voting shares U.S. approval to integrate the operations of the two airlines
SAS	Continental	24% interest in Continental, Continental in bankruptcy and SAS likely to loose its interest in carrier
Air Canada	Continental	proposed to acquire 22% interest partners in transaction acquiring additional equity
Ansett (Australia)	Ansett New Zealand	controlling interest
Ansett (Australia)	America West	25% stake, but America West in bankruptcy
Japan Air Lines	Hawaiian	10% ownership stake
Japan Air Lines Qantas	___ Air New Zealand /	joint ownership of minority stake
Delta Swissair Singapore	\ |---------- /	Joint 5% equity stakes in each other marketing common service level and global network
American	Canadian	proposed 25% equity stake

one type of alliance. Neither is able to offer daily service from western Canada to Germany. The marketing alliance allows them to sell seats on each other's aircraft, with the two carriers alternating days they fly. This way, the two carriers can effectively offer daily service to their respective customers. Another example is Air Canada's alliance with Royal Jordanian. RJ flies the route from Canada to Brussels and Jordan. Air Canada is able to sell seats on this flight with an Air Canada flight number.[16] This creates the impression for the consumer that Air Canada services more markets than they can economically justify at present. While weak carrier alliances such as these allow airlines to obtain some marketing advantages, the alliances are transitory. Lufthansa could decide to terminate the agreement with Canadian on short notice and switch its allegiance to Air Canada or to fly the daily service itself. Since carriers view these marketing agreements as short lived, they are reluctant to invest the time, effort and resources to develop the full potential of the alliance.

A *strong carrier alliance* tries to make the relationship between foreign air carriers more permanent, typically by requiring one carrier to invest in the other, or to have mutual equity investments in each other (e.g., the Singapore-Swissair-Delta alliance). With a minority equity investment a number of advantages are achieved. A seat on the partner's board of directors gives a carrier information on strategic developments and allows its voice to be heard in the partner's marketing and capital plans. Marketing arrangements which result in one partner realizing a greater share of the total profits is mitigated by some of those profits being paid back to the partner/investor. These advantages make the carriers more likely to undertake long term

[16] This is referred to as "code sharing."

market and product development. They also make it easier to justify some cost reducing investments, such as utilizing maintenance facilities of the partner for some aircraft types, thereby allowing both partners to reap the advantages of such economies of scale as might exist.

However, a strong carrier alliance is not necessarily a globally efficient operation. The fully global carrier is one which would establish a single global brand identity, be able to deliver a globally consistent level of service, be able to find synergies to offer low prices whenever justified, would exploit all available opportunities for using the fleet, etc. In the airline industry there are a handful of activities which would need to be handled on a global basis in order to build a globally integrated organization. These include:

- aircraft and fuel purchasing in order to obtain the greatest cost advantage possible
- common frequent flyer program for building and reinforcing customer loyalty
- common brand identity
- common management of the inventory of airline seats,[17] and common hosting of seat inventory[18]
- distribution of airline services through a computer reservation system, showing itineraries as single carrier (on-line) routings
- scheduling of aircraft and flights.

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[17] *Airline seat management* is the technique of managing how many seats on a given flight to sell at a discount, how many to save for local passengers versus connecting passengers, etc. Seat management procedures are very complex and are extremely costly to develop. Nevertheless the advantages to having a superior seat management technique can be an increase in revenues of several percent - with almost no increases in costs. The profitability impact can be the difference between success and bankruptcy in today's deregulated industry.

[18] In order to engage in the most productive forms of joint revenue maximization from flights (i.e., airline seat management), the two carriers' real time seat inventories should be hosted in the same computer system.

A global system of air carriers which could manage the above activities jointly, while leaving flight operations to each constituent airline, would be able to enjoy a cost advantage over competitors, as well as product, price and revenue enhancement. These advantages are likely to be small when measured as a percentage of total sales revenue. However, since the industry is so highly levered (financially and operationally), small increases in margins can translate into significant differences in profitability, and eventually of survivability. The global carrier system would also be able to concentrate its resources for developing new seat management capabilities, scheduling capabilities, etc. These systems are undergoing rapid technical improvement, and keeping up with (or ahead of) the competition is vitally important. Since these systems are also very expensive to develop, shared effort can be cost reducing or service enhancing.

F. Airlines are Information Driven Industries

The technology of flying, maintaining and servicing aircraft is relatively standard throughout the world. With the exception of the former and current communist countries, all the developed nations fly jet aircraft built in either the U.S. or Western Europe. While some specialization of aircraft exists, aircraft operating procedures are very similar throughout the world.[19] Safety standards for aircraft airworthiness, pilot (flight attendant and mechanic) training and duty time, and aircraft maintenance established by the U.S. Federal Aviation

[19] In fact, flight simulators used by one airline for a particular aircraft type are utilized to train pilots of another airline flying the same aircraft type.

Administration are generally accepted in much of the world.[20] Because of this high degree of standardization, airlines are less likely to achieve significant technical advantages over rivals in terms of flight operation, unless there is a marked difference in wage rates paid for flight crew.

While competitive advantage is unlikely to arise from aircraft operation, the way those operations are combined and sold does offer significant potential advantage. Efficient scheduling of flights to maximize crew and aircraft productivity (by avoiding unneeded layovers or pay premiums), efficient control of which seats on a flight to hold for connecting passengers rather than local passengers, etc., all offer potential for competitive advantage. The following activities in an airline are among those which can give a carrier an edge over its rivals, either in terms of lowering costs or generating additional revenues:

- Management of the inventory of airline seats - (e.g., decisions regarding the number of seats to be sold at discount versus those to be reserved for full fare but late booking customers; e.g., decisions regarding the number of seats to be held for connecting passengers versus held for local passengers[21]).
- Pricing of airline seats

[20] Typically, there are only minor variations from the FAA standards.

[21] Typically, connecting passengers (e.g. Calgary-Toronto-St.Johns) generate lower revenue per kilometre than the local passenger (Calgary-Toronto) and thus the local passenger might be favoured in the seat allocation decision. However, if one local segment (Toronto-St. Johns) is not selling well, then the carrier may generate more total revenue for the system if the last few Calgary-Toronto seats are saved for connecting (Calgary-Toronto-St. John) customers. While this seems straightforward, it becomes a very complex problem when dealing with hundreds of flights each day with thousand of possible passenger connections between the flights. A carrier which is able to master this complexity can have a markedly improved ability to obtain higher total revenues than its rivals.

- Selling the airline's services through the travel agent network as well as the airline's own reservation offices
- Efficient and value adding passenger processing at the time of the flight[22]
- Revenue accounting
- Management of the frequent flyer program
- The ability for travel agents to offer service enhancements, such as pre-flight boarding passes, automatic tracking of frequent flyer mileage, etc.
- Forecasting trends in customer demand for each flight, and generally for capacity required
- Market analysis
- Scheduling of flights
- Scheduling of aircraft assigned to particular flights
- Scheduling of flight crews
- Scheduling of maintenance and other ground crews
- Logistical coordination of the flow of materials (food, consumables, fuel) to aircraft

Independently, each of these information based activities are straightforward tasks. However, when managing an operation involving hundreds of flights per day, scores of thousands of passengers per day, millions of customers per year, many of which will book (and pay) months

[22] Value added passenger processing can include factors such as automatic recording of frequent flyer points earned for all trip segments; issuing seat assignments and boarding passes for connecting and return flight segments; confirming for the passenger various special requests, (such as special meals, wheelchair service), etc.

in advance, and tens of thousands of employees, the problem can become daunting. In fact, the airline information problem is currently the largest single information system problem in the world. It is a well known fact that the largest computer systems in the world, other than those operated by the U.S. Defense and Intelligence Agencies, are those operated by the large airlines. Managing and processing information is what makes today's airlines possible. Carriers who are skilled at information management have decided advantages over their competitors. They can deliver services at lower cost due to productivity gains made possible by a capable information system. In addition, a good system allows the carrier to obtain advantages in terms of services provided to customers and revenues which can be generated from customers. These enhancements can mean the difference between survival and failure in the increasingly competitive airline industry of the 1990s.

The core of the information system in a modern airline is the "hosted" real time inventory of the carriers seats on flights. This resides in the *hosting* computer reservation system. A carrier which is able to develop or purchase state of the art hosting CRS services will be better able to withstand the global competitive forces of the 1990s. Proper selection of a CRS base can provide a carrier with reduced costs and revenue enhancement.

Both Air Canada and CAI are likely to replace their current hosting software in order to remain globally competitive. CAI would like to purchase hosting services from American.

Among other options,[23] Air Canada has purchased BAABS hosting software from mega-carrier British Airways.[24] It is interesting to note that Air Canada's purchase was unilateral. It did not involve CAI or Covia, its partners in the Gemini CRS.

[23] Air Canada could develop its own up to date hosting software (either internally or via Gemini), could purchase hosting services from Continental Airlines, which it is proposing to invest in, could purchase hosting services from its Gemini partner Covia/United, or from another provider.

[24] Air Canada is likely to make modifications to BAABS to suit its own needs. Since BAABS is based on IBM hardware and software, the IBM staff of Gemini (formerly devoted to the Pegasus service provided to CAI) will be of value to Gemini/Air Canada in the development (and operation) process of the conversion from Unisys based Reservec II (the name of Air Canada's hosting system) to IBM based "Reservec III."

IV. Entry Barriers

A. Types of Entry barriers.

"Entry Barrier" is a term economists use to denote a friction which prevent new firms from commencing operations in a given market. This section discusses various types of entry barriers which exist in the airline industry. Understanding them is important for appreciating whether or not competition will be maintained in airline markets as the industry undergoes restructuring.

Economies of scale have often been considered a potential barrier to entry by small firms into an industry. As discussed in Section II, it is important to distinguish between cost economies of network size and cost economies of traffic density. Network economies would occur if adding additional cities to an airline network allowed the cost per passenger to fall.[25] The evidence suggests that in the range of carriers the size of Air Canada or CAI, such economies do not exist. *Economies of traffic density* would occur if the cost per passenger drops when a carrier experiences an increase in traffic in a network of a given size.[26] Gillen, Stanbury and Tretheway (1988) found that the minimum efficient traffic density for an air carrier is about that of CAI. Smaller carriers are likely to operate with higher unit costs, unless they

[25] This assumes that the amount of traffic per city is unchanged after the addition.

[26] This would be because fixed station costs can be spread out over more passengers, larger sized aircraft could be used, etc.

can confine their service to a handful of cities and provide very large volumes of service between these cities.

Airline hubs are another barrier to entry. Hubs lever the effect of adding new stations to the service network. For example, increasing the number of stations by 50%, from 9 to 14, increases the number of city pairs served by more than 100%, from 45 to 105. When applied to U.S. hubs, such as American's 100 city hub at Dallas-Fort Worth, the traffic generating potential of an adding another city to the network is very large. Relatively small amounts of traffic can justify frequent daily services. A new entrant to a city pair market connected to a major hub would be unable to replicate the network of the hub carrier, and thus would be confined to a small portion of that market. Air Canada has cited this as a problem it faces in competing with U.S. carriers in the transborder market.[27] On a route such as Toronto-Chicago, Air Canada is largely confined to Chicago originating/destined traffic. In contrast, its competitors, United and American, can access traffic from other cities connected to the Chicago hub and carry them through Chicago to Toronto.

An important potential barrier to entry is *control of the marketing distribution channel.* If incumbent firms have complete control over the marketing channel, then new entrants could be excluded from the channel and thus, be unable to effectively sell their services.

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[27] "Air Canada Submission to House of Commons Special Committee on Canada-United States Air Transport Services," Montreal, 6 December 1990. See especially pp. 9-14.

Travel agent commission overrides, when used by dominant carriers, may be a barrier to entry. A recent study by the U.S. Department of Transportation found that agencies will tend to look favourably on a small override commission from a dominant airline, which accounts for say one-third of its total bookings, than on a high override commission paid by a small, entrant carrier.[28]

Computer Reservation Systems are an entry barrier. Because of the importance of this barrier to entry in this proceeding, it will be discussed in a separate section.

Code sharing can also be a barrier to a new entrant. With code sharing, a flight from A to B on Carrier 1 is shown in the CRS as a flight on Carrier 2. This can be important when that flight is combined with a Carrier 2 flight from B to C. The code sharing arrangement shows the A-B-C flight as being a "single carrier" service, which gets a higher priority in some CRS displays than an "interline" service.

Tretheway (1989) describes how *airline frequent flyer programs* can act as a *powerful* entry barrier. This is because it is much easier and cheaper for the large network airlines to provide these programs than it is for entrants. Here in Canada, Wardair had great difficulty offering a frequent flyer program which could compete with those of Air Canada and CAI. Its original attempt in 1988 was terminated, as Wardair found it too expensive to operate. Following this, the carrier made repeated statements that it was going to produce a new frequent

[28] U.S. D.O.T. (1990), p. 28.

flyer program. The program which they eventually introduced in October, 1988, offered awards at roughly twice the frequency of Air Canada and CAI, and the awards were of greater value.[29] As an example of the latter, popular flights and travel times were not blocked out from frequent flyer award usage, as is often the case with other carriers. Gillen, Stanbury and Tretheway (1989) point out that frequent flyer programs are not quantity discounts but rather loyalty inducing incentives. They concluded that these programs are anti-competitive and should be terminated if competition is to be encouraged.

Another potential barrier to entry is sometimes referred to as *vertical integration.* In the case of air transport, this would involve acquiring suppliers (and distributors) of services needed by a carrier and its rivals. By controlling up and downstream markets, a carrier could exclude a rival from a market, raise its costs,[30] or indirectly control its actions.[31] There are many up/downstream firms which a carrier could seek to control for anti-competitive purposes. On the marketing side, these include travel agents and computer reservation systems. On the supplier side these might include fuelling firms, caterers, ground handling services, etc.

One controversial type of vertical integration is *control of feeder carriers.* In an important sense, these firms supply passengers to trunk carriers. Air Canada and CAI have been

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[29] One problem Wardair faced was that there were no regional carrier partners left to join their program. With the exception of City Express, all Canadian airlines of any importance had already been affiliated with either CAI or Air Canada.

[30] By setting up high prices for wholly owned suppliers, a carrier can raise costs of a rival who must use that supplier. The offending carrier is simply transferring money from one wholly owned entity (the airline) to another (the supplier).

[31] For example, a carrier which owns a monopoly ground handling services firm can cause a rival to reschedule a flight by instructing the handler to say it is not able to provide the service at the desired time.

successful in purchasing all the major regional feeder carriers in Canada. By preventing their feeder subsidiaries from signing interlining agreements or putting in joint fares with other carriers, CAI and Air Canada could be excluding new Canadian entrants from the domestic trunk airline routes for important segments of trunkline markets. Just prior to Wardair's demise, it announced that it was going to pay feeder airline fares for its passengers, at great expense, in order to get access to this important segment of the scheduled airline market.[32]

Another type of entry barrier involves *access to public infrastructure: airports and airways*. In some nations, airport facilities might not be available to new carriers, and takeoff/landing slots may be restricted. This has often been cited as a problem in the U.S. market (for both entrant U.S. carriers, as well as for Canadian carriers attempting to compete in the transborder market). In Canada, Pearson International Airport (PIA) in Toronto experiences capacity rationing, and this was a problem when Intair attempted to launch services out of PIA which competed with CAI and Air Canada.

B. Cumulative height of entry barriers

While not exhaustive, the above list of entry barriers is illustrative of the problems a new carrier could face when entering an airline market.[33] Individually, each of these can be quite

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[32] "Wardair to Pay Commuter Fares for some Connecting Passengers," Globe and Mail, 18 January 1989, p.B10.

[33] It also may apply to an existing Canadian carrier attempting to enter a foreign market.

serious. What is more important, however, is the cumulative height of the entry barriers. Solutions may be found for one or a few of these barriers, but in today's Canadian airline industry, it is out of the question that a new carrier could launch a nationwide service. The record supports this conclusion. Wardair, a carrier with an established reputation and operating expertise, was unable to compete and had to exit the industry by merging into CAI. Regional carrier Intercanadian attempted to succeed alone in regional markets and failed.[34] Niche carrier City Express also failed even though it competed with low costs and entered only a handful of markets. While a few charter specialists, such as Canada 3000 are attempting to compete in a few transcontinental markets, caution is in order. These carriers are presently confining themselves to one or two scheduled routes, and only time will tell if they are able to survive. (Recall that Wardair, City Express and Intair did not fail immediately.)

The Canadian airline industry is currently undergoing restructuring. CAI is unable to continue on its own, and must either merge with Air Canada, form an equity injecting alliance with a foreign airline, or enter bankruptcy proceedings. How would these alternative outcomes affect competition in the airline industry? This will be the subject of Sections IV to VI of this paper. Before turning to it, however, it is appropriate to spend a moment discussing the role of CRSs as a barrier to entry into the airline industry, and to discuss other competition issues with respect to CRSs.

[34] During its attempt at operating independently, Intercanadian was known as Intair. After the airline failed, a small part of the corporation continued to function in its previous role as a regional feeder carrier to CAI, again with the name Intercanadian.

C. CRS as an entry barrier and other competition issues

In Canada, there are a large number (4,300) of travel agents who act as intermediaries in selling airline services to retail customers.[35] On the surface, this might suggest that the two dominant air carriers would not be able to control the marketing channel. However, in the past, travel agents were strongly influenced in their choice of which airline to book a customer on by the computer reservation systems (CRS) which they use. Similarly, the agent's choice of which CRS system to use was strongly influenced by the carrier it did the most business with. The fact that travel agents rely on a single CRS service to provide information on airlines,[36] combined with the fact that the two dominant Canadian carriers control the dominant CRS system in Canada, suggest that there may be potential for these two carriers to prevent or hinder access to the distribution channel for new entrants. While the issue of distribution CRS dominance in Canada was addressed by a consent order between the Director of Investigation and Research and Gemini (the CRS vender jointly owned by Air Canada and CAI[37]), the potential for such abuse must be recognized when contemplating how entrant Canadian carriers will fare.

The 1989 Consent Order in the Gemini case was an important first step in promoting competition in both the distribution CRS and airline industries. Distribution CRS systems need

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[35] In Canada, 70% of airline tickets are sold by travel agents. Source: "Agreed Statement of Facts" filed by the parties in support of the application for the Gemini Consent Order, paragraph 19.

[36] It is too expensive and inefficient for most travel agencies to have more than one CRS system.

[37] For example, schedule A of the 7 July 1989 Consent Order stipulates that Gemini "shall not discriminate in providing access to the system to any carrier willing to pay the non-discriminatory fee and comply with the system vendor's customary terms" (p. 9). There are many other additional pro-competitive provisions in the consent order.

access to airline seat inventories for periodic updating, and for last minute seat bookings. These CRSs also depend on booking fee revenues from carriers whose seats are to be sold. The consent order insured that CRS systems competing with Gemini would have access to airline information and be paid fees for booking services, even though Gemini is owned by the two dominant Canadian air carriers.

Another aspect of competition in the distribution CRS market which was addressed by the Consent Order was limiting the contract term between distribution CRS vendors and travel agents. As was documented in various U.S. CRS investigations, competition from competing CRS services could be delayed or prevented by long term contracts. These prevent the travel agent from switching CRS vendors.

An important element of CRSs is that they are an input into the airline industry. Airlines must purchase CRS services (or provide them internally). As discussed above, vertical integration can be a barrier to entry if potential competitors are excluded from purchasing the needed input. Another aspect is that vertical integration can be used to raise rivals cost or to prevent them from considering alternative services. The Gemini hosting contract being considered in these proceedings is an example of this type of effect.

If a carrier is tied to a particular vendor of CRS services, it can face increased costs if the vendor is a high cost producer or does not keep pace with productivity developments elsewhere in the CRS industry. Furthermore, the carrier can lose marketing advantages if the

CRS vendor offers a lower level of service or functionality, or if it fails to keep up with service improvements elsewhere in the CRS industry.

In the case of CAI, its hosting CRS services from Gemini are based on CAI's original hosting system, Pegasus, which was developed by CAI's predecessor, CP Air. As CAI lacks the financial resources needed to undertake the type of system development needed to stay competitive in the 1990s, it must look elsewhere for CRS services. However, its existing hosting contract with Gemini prevents it from pursuing the option of purchasing state of the art services from American at relatively low cost.

The next sections of the report examine the consequences (in terms of airline competition) of the inability of CAI to leave the Gemini hosting computer reservation system. There are two possibilities in the event of CAI being compelled to stay with the Gemini hosting services: merger with Air Canada and failure. These will be examined separately. In addition, comments are provided on the likely competitive implications if CAI were able to leave Gemini and form an equity injecting, but non-controlling alliance with American Airlines.

V. Case 1: Inability to Terminate Hosting Contract Leads to Merger of AC/CAI

It is well known that Canadian Airlines International Limited (CAI) is no longer able to continue operations without additional injection of cash or a merger with another carrier able to support its cash flow. This fact has been publicly acknowledged by the carrier, as well as implicitly by the federal, Alberta and British Columbia governments.[38] In July, 1992, CAI and Air Canada (AC) announced that they were pursuing merger talks, and in September the two carriers announced that they had agreed to merge, although no merger agreement had been signed as of that date. In the following weeks, the two carriers attempted to develop a merger plan and agreement for presentation to their respective boards of directors, and eventually to their shareholders. AC and CAI filed an application to merge with the National Transportation Agency, which started public hearings.

When the merger plan was presented to the boards of the two carriers,[39] Air Canada withdrew from the agreement, citing the fact that the merged company (mergeco) would be insolvent by the end of 1993.[40] The financial advisors hired by Air Canada were unable to render a positive fairness opinion, indicating that Air Canada's shareholders would not be well

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[38] The Federal Government has provided loan guarantees to CAI of $50 million, and the B.C. and Alberta governments combined have provided it with an additional $70 million in guarantees. CAI has already started to draw on the federal loan guarantees.

[39] The merger plan was presented to the board of PWA (the parent of CAI), rather than of CAI.

[40] Point five of Air Canada's press release titled "Air Canada Statement to NTA" states "The Air Canada Board did not approve the OFT (Operating, Financing and Transition) Plan as, in the circumstances, it was not able to conclude that the merged company would be viable, based on the plan, or that approval of the plan would be in the best interest of Air Canada's shareholders."

served by the merger. Mergeco would require either an injection of funds by the federal government, or substantial dilution of the existing shareholder's interest. The two carriers were reported to have approached the federal government, requesting $1.5 billion in funds. This request was turned down. This leads to the first major consequence of hypothetical merger of AC and CAI: *mergeco would not be a viable economic entity.*

Although unlikely, it is necessary to examine the consequences of the merger assuming that mergeco were to receive a massive government subsidy and/or undergo a successful debt restructuring that would make it economically viable. By almost any measure, mergeco would almost completely dominate the domestic Canadian airline industry. AC, CAI, and their regional feeder carriers would control 96% of domestic scheduled passengers carried in the top 205 city pair markets (based on 1990 data). The data on passengers carried look marginally better (i.e., less concentrated) than would a distance measure such as revenue passenger kilometres, since a passenger carried by a tiny regional carrier (for example on the short route from Nanaimo to Vancouver), counts that same on the non-distance measure as a passenger carried by CAI or AC from Vancouver to Montreal. The initial dominance of mergeco is self evident: *Mergeco would dominate the Canadian airline industry, and since it would control 96% of the market, must be considered as a near monopoly.* This leads to two additional matters to be considered: the consequences of the near monopoly and whether new competitors might emerge.

Consider first the issue of whether or not new competitors might emerge. Section IV of this report discussed the issue of entry barriers into the airline industry. There it was argued that the cumulative height of such barriers is insurmountable: i.e., new carriers will not successfully enter the national scheduled airline market. The failure of Wardair in its attempt to do so is evidence support this. Even attempts to enter important regional markets, such as City Express' attempt to serve the Toronto Island market and Intair's attempt to compete on various Quebec and Eastern Ontario routes.

If the observation of the failure of all previous attempts to enter the market failed is not convincing, then ask the following common sense question. Would you invest your money in a new carrier planning to compete against the combined AC/CAI, given the following advantages which mergeco enjoys:

- An established reputation - mergeco is known to all previous airline travellers.
- The only frequent flyer program in the country. Even if the entrant launched its own plan, it is with mergeco in which all existing travellers will have accumulated large point balances.
- The ability to fly the consumer to/from almost any point in the scheduled air network, either by itself or via its affiliated regional feeder carrier network.
- The ability to carry the passenger directly, or via its own connecting flights, to a large number of international destinations.

- The operation of a combined fleet of roughly 140 aircraft, enabling the carrier to serve domestic (and foreign) points with a very high frequency of service - enabling the consumer to change plans at the last minute and still find a convenient flight.
- The operation of a combined fleet of roughly 140 aircraft, giving mergeco greater opportunity to substitute aircraft or reroute passengers when problems arise.
- The knowledge of how to sell their product in the Canadian domestic market - mergeco's sales staff have information on every existing traveller, where they fly, how often and at what fare - mergeco knows every travel agent in Canada, what volume of tickets they sell in the domestic market. etc.
- The ability to offer attractive quantity discounts to travel agents based on total tickets booked (rather than tickets booked in a single market) due to their extensive market coverage.
- The ability to subtly influence various industry suppliers (e.g. catering firms) due to their dominance of the industry.[41]
- Access to the most desirable gates, ticket counters, office space, etc. at all Canadian airports.
- Sufficient traffic volume to reap the available economies of traffic density.

Clearly, entry against mergeco would be a daunting proposition. The consumer would only respond to the new entrant's offering only in one of two cases. The first is if the entrant offered

[41] This can take several forms such as lower prices due to quantity discounts or giving mergeco priority whenever a bottleneck, shortage or other problem develops.

a significantly lower price. However, since 1979, when the Canadian carriers started to receive some pricing freedom, the record has been one of the major carriers matching low price offerings of competitors.[42] Low fares offered by Wardair, City Express, Intair, and by CAI and AC themselves, have always been matched. An entrant knows that it will likely not be able to sustain an advantage by using price.

The second possibility is by offering a superior level of service. Surveys of consumer behaviour reveal that the most important aspect of airline service is schedule convenience and frequency.[43] A carrier with greater than 96% market share will have a scheduling advantage, both collectively in all markets (i.e., including connecting markets) and likely in individual city pair markets. As for higher quality of in-flight service, the experiences of Wardair and Intair indicates that this is not enough of an advantage to sustain economically viable operations. In any event, higher service quality raises costs.

It is conceivable that mergeco would divest itself of either AC's or CAI's regional feeder carriers. Theoretically, this would allow a collection of regional feeder carriers to either launch a competing nationwide service by itself, or to join forces with an existing charter carrier to launch a competing nationwide service. However, the go-it-alone route is not viable. The regional carriers lack experience in operation of a fleet of jet aircraft operating a nationwide

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[42] A unique example of a major carrier not matching lower prices is underway at present in the Toronto-Montreal market. Here, the fact that the competitive responses of carriers is under close scrutiny by the Competition Bureau (and potentially by the National Transportation Agency in the very near future) may be the motivation behind this only deviation from the pattern of meeting competitors' low fares.

[43] The survey by Ostrowski and O'brien (1991) is a good example of this.

service.[44] Even if the regional joins forces with an existing jet charter carrier such as Canada 3000, a *viable* service would still not be possible. While such an alliance addresses the issues of regional feeder traffic, jet operation, and perhaps that of the reputation of an established carrier, the alliance makes no contribution to the problems of frequent flyer programs, feed traffic from international flights,[45] etc. The barriers to *sustained, viable* entry are still insurmountable.

The second fundamental issue to consider is what the effect would be of the near monopoly of mergeco. In a study undertaken for Transport Canada, Oum and Tretheway (1991) concluded that a monopoly would not be in the best interest of Canada. The study cited higher airfares, reduced services, and higher unit costs as the reason. The study specifically stated that a monopoly would lead to higher costs from "X-inefficiencies." These can arise from managerial inefficiencies induced by the lack of the managerial disciplining force of competition, and from higher wages paid to labour due to their increased bargaining power.[46] These are not the elements needed to forge a globally competitive air carrier. Oum and Tretheway estimated that the increase in costs could be as high as 13%. These increased costs would be passed on to consumers in higher air fares. In addition, the market power of the monopolist would give

[44] Some of the regionals operate a few small jets, such as the F-28, by these are on short stages and the operation is not at all like that of an extensive transcontinental service.

[45] As discussed in Oum and Tretheway (1992, p. 78), international traffic is simply another form of feed traffic. Consider two airlines, both operating a Boeing 737 flight from Toronto to Winnipeg. If one carrier receives an extra eight passengers per day on the flight from connections in Toronto to international destinations, then it receives revenues for eight additional customers, with the only increase in costs being that of an extra meal and a marginal amount of extra fuel. These extra passengers represent almost pure profit to the airline, and give it a marked competitive advantage.

[46] With the current duopoly, a major strike at one carrier will not totally disrupt nationwide air services. In contrast, a strike at a mergeco would paralyse the nation's air transport system, putting significant political and other pressures on the carrier to settle with labour.

it the ability to raise fares even further in order to extract monopoly rents. Combining the increased airfares with estimates of air travel demand elasticities,[47] traffic could drop off by 17% or more, depending on the monopoly rents extracted.

A monopoly in domestic markets potentially can also reduce competition in international airline markets. In three large markets (Canada-UK, Canada-Germany, Canada-France) there will be the removal of competition between Canadian air carriers, although a foreign carrier may remain on the route. More seriously, even where current competition is between one Canadian and one foreign carrier, competition can be reduced. Consider the example of the Canada-Hong Kong market, flown by CAI and Cathay Pacific. Both can compete for customers in the Vancouver-Hong Kong market. In addition, due to Cathay's alliance with Air Canada (which does not serve the route) competition exists in all other markets as well: e.g., Toronto-Hong Kong, Winnipeg-Hong Kong. Air Canada carries the passenger to Vancouver where she/he transfers to the Cathay flight. With the merger of AC/CAI, mergeco will have no interest in interlining traffic with Cathay. Thus with the exception of the Vancouver market, there will be a lessening of competition in the Canada-Hong Kong market. Even in Vancouver, there could be a loss of competition. Cathay's original strategy when it entered the Vancouver market was to take traffic out of eastern Canada.[48] It felt that CP Air's (the predecessor of CAI) dominance of the Vancouver market was too formidable to make a viable breakthrough for several years. Even today, a very large portion of Cathay's traffic from Canada is connecting traffic from Air

[47] Using Canadian data, Oum and Gillen (1986) found air travel elasticities in Canada to be in the range of -1.1 to -1.3.

[48] Presentation made by Cathay Pacific to UBC Faculty of Commerce and Business Administration's Air Transportation class, 1985.

Canada. Loss of this could possibly render Cathay's service to Vancouver uneconomic, with the result being the exit of Cathay from the market, or alternatively, significantly reduced capacity and frequency of service.

The merger of CAI and AC would result in a substantial lessening of competition in Canadian airline markets. Entry barriers are too high to result in *sustained viable* entry of new domestic Canadian carriers. Cabotage is not legal at this time, and in spite of the public debate on a merger of AC and CAI, there is no proposal to change the existing laws governing cabotage. Canada must look to the continued existence of CAI to provide competition in Canada's domestic market, and to enhance competition in markets from Canada to international destinations.

VIII. Case 2: Inability to Terminate Hosting Contract Leads to Financial Failure of CAI

This section of the report examines the case where the inability of CAI to terminate its hosting services contract with Gemini leads to the financial failure of CAI. The alliance with (and equity injection from) American Airlines is not possible, as a condition of an agreement with American is that CAI switch its hosting services from Gemini to American's system. With no financial injection forthcoming and with exhausted cash reserves, CAI will have as its only alternatives: merger, purchase by another party, or failure. Merger is not discussed in this section, since that possibility was discussed in the previous section.

During the period in the Fall of 1992, when CAI and Air Canada proposed merging, CAI was instructed by the Director of Investigation and Research to look for alternative purchasers for CAI. The outcome of the process was that the only meaningful alternative purchaser is American Airlines, at least prior to a financial failure of CAI. Without the American Airlines option, CAI is highly likely to fail.[49] *Since there are no alternative purchasers of CAI, the inability to terminate the Gemini hosting contract will likely result in the financial failure of CAI.*

[49] It should be noted that CAI has already stopped payments to its creditors, even without seeking protection under bankruptcy or other creditor statutes. This substantiates the seriousness of CAI's current financial position.

The financial failure of CAI has four possible outcomes:

- Merger with Air Canada. This was dealt with in the previous section. All that changes relative to the previous case is the price AC pays for CAI. In any event, no new cash is injected into mergeco.

- Liquidation of the company.

- Sale to a purchaser other than Air Canada or American.

- Sale of significant assets to Air Canada and/or others, and continued operation on a reduced scale.

Each of the latter three options are now discussed in turn.

A. Liquidation of CAI

In this scenario, CAI would cease to operate, and its assets would be sold off. This would result in the removal of the only existing vigourous nationwide competitor to Air Canada. If no other carrier entered the national market, then there would be a substantial lessening of competition. Air Canada would end up, at least initially, with a near monopoly of the domestic

trunk market. The issue then focuses on whether in the long run there would be an entrant into the industry which would provide sustained and effective competition to Air Canada.

Regional Carriers will fail if they are left on their own. After liquidation of CAI, its former regional carriers (e.g., TimeAir) might continue to operate, thus providing some competition in regional markets. However, the traffic base of the ex-CAI regionals would be severely eroded if they were to operate on their own in competition with Air Canada and its regional carriers. Between one-third and one-half of a regional's total traffic connects to a trunk flight. Could the orphan regional carriers retain this traffic? It would be possible for these passengers to fly on one of CAI's former regional carriers then connect to an Air Canada flight. However, the ex-CAI regional would be at a severe disadvantage. If the consumer flew with Air Canada's regional carrier she/he would receive frequent flyer points in a single plan (Air Canada's). The ex-CAI regional would not be able to award Air Canada points for the regional flight. Additionally, the price charged for the Air Canada - AC regional routing would be lower. Affiliated carriers offer *joint* fares on connecting flights. These joint fares are less than the sum of the two flight segments. With a joint fare, Air Canada reduces the amount it receives for the trunk service it provides. A former CAI carrier would not be able to obtain a joint fare from Air Canada. AC has every incentive to keep all the revenue in-house and would be unwilling to enter into a joint fare with a competitor to the regional feeder carrier it owns. To do otherwise would result in a revenue erosion for AC. The result is that the ex-CAI regional feeder carrier would lose its connecting trunk traffic base. In addition to joint fares, regional carriers receive many other services from trunk carriers, such as baggage handling and

ticketing, catering services, seat management, etc. Air Canada would have an incentive to either not offer such services to the ex-CAI carriers, to reduce the service level, or to charge higher fees.

With a traffic loss of one-third to one-half due to the loss of connection traffic, these carriers would have to reduce service frequency and/or raise fares. Reduced service frequency, however, makes a carrier less attractive, even for the local (non-connecting) passenger. Ostrowski and O'brien (1991) report that service frequency is the most important factor in the business traveller's carrier choice decision.[50] It is the second most important factor for the leisure traveller, ranking just behind price. With reduced traffic from the loss of connecting passengers, frequency falls, and this in turn leads to the loss of some of the local traffic. The reduced traffic levels would induce another round of frequency cuts. Traffic and revenues would continue to spiral downward, and it would only be a short time before the ex-CAI regional carriers would fail themselves. Without an allied trunk carrier, such as CAI or AC, regional carriers cannot survive.

Regional Carriers aligned with U.S. carrier would not provide significant domestic competition. Another possibility is for the ex-CAI regional carriers to be purchased or otherwise aligned with a U.S. carrier. Outright purchase is not possible under present Canadian law. Nevertheless, some sort of alliance involving a minority equity stake hypothetically could be possible. This scenario gives the ex-CAI regional carriers access to feed from/to transborder

[50] Regional air traffic has a higher proportion of business travel than do trunk carriers. On short distance routes, leisure travellers have a greater tendency to use their automobiles to drive from the small community where they reside (or are destined to) to a major airport.

trunk routes, but transborder traffic accounts for less than a third of the total Canadian market. Without the ability to provide domestic connections, the regional carrier's traffic and service offerings would spiral downward, again with the carriers eventually going out of business due to an inability to offer competitive services in domestic as well as transborder markets.[51] This scenario would never provide any competition in domestic trunk markets, and by itself this would result in a substantial lessening of competition. Eventually the ex-CAI regional carriers would fail themselves, and the substantial lessening of competition would extend to all air markets.

Regional Carriers purchased by existing jet charter carrier would not survive. A third scenario is that the regional feeder carrier would be purchased or otherwise aligned with an existing small charter carrier (e.g., Canada 3000), and compete against Air Canada. It is the opinion of this author that this outcome, while it might be attempted, would not survive for more than a period of a few months. This system (small trunk with regional feeder) would compete against Air Canada, with the latter possessing the following advantages:

- High frequency of service on most (if not all) trunk and regional routes within Canada.

[51] An important aspect of the modern airline is that traffic is a system phenomena. Passengers travelling between A and B do not consist merely of A to B passengers. The A to B flight also includes a) passengers from regional communities outside of A travelling to B, b) passengers from overseas transferring at A to a flight to B, and c) transborder passengers connecting at A to B. Any carrier missing one of these four traffic elements (local passenger, domestic connect, overseas connect, transborder connect) will operate with reduced demand, and will eventually be unable to compete in the Canadian market. This phenomena is easily observed from the fact that no regional carrier of anything but a very small size is independent of a national carrier, and vice-versa, no major national carrier operates without feeder carriers.

- Feed traffic from transborder routes. Currently, Air Canada has most of Canada's viable transborder routes. A new bilateral is being negotiated which *might* provide the competing system (ex-CAI regional with charter jet carrier) with transborder routes. This of course is speculative at this time. Even if transborder route rights were available, the competing system would need to overcome Air Canada's advantage of its historical presence in the U.S. market, as well as competition from U.S. carriers. The only viable means for the competing carrier to get access to transborder traffic yet survive competition from AC and U.S. carriers would be to align itself with a U.S. carrier. This is, of course, what CAI is proposing at this time, and it has the advantages of not requiring that CAI, the existing significant competitor to AC, go through financial failure.

- A loyal customer base due to the carriers' (AC and its regional carriers) existing reputations and customer familiarity.

- Very high customer loyalty to AC, due to the fact that almost every air consumer in Canada has an established base of points in Air Canada's frequent flyer program.

- An established operation with scheduling, operating and marketing procedures working relatively smoothly.

- Travel agent preference for AC due to the higher booking levels on Air Canada (which qualify the agent in many cases for higher ticket commissions).

- An established practice of meeting almost any price decrease offered by competitors. This means that price would not be an avenue for the competing carrier system to use to capture a portion of the market.

- Vast knowledge built up by AC over the years regarding consumer booking patterns, tastes, preferred flight times, etc. This allows AC to schedule flights at the times which are likely to maximize sales, to optimally set the number of seats which can be sold at discount so as to maximize total revenues, etc.

As discussed in the section on entry barriers, these are formidable obstacles to overcome - so formidable that they will not be successfully overcome, even by a carrier such as Canada 3000 which has some consumer recognition.

Expansion of an existing charter airline. A fourth scenario would be for an existing charter airline to enter the national scheduled service market. While the carrier may have some name recognition, and has experience flying and maintaining jet aircraft, it would face the same list of entry barriers. It would need to purchase or otherwise align with a set of regional carriers. If it did so, then the scenario is the same as the one previously considered. Without

the regional carriers, the outlook is even worse, as the carrier would forego the opportunity to obtain regional feed traffic.

As Wardair discovered, knowledge of how to operate charter services does not automatically translate into success in scheduled services. Charter flights are operated only when full, and can be delayed should problems arise. To be successful in the scheduled industry, high service reliability must be delivered. Further, costs go up as the need to maintain consistency in the schedule will require operation of flights even when traffic is sparse.

B. Sale of CAI to a purchaser other than AC or American

Creditors become new owners of CAI. One possibility is that CAI would fly from the ashes of financial failure on a smaller scale, with former debt holders as new owners. This is unlikely to be successful. No carrier in North America has successfully returned from bankruptcy yet. Continental tried once, but suffered a downward spiral in traffic that resulted in a second visit to the bankruptcy court. Eastern, Pan Am, Air Florida, etc. ceased operations. Braniff went through two bankruptcies. While a number of U.S. carriers are operating in 1992 under bankruptcy protection (Continental, America West, TWA), only time will tell if they are ultimately successful. The historical record does not support this option.

One of the consequences of financial failure is a loss of consumer confidence, and a corresponding loss of traffic and revenues. Consumers are reluctant to book (and pay) far in

advance on a failed carrier. Thus these carriers typically have to sell their seats closer to flight date, and often have to make large numbers of seats available at the lowest discount levels in order to get any traffic at all. Carriers which enjoy the trust of the consumer have higher prepayments from consumers. Since their seats fill up earlier, they do not have to discount seats close to the flight date as often. Both from earlier prepayment and higher average fares, non-bankrupt carriers enjoy significantly better cash flows.

Frequent flyer programs also play a role in lessening the potential for a failed carrier returning to health. A business traveller choosing between AC and post-bankruptcy CAI would face the same price for the two carriers' services. Both offer frequent flyer benefits. However, the consumer will favour AC's frequent flyer plan. Building points in CAI's plan is risky. The North American record with failed carriers is not good. The consumer would view points painstakingly built with CAI toward a desired trip could be lost. The consumer would favour AC.

Going through financial failure will result in a loss in traffic due to lost consumer confidence. It also means reduced ticket prepayments and larger numbers of seats which will need to be discounted. Like the case discussed in Section A for regional carriers, loss of traffic will have to be met by reducing flight offerings. Reduced frequency of service results in further losses of customers. A Braniff-like downward spiral in traffic takes over. Eventually the carrier will no longer be a significant competitor. Bankruptcy protection may delay the inevitable for

a few months, but *eventually, financial failure results in the loss of a significant carrier.* In Canada's case, there is unfortunately only one significant domestic competitor to Air Canada.

Sale of CAI to another entity. As discussed in the introduction to this section, CAI has already looked for alternative purchasers and found none. The transaction with American Airlines is the only option it has open to it without failure.

A possibility which must be considered in assessing competitive outcomes of industry restructuring is allowing the firm to go through bankruptcy with a new owner taking control and piloting the company to renewed health. If this is possible, then hypothetically CAI could possibly be maintained as a significant competitor. A possible scenario is that existing shareholders lose their interest in CAI, debtholders receive equity in place of their debt, and a new owner injects some additional cash into the operation in exchange for a controlling interest.

Could this work? As discussed in the previous case with creditors assuming control of the airline, CAI would face the problem of a loss of consumer confidence with a failure, and would lose a substantial amount of traffic. It would also have to discount its product more heavily and suffer from a loss of early prepayments by consumers. CAI would have to buck the established pattern of failed carriers not returning to health. If successful, CAI's rise form the ashes would be unique. The only difference here is that a new investor would inject some additional cash into the operations, increasing somewhat the period during which the carrier might survive.

There is one scenario for a post-bankruptcy CAI which could work. The carrier could align itself with a U.S. carrier. This would create some new transborder traffic flows. If the alliance is with a financially strong U.S. carrier, then consumer confidence would recover faster, although there would still be some loss here. In this scenario, the frequent flyer plan of CAI would be joined with that of the U.S. carrier, enhancing its attractiveness and making it more secure. The U.S. carrier could offer various services, such as superior seat management technology relative to what the carrier currently has. Because of the greater economies the U.S. carriers enjoy in the provision of some of these services, the Canadian carrier would enjoy reduced costs as well as enhanced revenues from superior technology.

This scenario is, of course, exactly what CAI and American are proposing to do. They are being prevented from pursuing this course by the Gemini hosting contract.

C. Sale of parts of CAI's operation to Air Canada, with CAI operating on a smaller scale

Another possibility which must be considered when examining the competitive consequences of an industry undergoing restructuring is sale of some of the firm's assets and operating on a reduced basis. CAI has few assets of value to sell.

The most often cited asset is its route rights to Pacific Asia. Air Canada has publicly acknowledged that it is keenly interested in these rights. In the U.S., carriers have been able to sell their route rights to other carriers.[52] In Canada, however, sale of foreign route rights is not allowed by law. Sections 90 and 95 of the *National Transportation Act of 1987,* do not allow licenses to be transferred from one carrier to another. Some may suggest that this can be evaded by transferring aircraft at prices above market value to reflect the value of the route. However, this is unnecessary. Air Canada might only need to wait for CAI to fail to acquire the route rights at no cost.

Other assets which could be sold are CAI's regional carriers and its aircraft. It is not clear that there would be any buyers for the regional carriers. Their value to a buyer reflects their ability to earn profits. Profitability depends on traffic. Without feed traffic from CAI, it is unlikely that the regionals would be profitable. Eventually the regionals would have to re-align themselves with CAI in order to be viable.

Aircraft can be sold, over time. However, today's aircraft markets are glutted with excess planes. The failures of Pan Am and Eastern, along with the downsizing of Continental and TWA, have flooded the market with used aircraft. In addition the "healthy" carriers are attempting to downsize their fleets as they adjust to the downturn in traffic. It is a buyer's market, and CAI is unlikely to realize much for the few aircraft it owns rather than leases.

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[52] For example, Pan Am sold its Pacific route rights to United. Braniff sold its South American rights to Eastern who in turn sold them to American.

Even if it were possible to sell some assets and downsize, one has to question whether this makes sense in this industry. As was discussed earlier in this report, there are significant advantages which accrue to large carriers. These advantages gave rise to the consolidation of the U.S. and Canadian airline industries, and is now exerting pressure to consolidate across borders. Downsizing makes a carrier a less tenable competitor. *The only way that downsizing can be viewed as being successful is if it is done in conjunction with forming a strong alliance with a U.S. or other international carrier.* In this way, the advantages of size can be realized by sharing in the cost reducing advantages of the alliance's computer system, buying power, etc., and from its revenue enhancing abilities. *Of course, this is exactly what CAI and American are proposing to do: form an alliance between CAI and a large, strong U.S. carrier.*

D. Conclusion: Failure removes the only significant competitor

This section examined the various scenarios which could result from the failure of CAI. Merger with AC leads directly to the loss of the only significant competitor in the national market. Various non-merger scenarios were examined, but were rejected as non-viable, except in the case that an alliance is made with a U.S. carrier. This is, of course, what CAI and American are proposing, but they are prevented from doing so by the terms of the Gemini hosting contract. *Financial failure of CAI with subsequent restructuring will still lead to a substantial lessening of competition, unless that restructuring involves a strong alliance with a U.S. or other large foreign carrier.*

VII. Scenario with Termination of the Hosting Contract

This section seeks to describe what the competitive consequences in airline markets would be of terminating the Gemini hosting contract with CAI.

Termination of the Gemini hosting contract will remove a major obstacle to CAI's ability to complete its transaction with American. The main elements and results of a successful transaction between American and CAI include:

- The cash injection of $246 million in equity capital by American.

- The switch from Gemini to American's hosting computer will reduce the cost of hosting services for CAI.

- American will make available its world class airline seat management software. This software can only be used if the CAI seat inventory is hosted on American's CRS. The software is superior to CAI's own seat management system and will lead to revenue enhancement of several percent. Since flight costs do not increase by the use of better seat management , the increased revenues will flow to CAI as higher profits.

- American will make available other services tied to hosting, including airport processing functions, flight planning, etc. These will improve customer service, improve productivity, and reduce costs.

- CAI and American will align their frequent flyer programs, enhancing the attractiveness of their programs for consumers in both countries.

- American and CAI will potentially develop marketing arrangements to cross-sell the others' services, providing the consumer with a greater number of destinations and flights, and thus increasing CAI's revenues.

The consequences of this for CAI include:

- Increased consumer confidence in Canadian.

- Ability of Canadian to sell into the transborder market more than it ever has in the past.

- Incentive for American to use its market strength/coverage to sell Canada and flights on CAI.

- Reduced cost and increased revenues for CAI, reducing, then eliminating its losses and returning it to a positive cash flow.

- Injection of cash into Canadian to allow it to weather transitional costs.

- Linking Canadian's future to that of the largest and most innovative airline in the world.

- Survival.

- Eventual return to financial health.

The question now is what are the consequences for competition in Canadian airline markets. The alliance allows CAI to survive in its present (not down-sized) form, and thus maintains a significant competitor in the national Canadian airline market. Since there are presently only two national competitors, this is critical to the competitive health of the industry. The proposed alliance is a long run solution to competition in the industry. American is one of the strongest competitors in the world airline industry, and in my opinion, the single most innovative carrier in the modern era. American will be a survivor of the increasingly globalizing airline industry. American will have an important investment in Canadian and will have a strong interest in seeing Canadian survive along with it. CAI would be able to participate in globalization while there are still first mover advantages. It will continue to have access to

further innovations by American. As American solicits other global alliance partners, Canadian will be able to share in the revenue enhancing advantages of such alliances.

The benefits to the maintenance of competition in the Canadian airline market are considerable. By preventing the near monopolization of the industry, prices will be lower and total service offerings will be higher than they would have been without the termination of the hosting contract. Competitive prices and good service offerings will encourage travel on Canadian airlines. This will influence the choices of Canadian residents as to where to holiday, hold conventions, etc. It will maintain and likely improve the attractiveness of Canada as a tourism, conference, etc. destination. Good air service makes Canada a more attractive location in which to locate corporate offices. All of these enhance economic activity, both in the aviation sector, and in aviation related/dependent sectors such as tourism.

Will the alliance of CAI and American have negative consequences for Air Canada's ability to compete? Certainly Air Canada will face competitive pressure relative to having a monopoly. The CAI/American alliance will be a strong competitor for AC. Nevertheless, AC will remain a significant competitor itself. To begin with, CAI is not likely to try and dominate the Canadian market. It does not have enough aircraft to do so, and in fact is trying to reduce its fleet size somewhat. Secondly, the consolidation benefits CAI will achieve through an international alliance with American can be matched by Air Canada if it completes its proposed acquisition of Continental, its marketing agreement with United, and/or an equity alliance with Air France. Air Canada will not wither in the face of competition from CAI/American. It will

respond competitively, as it has often done in the past. If CAI obtains a significant advantage from aligning its frequent flyer program with American's, then AC can do something similar with Continental or United.[53] Air Canada will have to respond to CAI's enhanced competitiveness, but that is the intent of competition policy. Air Canada is not disadvantaged in this competitive struggle, and indeed has proven itself a formidable competitor time after time. The major challenge Air Canada will have to face is reducing its costs, but that is a challenge it already faces. Without the presence of CAI as a significant competitor, AC would not have adequate pressures to adjust its costs to efficient levels.

New entrant airlines are unlikely to be able to compete, except in niche markets, against the new CAI and against Air Canada. But that is no different than the situation today. The cumulative height of entry barriers are insurmountable in North American air transport. Competition must come from existing carriers, and all steps must be taken to insure that competition between existing carriers is maintained and nurtured.

[53] Air Canada's announced marketing agreement with United has provision for frequent flyer program cooperation between the two carriers.

VIII. Conclusion

This report has made the following observations:

- That there are economic forces in the airline industry which favour large over small carriers and that recent political changes are allowing these forces to manifest themselves across national borders.

- That circumstances in the airline industry have changed, requiring both Canadian air carriers to undertake further consolidation. In particular, the financial condition of both carriers has deteriorated, and CAI is facing the prospect of bankruptcy.

- That a pro-competitive solution to CAI's imminent financial collapse is at hand via an equity infusion from building an alliance with American. This transaction would be cost reducing and revenue enhancing.

- That the hosting contract between CAI and Gemini prevents the pro-competitive alliance of CAI and American from taking place.

- If CAI is prevented by the Gemini hosting contract from pursuing this alliance, the result will be monopolization of the Canadian airline market, either by the forced merger of CAI with Air Canada, or by the failure of CAI.

- That varying the restrictive provisions of the CAI-Gemini hosting contract will help maintain a significant competitor in the Canadian airline industry, and thus work toward preventing a substantial lessening of competition.

- That various scenarios involving the failure of CAI, e.g., regional carriers attempting to launch a competitive nationwide service, or CAI downsizing, will all eventually lead to failure and the loss of the only significant competitor to Air Canada in the domestic airline industry.

- That the cumulative height of entry barriers is insurmountable, preventing viable entry by a new competitor

From this it can be concluded that in the present circumstances, the only viable possibility for maintaining a significant competitor to Air Canada in the Canadian airline industry is to facilitate the alliance between American and Canadian. This can only be done if Canadian is allowed to terminate its hosting contract with Gemini. There is no alternative to terminating this hosting contract. If CAI is forced to keep its inventory hosting in Gemini, then it will be unable to complete the transaction with American and reap the advantages of the cost reducing and

revenue enhancing benefits of the alliance. American has no interest in injecting cash into CAI without the transfer or CAI's seat inventory to American's hosting system.

The Gemini hosting contract with CAI is now known to be a serious impediment to competition in the airline industry. It will result in the near-monopolization of the Canadian airline market, with competition limited to a handful of niche/fringe carriers. It is essential that the Consent Order be varied to allow CAI to terminate its contract with Gemini.

Appendix 1

Foreign Ownership Limitations on Carriers

There are three significant institutional constraints which currently would prevent merger of air carriers of different nations, or majority (or controlling minority) equity positions. First, many nations have legislation prohibiting or limiting foreign ownership of air carriers. Section 101 of the U.S. *Federal Aviation Act* restricts foreign ownership of a U.S. air carrier to no more than 25%. Section 87(1) of Canada's *National Transportation Act, 1987,* also restricts foreign ownership of Canadian air carriers to no more than 25%. Similar provisions can be found in other nations.

In some cases, restrictions can be found in additional legislation. For example, in Canada, the Province of Alberta's *PWA Act,* requires that no individual or entity can control more than 10% of the voting stock of PWA Corp., the parent of the wholly owned subsidiary, Canadian Airlines International Ltd.[54] Canada's *Investment Canada Act,* also has jurisdiction and upon review, foreign control in any Canadian enterprise can be limited if it is deemed to be in the public interest to do so.

The legislative restrictions on foreign ownership of air carriers obviously prevent outright acquisition of Canadian, U.S., etc. air carriers by foreigners. Generally, the legislation also has language which further prevents a foreign carrier from acquiring an ownership stake, which

[54] The federal *Air Canada Public Participation Act*, similarly restricts interest in Air Canada by an individual or entity to 10%.

although within the legislative limits, effectively gives control of the air carrier. Section 408(f) of the U.S. *Federal Aviation Act,* presumes a 10% ownership stake to be a controlling interest, unless the Dept. of Transportation specifically finds otherwise. In other nations, such as Canada, no specific ownership stake is specified as to what constitutes a controlling interest, leaving it to the regulatory agency to rule on a case-by-case basis.

A second institutional constraint is defacto restriction of foreign carrier ownership, even when there is no specific legislative requirement. The U.K., for example, has no specific limits on foreign ownership of British carriers. The U.K.'s CAA, however is required to monitor foreign ownership of British carriers and to report to the Minister of Transport when an airline is no longer U.K. controlled. It is then at the discretion of the Minister as to whether the carrier can keep its license. In such nations, non-legislative traditions appear to be very powerful and effectively prevent foreign control of carriers.

A third constraint can be found in the bilateral air services agreements between nations. Article 7 of the "Standard Form of Agreement for Provisional Air Routes," which is contained in Part VIII of the *Chicago Convention*, provides that: "Each contracting party reserves the right to withhold or revoke a certificate or permit to an airline of another State in any case where it is not satisfied that substantial ownership and effective control are vested in nationals of a party to this Agreement." This statement, or language similar to it, can be found in almost all of the thousands of bilateral air services agreements currently in existence. These constraints are intended to prevent Alitalia, for example, from facing competition from a U.S. carrier on a

Canada-Italy route. Canada can only designate a Canadian controlled carrier to fly on Canada-Italy routes. While there are some exceptions to the standard bilateral national control provision, they are rare.[55]

Finally, while not an outright constraint on foreign ownership or acquisition of airlines, government ownership of many of the Non-North American airlines, effectively prevents foreigners from acquiring a major carrier in another nation without complete approval of the government in question.

[55] For example, BWIA, an airline controlled by nationals of Trinidad and Tobago, is allowed by Canada to operate service from Saint Lucia (an independent nation) to Canada.

Appendix 2

Reform of North American Domestic Air Transport Regulation

During the era from roughly 1930 to 1976, the airline industry was constrained by pervasive government regulation, and typically, some degree of government ownership. Starting in 1976, the U.S. instituted a series of measures which loosened regulatory controls on the industry. In 1978, these changes were formalized by passage of the *Airline Deregulation Act*. By 1981, the U.S. industry was largely free of economic regulation. The removal of regulation allowed economic forces which had previously been suppressed to exert themselves on the industry. As a result, the industry has changed. Among many other changes, deregulation has brought about:

- The offering of discount prices
- The adoption of marketing practices such as frequent flyer programs
- The development of directional hub and spoke systems
- Competition between carriers for travel agent loyalty
- The integration of regional feeder carriers with trunk carriers

Canada also deregulated the southern airline industry in a series of moves beginning in 1979,[56] when Wardair was allowed to offer ABC charters in domestic markets.[57] In response,

[56] The National Transportation Act deregulated "southern" Canadian airline markets. Specifically, the act deregulated all airline markets except those in the "designated area." The designated area is defined in the Act, and includes the sparsely populated northern areas. As an example, Edmonton, is in the south for airline regulatory purposes.

Table 4: US Airline Mergers

U.S. Mergers

Pre-1986		
	Pan Am	- National
	Republic	= North Central + Southern
		+ Air West
1986		
	Delta	- Western
	Northwest	- Republic
	TWA	- Ozark
	USAir	- Piedmont
		- PSA
	Continental	- Texas International
		- Frontier
		- People Express
		- NY Air
	American	- Air California
	United	- bought Pan Am Pacific routes

scheduled carriers were allowed to offer capacity controlled discount fares. In 1984, the New Canadian Air Policy granted considerable defacto freedoms to carriers.[58] As reported in Oum and Tretheway (1984), the effects of the 1984 policy included:

- significant new entry onto routes by existing carriers
- easing the transfer of route service obligations from trunk to feeder carriers
- the granting of domestic scheduled services to Wardair and other carriers
- the removal of most restrictions on carrier pricing

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[57](...continued)

[57] ABC charters allow tickets to be sold to anyone. Previously, all tickets on a charter flight had to be sold to members of a common entity, for example, the sewing club at the local church.

[58] None of the air transport legislation was changed as a result of the 1984 policy. However, the Minister of Transport indicated that the Canadian Transport Commission was to give greater weight to the benefits of competition in assessing applications for public convenience and necessity. This was given substance when the Minister used his right to grant appeals to enforce the new policy direction.

Table 5: Canadian Airline Mergers

Canadian mergers

Canadian Airlines International
= CP Air (+Nordair+EPA+Quebecair)
(1985-87)
+ PWA (1987)
+ Wardair (1989)

Air Canada + CAI
(proposed and withdrawn 1992)

- the removal of all constraints on carrier capacity and aircraft type decisions
- signalling to carriers that complete deregulation was imminent.

The National Transportation Act of 1987 culminated this process by virtually deregulating the southern sector of Canada.[59] To compliment the deregulation of the industry, Air Canada was privatized in two stages over the 1988-89 period. Today, Air Canada is fully privately owned, although provisions of the *Air Canada Public Participation Act* restrict the ability of any one individual or entity from voting more than 10% of its common stock. This essentially prevents shareholders from ousting management. CAI, whose parent PWA Corp. was privatized by the Government of Alberta in 1984, has a similar 10% ownership restriction.

While the U.S. and Canada have separately deregulated their domestic markets, transborder air services continue to be regulated. Since the early 1980s, the two governments

[59] Some ability to monitor price increases remains, as does limitations on exiting routes when a carrier is the last or only one to serve it. More extensive regulation continues in the Northern region of Canada, although even here, the application of a reverse onus burden of proof has allowed more entry and pricing freedom than heretofore.

have essentially allowed the carriers unlimited pricing freedom.[60] However, route entry is strictly regulated by the bilateral air treaty which names specific routes which can be flown by carriers of each nation. With few exceptions, all routes allow only one airline per nation, and many do not allow both nations to serve the same route. The treaty was last revised in 1974, and since then only one new route has been authorized for trunk carriers. Currently, Canada and the U.S. are attempting to negotiate a new treaty, which would have as its goal complete deregulation of transborder services. Cabotage, or the right of U.S. carriers to fly within Canada (and vice versa) is not being negotiated.[61]

The deregulation of the separate U.S. and Canadian domestic airline markets allowed the economic forces favouring large carriers to manifest themselves. The result has been consolidation of the two domestic airline markets. **Table 4** lists the mergers which took place in the U.S., while **Table 5** lists the series of acquisitions and mergers which led to the formation of CAI from CP Air and the former regional carriers.[62]

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[60] Pricing in the Canada-US air market works on the basis of double approval. That is, the governments of both nations must approve any proposed air fare. This veto power of each nation has been used on occasion, but overall, carriers have broad pricing freedoms.

[61] The definitions of cabotage and the other "freedoms of the air" are discussed in Appendix 3.

[62] Prior to 1984, the term "regional" carrier had a particular regulatory meaning. All of these regionals operated jet aircraft. Today, a regional carrier is any carrier operating on short stage length routes, generally with turboprop aircraft. The term regional carrier no longer has a specific regulatory meaning.

Appendix 3

The Freedoms of the Air

In discussing the exchange of rights for scheduled air services between nations, a vocabulary has emerged which is referred to as the *freedoms of the air*.[63] **Figure 3** illustrates the first two "technical freedoms" of the air which were granted by the IASTA agreement.

1st Freedom The right of a foreign airline to fly across the home country (commercial flights only)

2nd Freedom The right of a foreign airline to make a technical stop in the home country (e.g., for maintenance or refuelling) while enroute to another foreign country.

Figure 4 depicts the "basic" traffic freedoms. These give an airline the right to carry traffic to and from a foreign nation. Like all traffic freedoms, these must be negotiated on a bilateral basis between two nations. The third and fourth freedoms cover most international air traffic. In practice, third and fourth freedoms are granted simultaneously.

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[63] The first five freedoms are specified in the Chicago Convention. The other concepts of freedoms of the air have been developed subsequently.

Figure 3: The First and Second "Technical" Freedoms

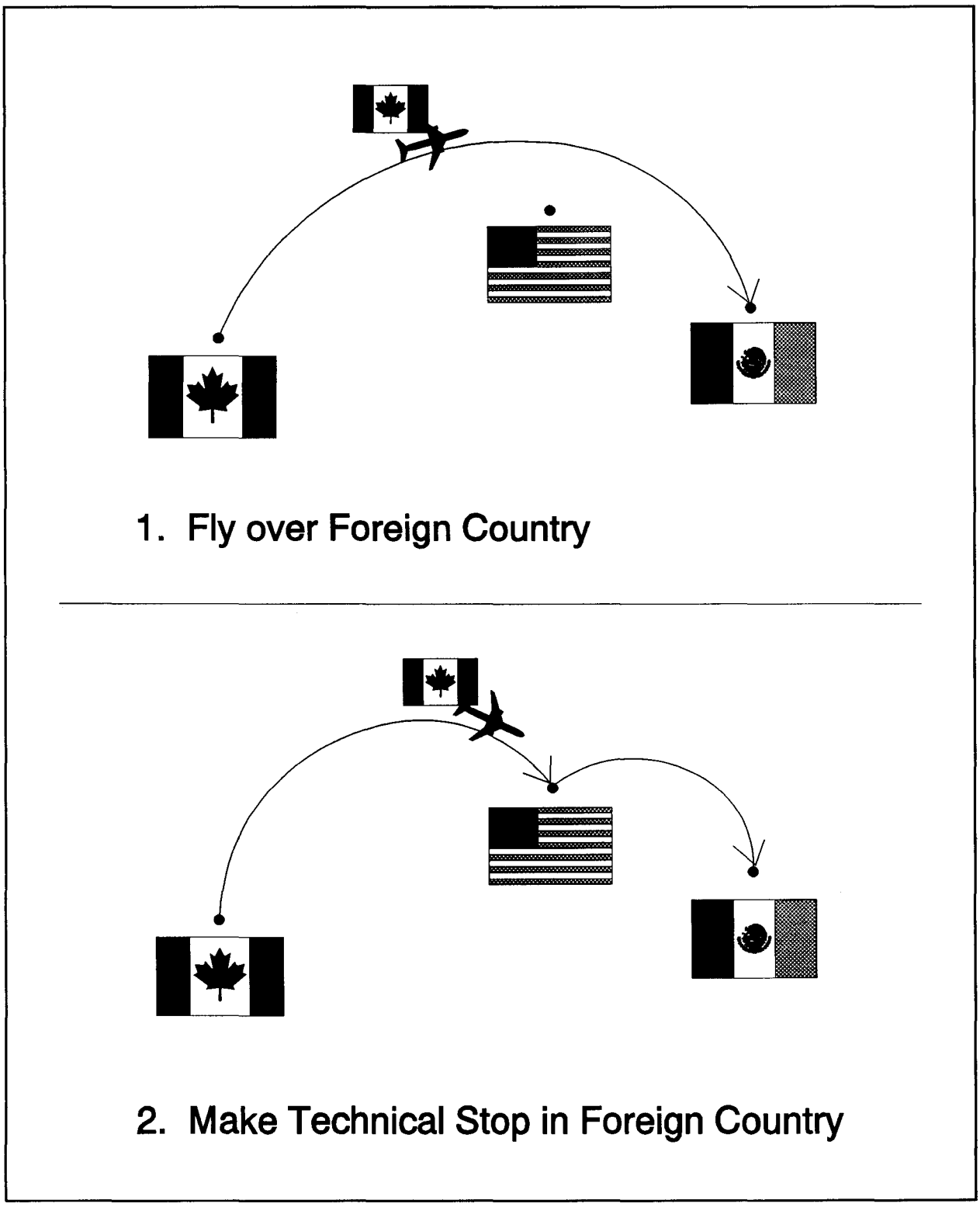
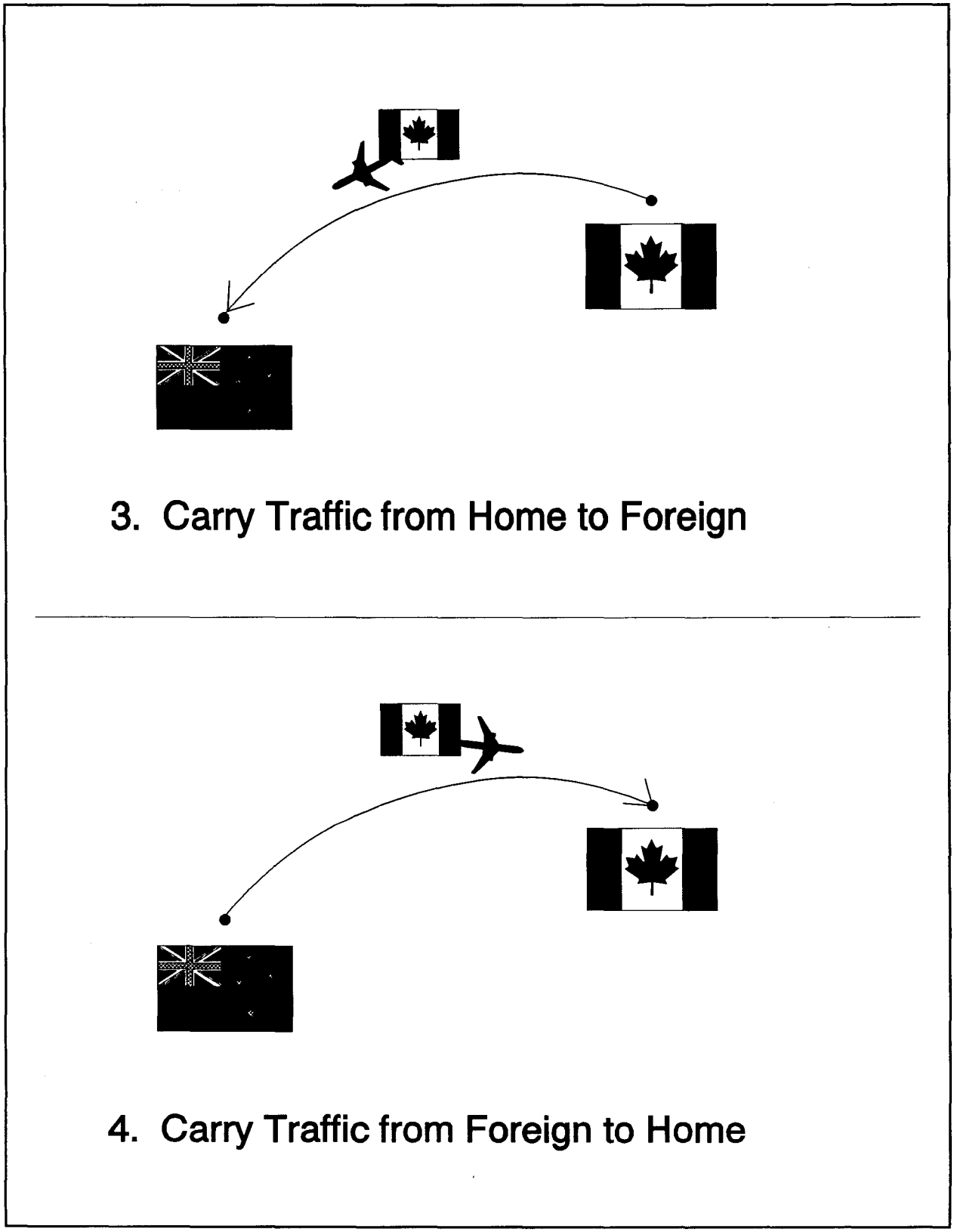


Figure 4: The Third and Fourth "Basic Traffic" Freedoms



3rd Freedom The right of an airline of the home country to carry traffic from the home country to a particular foreign country.

4th Freedom The right of an airline of the home country to carry traffic from a particular foreign country back to the home country.

Figure 5 illustrates the fifth, sixth and seventh freedoms.

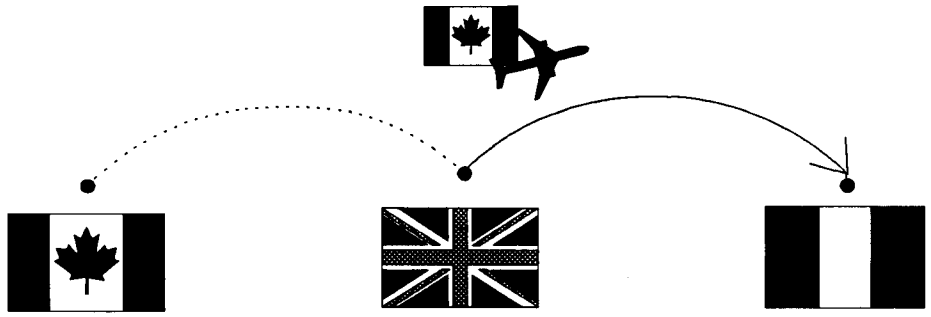
5th Freedom The right of an airline of the home country to pick up additional traffic in a first foreign country and carry it to a second foreign country.[64] Typically these flights are extensions of flights which start out as third or fourth freedom flights.[65]

6th Freedom The right of an airline of the home country to pick up traffic in a foreign country, carry it to the home country and then on to yet another foreign country.

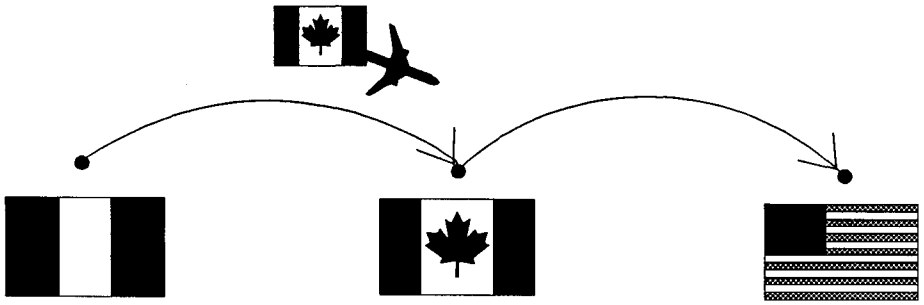
[64] For example, the right of Air Canada to pick up traffic in London and carry it to Bombay, but note that traffic originating in Canada, destined to Bombay but via a flight which makes a stop in London, is considered as 3rd freedom traffic. Fifth freedom traffic is that which originates in a foreign country, England in this example.

[65] Fifth freedom flights require negotiating the rights with *both* foreign countries.

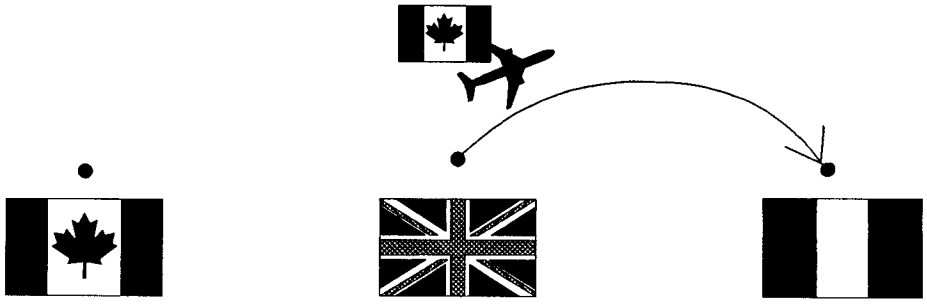
Figure 5: The Fifth, Sixth and Seventh Freedoms



5. Pick up Traffic in Foreign Country and Carry to Other Country



6. Carry from Foreign Country to Other Country via Home Country



7. Pure Foreign Flight: Foreign Country to Other Country

7th Freedom The right of an airline of the home country to pick up traffic in one foreign country and carry it to another foreign country, without the flight passing through the home country.[66] This is a pure foreign flight. It is not an extension of a third or fourth freedom flight.

Finally, **Figure 6** shows the two *cabotage* freedoms. Cabotage is the right to provide air services *within* a foreign nation.

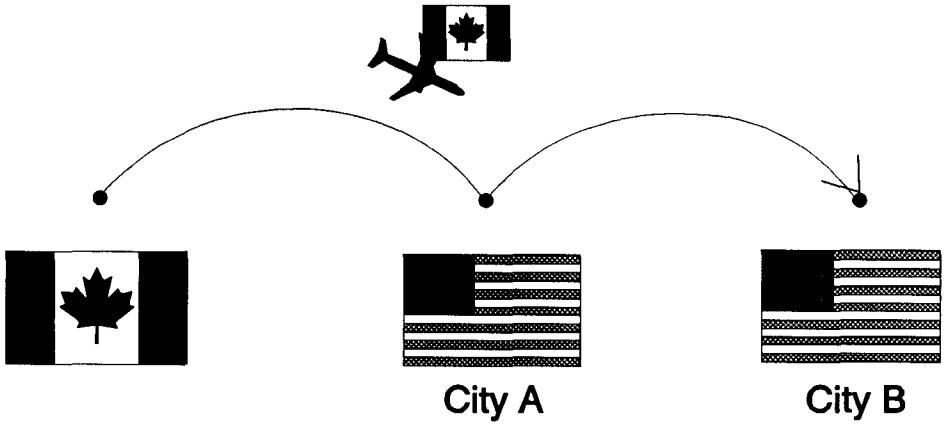
8th Freedom The right of an airline of the home country to pick up traffic in one city in a particular foreign country, and carry it to yet another city in the same foreign country as an extension of a third or fourth freedom flight.[67] This involves a purely domestic flight in that foreign country. The eighth freedom is also sometimes known as *tag-end cabotage*.

9th Freedom The right of an airline of the home country to pick up traffic in one city of a particular foreign nation and carry it to yet another city in the same foreign nation--without the requirement that the flight commence in the

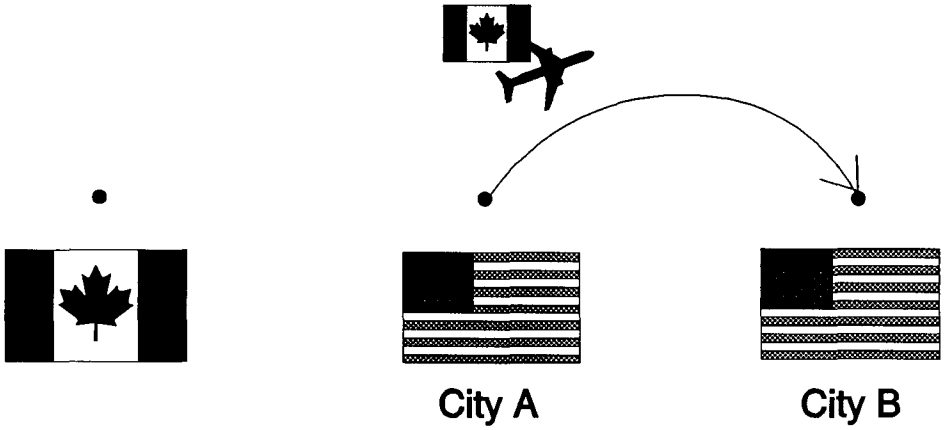
[66] For example, the right of U.S. carrier Pan Am to operate flights from London to Frankfurt, without any requirement that the flight originate or end in the U.S.

[67] For example, the right of Air Canada to fly from Toronto to Chicago and then on to Dallas, with the right to pick up new passengers in Chicago and carry them on to Dallas. (Note that Air Canada does not have such freedom at present.)

Figure 6: The Cabotage Freedoms



8. Cabotage: City A in Foreign Country to another city in that country. Flight must originate in Home Country.



9. Pure Cabotage: City A in Foreign Country to City B in same country. Flight need not originate in Home Country.

home country.[68]

The first two technical freedoms are provided by the IASTA agreement and generally are written into a bilateral air services agreement as well. Most air bilateral treaties between nations provide for the third or fourth freedoms. Sometimes, limited fifth freedom rights are granted. In practice, sixth freedom rights are not negotiated, but carriers carry sixth freedom traffic via their third and fourth freedom rights.[69] Seventh freedom rights are rare, and where they exist, are usually artifacts of the early years of air transport when many countries did not have their own carriers. Cabotage (8th and 9th freedom) rights are almost non-existent at present.

[68] For example, the right of Japan Air Lines to fly between Regina and St. John's. (Note that JAL does not have such freedom at present.)

[69] Thus, Canada has not negotiated with Japan and Chile to allow its carrier, Canadian Airlines International Limited, to carry traffic from Japan to Chile. CAI does so by using its fourth freedom rights from Japan to Canada and its third freedom rights to carry traffic from Canada to Chile. In markets with no direct services (such as Japan-Chile), such tacit sixth freedom operations are usually not contested. In markets (such as the U.K.-Italy) with direct services, sixth freedom operators (for example, KLM of the Netherlands) are allowed to carry a small portion of the traffic (10-20%) without contest, but beyond these "understood" market shares, their right to carry the traffic would probably be contested.

Appendix 4

Changing Political Attitudes Toward Air Transport

While air transport has been a highly regulated and highly protected industry, typically involving government ownership of carriers, the political relationship between governments and carriers has changed throughout much of the world. In the past, governments a) often owned the dominant national carrier; b) the carrier would have received equity capital (often with no requirement to pay dividends), loans from the government, or loan guarantees; c) protection from domestic competition by regulation of route entry and prices; and d) protection from international competition by accepting prices set by the airlines through the International Air Transport Association's tariff setting conferences, and by allowing carriers to enter into pooling arrangements with "competing" foreign carriers.[70] This has cost nations in terms of tax revenues devoted to carriers, government resources committed to pervasive regulation of carriers, higher costs of providing services due to lack of efficiency incentives in the absence of meaningful competition, higher prices paid by consumers, and reduced traffic and tourism due to the higher prices. Governments were willing to incur these costs in order to achieve goals such as establishing a broad network of airline routes within and to/from the nation, and in the case of developing nations, creating employment in skilled trades.

[70] Pooling arrangements essentially enforce a market sharing arrangement on carriers. The typical pool, for example, involves the two carriers on a route to compare traffic data each month, with one carrier paying the other carrier if it carried more than half the passengers in the market.

In the late 1970s, government attitudes toward air transport started to change. Two forces were acting to bring this about. First, ballooning government deficits have caused governments to reconsider priorities. Faced with taxpayer resistance to further taxation, high interest rates causing debt service costs to begin to use up the largest share of tax revenues, and items such as health care with higher priority and ever increasing costs, governments have had to put carriers at the end of the line for government assistance. With little prospect for additional government equity injection, carriers were faced with a choice between a) doing without equity and pursuing high risk debt-only financing, b) foregoing fleet replacement and renewal, or c) requesting privatization (in whole or in part) in order to obtain needed equity capital from the private sector. This has resulted in several full, partial or contemplated privatizations of air carriers. **Table 6** lists some of the privatizations which have occurred in the past few years. These have involved airlines of developed as well as developing nations; privatizations have occurred in North America, Asia, Europe, and South America; large carriers as well as smaller carriers.

The second force bringing about changed government attitudes toward air transport was the deregulation of the U.S. airline industry. This action has been highly publicized throughout the world, and the results are very visible. Europeans, for example, began to question why a flight from London to Rome cost more than a flight from London to New York (or Chicago or Los Angeles). Studies found that fares in Europe were up to four times higher per kilometre than those in the U.S. Even after controlling for factors such as the circuitous routings required by European air traffic control, European air fares were found to be much higher than those in

Table 6: Partial List of Airline Privatization

Airline Privatization
partial listings

Full Privatization:	Partial Privatization:	Contemplated Privatization:
British Airways	Aerolineas Argentinas	Aeroflot
Korean	Australian	Olympic
Air Canada	Qantas	TAP Portugal
Aeronaves de Mexico	Austrian	Air France
Air New Zealand	Alitalia	Lufthansa
Japan Air Lines	El Al	Iberia
	CSA (Czechoslovakia)	
	KLM	
	Lan Chile	
	Malev	
	Malaysian	
	Sabena	
	Singapore	
	Viasa	

the U.S.

In Canada the effect of U.S. deregulation was immediate as Canadians began diverting to U.S. airports (and destinations) in increasing numbers. This lead to the phasing in of Canadian regulatory reforms beginning in 1979.

Table 7 gives a list of nations which have deregulated or are about to deregulate their markets. In addition, there are a number of international aviation free trade areas, where carriers within the area can fly freely *between* nations. These are shown in **Table 8**. In the move to liberalize air transport economic regulation, consumer groups and communities (often represented by airport operators) have been strong lobbyists. They perceive that the industry

Table 7: List of Deregulated Airline Markets

List of Deregulated Airline Markets	
1977	U.S. Air Cargo deregulated
1978	U.S.
1979	Canada - phase I Chile
1983	New Zealand
1984	Canada - phase II
1986ff	United Kingdom
1989	Canada - phase III
1991	Australia
1992	South Africa
1993	European Community plus Austria, Norway, Sweden, Switzerland

has reached a level of maturity which no longer requires pervasive regulation. They argue that the time has come for competition to bring about lower costs and prices and the accompanying increase in air traffic. Consumers want the lower prices so they can enjoy air travel to family and tourist destinations. Businesses are aware that lower cost transportation (whether cargo or passenger) lowers the cost of doing business. Communities see the economic development benefits of increased air travel and how improved air transport access makes their communities more attractive locations for business and tourism.

The result has been a dramatic shift in government attitudes toward its airlines. Former regulators now increasingly think of air transport as just another industry in the economy, not

Table 8: Air Transport Free Trade Areas

Air Transport Open Skies Areas

1986	U.K. - Netherlands
1992	U.S. - Netherlands Venezuela, Columbia, Ecuador, Peru, Bolivia
1993	Internal European Community (12 nations) EC - Austria, Norway, Sweden, Switzerland Canada - U.S. ? Australia - New Zealand?
1994	Japan - Korea?

? denotes negotiations underway or proposed, but outcome has not been determined.

as a special industry requiring its own regulatory and government support infrastructure. A subtle but important sign of this changed attitude is the consideration of air transport in the General Agreements and Trade and Tariffs (GATT). In the current round of negotiations, one of the important items under consideration is the inclusion of services in the GATT mechanism. While air transport is a service, in the past it would have been automatically excluded. Now however, air transport is on the negotiating table. The burden of proof is on the industry as to why air transport should not be part of a final agreement. This shift of burden is an important signal that government thinking worldwide has evolved.

A consequence of this shift in political attitudes toward the industry, from one of protectionism to one of treating it as an industry like any other, is that governments are showing themselves increasingly willing to contemplate loosing the strict foreign ownership limitations on carriers. (**Appendix A** discusses foreign ownership limits on carriers.) They are willing to do so for three reasons. First, as already mentioned, governments are increasingly thinking of

air transport as any other industry, and thus there is no need to impose any special ownership regulations on it. Second, as carriers need to re-equip themselves in the 1990s, they will need access to additional equity capital. Domestic markets may not be sufficient to support all the equity needs of some carriers at tolerable returns to shareholders. Even the U.S., with the largest air market in the world, has an investigation underway on the financial needs of its carriers with a specific mandate to examine whether the U.S. foreign ownership limitation should be modified by new legislation.

Third, governments are realizing that the consolidation forces discussed in the previous section are pressing on the industry. Carriers who can knit cross-border ownership arrangements may be able to achieve a competitive advantage in the global marketplace. If only one or two carriers groups are able to achieve global mass, then other carriers will be forced to respond. Some governments are realizing that there are "first mover" advantages, and that a proactive (rather than a reactive) approach toward loosing foreign ownership constraints may serve the nation better in the long run. **Table 3** lists recent airline acquisitions of minority stakes in carriers of other countries. Many of these acquisitions have taken place within the past few months, and may be only the opening moves in the move to globalize the industry. That so many acquisitions have taken place or have been proposed is a clear indication that governments are no longer keeping the door closed to foreign investment in air carriers.

The main point of this section is that government attitudes toward the airline industry are much different today than they were even a few years ago. The political will to own and finance

air carriers has largely passed. Governments are more inclined to treat air transport as they do any other industry. This has resulted in deregulation and increasing willingness to allow foreigners to invest in their airlines.[71]

[71] It is also important to note that as airlines are deregulated, governments are placing increased reliance on application of Competition laws. In the European Community, for example, the Competition Directorate (DG4) plays as large a role, if not larger, than the Transportation Directorate (DG7) in the transition to a substantially deregulated market.

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Exhibit B

Curriculum Vitae

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Children: Two

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b) Graduate

1976: University of Wisconsin-Milwaukee, M.A. (Economics)
1978: University of Wisconsin-Madison, M.S. (Economics)
1981: University of Wisconsin-Madison, Ph.D. (Economics)

c) Graduate - Thesis Titles

Ph.D.: "Productivity Growth and Returns to Scale in the U.S. Trunk Airline Industry, 1972-1978"

d) Academic Awards and Honors

1974-75 Wisconsin-Milwaukee, University Fellowship.
1975-76 Wisconsin-Madison, University Fellowship.
Best Paper Award - Canadian Transportation Research Forum 1986
Teaching Excellence Award - University of British Columbia, Faculty of Commerce, 1987
A.T. Kearney Inc. Best Paper Award - Transportation Research Forum 1988
Honourable Mention: Best Paper Award - Canadian Transportation Research Forum, 1989
Arne Olsen Master Teacher Award - UBC Faculty of Commerce, 1990
Honorary societies: Phi Beta Kappa
Phi Kappa Phi
Phi Eta Sigma

PROFESSIONAL EMPLOYMENT RECORD

1988-	Associate Professor, Faculty of Commerce and Business Administration, University of British Columbia
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1981-83:	Senior Economist, Laurits R. Christensen Associates, Inc., Research Associate, Department of Economics, University of Wisconsin
1978-81:	Research Associate, Laurits R. Christensen Associates, Inc.,
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1973-75:	Department of Learning Skills, University of Wisconsin-Milwaukee

PROFESSIONAL MEMBERSHIPS

American Economics Association
Canadian Economics Association
Midwest Economics Association
Western Economics Association
Econometric Society
Canadian Transportation Research Forum
Transportation Research Forum
Transportation and Public Utilities Group, AEA
Association for Public Policy Analysis and Management

PROFESSIONAL PAPERS

A. Books and Monographs

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8. "Canada and the Changing Regime in International Air Transport," in M. Zacher (ed.) *Canadian Foreign Policy and International Economic Regimes,* UBC Press, 1992, pp. 189-214, [with M.E. Dresner].

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1. "Flexible Cost Functions for Multiproduct Firms," *Review of Economics and Statistics,* August, 1980, pp. 477-481, [with D.W. Caves and L.R. Christensen].

2. "Productivity Performance of U.S. Trunk and Local Service Airlines in the Era of Deregulation," *Economic Inquiry*, July, 1983, Vol. 21, No. 3, pp. 312-324, [with D.W. Caves and L.R. Christensen].

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26. "Airline Deregulation in Canada and its Economic Effects," *Transportation Journal*, Vol. 30(4), Summer 1991, pp.4-22 [with T.H. Oum and W.T. Stanbury].

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28. "Concepts, Methods and Purposes of Productivity Measurement in Transportation," *Transportation Research-A*, 1992, Vol.26A No.6, pp.493-505 [with T.H. Oum and W.G. Waters].

D. Reports

1. "The Structure of the Canadian Airline System and the Expected Impact of the Movement Toward Deregulation," Three volume report submitted to Treasury Board of Canada, March 1985, [with T.H. Oum and D.W. Gillen].[1]

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[1] Revised version published as a book by Centre for Transportation Studies, UBC.

2. "Predatory Pricing in a Deregulated Canadian Airline Industry," confidential report submitted to Bureau of Competition Policy, Consumer and Corporate Affairs Canada, February, 1986, [with D.W. Gillen and T.H. Oum].

3. "Pricing Principles for Canadian Airports," a report prepared for Airports Task Force, Transport Canada, July, 1986, [with A. Manoucheri, D.W. Gillen and T.H. Oum].

4. "Pricing Policies for Canadian Airports with an Emphasis on Airfield Operations," a report prepared for Airports Task Force, Transport Canada, September, 1986, [with D.W. Gillen and T.H. Oum].

5. "Grain Costing Indices," confidential report prepared for Trade and Transportation Group for submission in regulatory hearings, Ottawa, November 1986.

6. "The Emergence of Airline Families: Issues of Control," report prepared for the Canadian Airline Pilots Association, February, 1987.

7. "The Impact of Bill C-18 on Employment in the Canadian Railway Industry," published as a Technical Report, Transport Canada, February, 1987, [with Frank W. Trotter].

8. "Development of Vancouver International Airport: Environment and Factors Affecting Success," report prepared for Asia Pacific Committee, and B.C. Department of Regional and Industrial Expansion, September, 1987.

9. "Logistical Marketing and Vancouver International Airport: The Need for a Strategic Approach," report prepared for Asia Pacific Committee and B.C. Department of Regional and Industrial Expansion, October, 1987.

10. "A Study of Peak Period Pricing with an Application to Toronto International Airport," report submitted to Airports Authority Group and Cost Recovery and Evaluation, Transport Canada, May 1988, [with D.W. Gillen and T.H. Oum].

11. "Alberta's Air Transportation System: Strategic Forces and Structural Alternatives," report submitted to Alberta Economic Development, April 1988, [with D.G. Dale, D.L. Frank, S.J. Ling and T.H. Oum].

12. "Review of Research Report on URCS Regression Equations," in U.S. Interstate Commerce Commission, *Uniform Railroad Costing System: Research Report*, July 1988, Washington, DC [with W.G. Waters II].

13. "Critical Review of Economic Analysis of Capacity Enhancement Strategies for Vancouver International Airport," review submitted to Vancouver International Airport's Airside Capacity Enhancement Management Team, November 1989.

14. "Monopoly versus Duopoly in Canadian Air Transport," confidential report submitted to Transport Canada, January 1991 [with T.H. Oum].

15. "Comments on Transport Canada's Proposed New Cost Recovery Policy: Phase II Discussion Paper," March 1991 [with T.D. Heaver, G.C. Chow, T.H. Oum and W.G. Waters II].

16. "Report of the Ministerial Task Force on International Airline Policy," July 1992. [I was Director of Research for the Task Force].

E. Testimony Provided

1. "Comments on Freedom to Move," *Minutes of Proceedings and Evidence of the House of Commons Standing Committee on Transport*, Issue #37, 19 November 1985, [with T.H. Oum].

2. "Analysis of the Changes in Airline Regulation Proposed in Bill C-18," Faculty of Commerce and Business Administration Working Paper, University of British Columbia, Vancouver, presented to House of Commons Standing Committee on Transport on behalf of the Consumers' Association of Canada, March, 1987, testimony appears in *Minutes of Proceedings and Evidence of the House of Commons Standing Committee on Transport*, Issue #17, 12 March 1987, [with W.T. Stanbury].

3. "Amendments Recommended to Bills C-18 and C-19," *Minutes of Proceedings and Evidence of the House of Commons Standing Committee on Transport*, Issue #19, 16 March 1987, [with G.C. Chow, T.D. Heaver, T.H. Oum and W.G. Waters, II].

4. "Monitoring the Effects of the National Transportation Act, 1987, and Associated Legislation," a report to Transport Canada, 29 May 1987, [with G.C. Chow, T.D. Heaver, T.H. Oum and W.G. Waters, II].

5. "Railroad Productivity Measurement," verified statement prepared for the Association of American Railroads for submission to the U.S. Interstate Commerce Commission, Ex Parte 290 (Sub. 4), 16 December 1988, [with W.E. Diewert and W.G. Waters II]. Reply verified statement submitted 17 January 1989.

6. "Analysis of the Effect of the Gemini Computer Reservation System Merger on Competition in the Canadian Airline Industry," affidavit prepared for Consumer and Corporate Affairs Canada for submission to Canadian Competition Tribunal, 1 March 1989.

7. "Comments" on the Uniform Railroad Costing System," verified statement prepared for the Association of American Railroads for submission to the U.S. Interstate Commerce Commission, Ex Parte 431 (Sub 1), 20 March 1989, Washington, DC [with W.G. Waters II].

8. "Comments," submitted to Canadian National Transportation Agency hearings on VIA Rail Pricing Policies," 30 March 1989 [with T.D. Heaver, T.H. Oum and W.G. Waters II].

9. "Physical Versus Deflated Expenditure Approaches Toward Rail Productivity Measurement," verified statement prepared for the Association of American Railroads for submission to the U.S. Interstate Commerce Commission, Ex Parte 290 (Sub. 7), 26 May 1989 [with W.G. Waters II]. Reply Verified Statement submitted 26 June 1989.

10. "Verified Statement," submitted to U.S. Interstate Commerce Commission on behalf of the Association of American Railroads, Ex Parte 290(Sub. 4), 14 August 1989 [with W.G. Waters II]. Reply verified statement submitted 29 August 1989.

11. "Strategic Options for Wardair," testimony prepared for the Air Crew Association of Canada (Wardair Pilots) for submission to labour arbitration hearing, November 1989. Reply testimony submitted January 1990.

12. "Statement to Commission of Inquiry on Canadian University Education," 6 November 1990.

13. "Submission to the Royal Commission on National Passenger Transportation on behalf of the Director of Investigation and Research: Competition Act," 15 November 1990. Submission jointly drafted with staff of the Bureau of Competition Policy and Professor George Wilson (Indiana).

14. "Submission of the Centre for Transportation Studies, UBC, to the Royal Commission on Passenger Transportation," 6 December 1990, Vancouver [with T.D. Heaver, G.C. Chow, T.H. Oum and W.G. Waters II].

15. "Verified Statement" submitted to U.S. Interstate Commerce Commission on behalf of the Association of American Railroads, Ex Parte 290 (Sub. No. 7), 5 April 1991. Reply verified statement submitted 6 May 1991.

16. "Verified Statement" submitted to U.S. Interstate Commerce Commission on behalf of the Association of American Railroads, Ex Parte 431 (Sub.No.2), 14 August, 1991.

F. Papers in Conference Proceedings

1. "An International Comparison of Airlines," *Proceedings*, Canadian Transportation Research Forum, University of Saskatchewan Printing Services, May, 1984, pp. 653-676.

2. "Measuring and Identifying the Causes of the Productivity Performance of the Canadian Class I Railroads," *Proceedings*, Canadian Transportation Research Forum, University of Saskatchewan Printing Services, May, 1985, pp. 743-765, [with K.D. Freeman, T.H. Oum and W.G. Waters].

3. "Productivity Adjustment to Price Levels in Regulated Rail Markets: Recent Developments in Canada and the United States," *Proceedings*, Canadian Transportation Research Forum, University of Saskatchewan Printing Services, June, 1990, pp. 339-350 [with W.G. Waters].

4. Productivity Trends in Canadian and U.S. Railroads," forthcoming *Proceedings*, Canadian Transportation Research Forum, University of Saskatchewan Printing Services, June, 1990, pp. 436-450 [with W.G. Waters].

5. "Costing the Movement of Hazardous Materials by Rail," *Hazmat Transport '91*, a National Conference on Management and Policy Issues in the Transportation of Hazardous Materials and Wastes, Northwestern University, Evanston, IL, June 17-19, 1991 [with W.G. Waters II].

6. "U.S. Railroad Productivity After Staggers," *Proceedings*, Transportation Research Forum, New Orleans, October 1991, pp. 521-531, published by TRF, Arlington, VA [with W.G. Waters].

G. Papers Under Review

1. "ICAO and the Economic Regulation of International Air Transport," Working Paper 89-TRA-004, Faculty of Commerce and Business Administration, University of British Columbia, June 1989 [with M.E. Dresner].

2. "Productivity Measurement and Its Application to the Rail Industry," Working Paper 90-TRA-011, Faculty of Commerce and Business Administration, University of British Columbia, Vancouver, September 1990, [with W.G. Waters II].

3. "Price Discrimination and Economics of Scope: Are Current Airline Practices Socially Optimal?" Working Paper 90-TRA-008, Faculty of Commerce and Business Administration, University of British Columbia, Vancouver, May 1990, [with I. Savage].

H. Unpublished Working Papers

1. "A Reexamination of Scale Economies for U.S. Trunk Airlines," SSRI Discussion Paper #8026, Dept. of Economics, University of Wisconsin-Madison, December, 1980, [with D.W. Caves and L.R. Christensen].

2. "Productivity Effects of Mergers in the U.S. Rail Industry: Economies of Density versus Economies of Firm Size," presented at Econometric Society Meetings, San Francisco, December 1983, [with D. W. Caves, L. R. Christensen and R. J. Windle].

3. "Cost Structure and Economic Performance of the Canadian Class I Railroads," University of British Columbia, Faculty of Commerce Working Paper 1087, February, 1985, [with K.D. Freeman, T.H. Oum and W.G. Waters II].

4. "Productivity in the U.S. Trucking Industry: The Early Deregulation Experience," Working Paper, June, 1987, [with G. Chow].

5. "Productivity Measurement of the Pulp and Paper Industry, with an Adjustment for Capacity Utilization: A Comparison of Canada, Sweden, and the U.S." Working Paper, March 1990, [with T.H. Oum and Y. Zhang].

I. Current Working Papers

1. "Total and Variable Factor Productivities: Relationships to Cost Function Estimation," Working Paper, May, 1987.

2. "Cost Function Estimation, Economists Versus the Practitioners: An Exploratory Analysis," Working Paper, July, 1987, [with T.H. Oum and W.G. Waters II].

3. "Measurement of the Social Marginal Costs at a Congested Airport: An Application to Toronto International Airport," Working Paper, Faculty of Commerce and Business Administration, University of British Columbia, December, 1987 [with D.W. Gillen and T.H. Oum].

4. "A Comparison of the Productivity Performance of the Canadian, U.S. and Swedish Pulp and Paper Industries," Working Paper, Faculty of Commerce and Business Administration, University of British Columbia, March, 1989 [with T.H. Oum].

5. "Pricing to Reflect Airport Runway Congestion: A Simulation-Based Methodology," Working Paper, Faculty of Commerce and Business Administration, University of British Columbia, May, 1989 [with T.H. Oum and D. Uyeno].

6. "The Characteristics of Modern Post-Deregulation Air Transport," Working Paper, Faculty of Commerce and Business Administration, University of British Columbia, Vancouver, February 1991.

7. "Productivity Measurement, Decomposition, and Efficiency Comparison of the Pulp and Paper Industry: Canada, the U.S. and Sweden, March 1991 [with T.H. Oum and Y. Zhang].

8. "European Air Transport in the 1990s: Deregulating the Internal Market and Changing Relationships with the Rest of the World," Faculty of Commerce and Business Administration, University of British Columbia, Vancouver, June 1991.

9. "The Cost Competitiveness of Canadian Air Carriers," Faculty of Commerce and Business Administration, University of British Columbia, Vancouver, June 1991.

10. "Measuring Productivity Sharing in Regulated Industries," Working Paper, Faculty of Commerce and Business Administration, The University of British Columbia, Vancouver, June 1991.

11. "Global Consolidation Forces in the World Airline Industry," February 1992.

12. "Productivity in the North American Rail Industry," March 1992 [with W.G. Waters II].

J. Other Publications

1. "Airline Productivity Under Deregulation," *Regulation*, Nov./Dec. 1982, pp. 25-28, [with D.W. Caves and L.R. Christensen].

2. "The Canada-U.S. Air Transport Bilateral: Will It Be Freed?" *Air Transport Management*, Vol. 1(1) March (April) 1988, pp.9-12 [with M.E. Dresner and C. Hadrovic].

3. "Survival Under Freer Skies," *Air Transport Management*, Vol. 1(2), May/June, 1988, pp. 10-12 [with D.W. Gillen and T.H. Oum].

4. "Selling Air Canada: A No-Lose Situation," *Globe and Mail*, 16 May 1988, p. A7 [with W.T. Stanbury].

5. "Hidden Agendas are Distorting the Safety Issue," *Air Transport Management*, Vol. 1(3), September/October 1988, p.11.

6. "Airport Pricing and Capacity Expansion: Economic Evaluation of Alternatives," *Transport Review*, published by Transport Canada, forthcoming, 1990 [with D.W. Gillen and T.H. Oum].

7. "Peak Period Pricing: An Idea Whose Time Has Come," *Air Transport Management*, Vol. 2(1), January/February 1990, pp.16-17.

8. "New Runways and the Environment," *Air Transport Management*, Vol. 3(1), March/April 1990, p.19.

9. "Prom Night: Choosing Partners for the Global Airline Dance," *Air Transport Management*, Vol. 3(2), May/June 1990, pp. 13-19.

10. "On the Urge to Merge," letter to editor, *Policy Options*, Vol. II(5), June 1990.

K. Book Reviews

1. Sigafoos, R.A. (1984), *Absolutely, Positively Overnight: The Story of Federal Express*, review appeared in *Logistics and Transportation Review,* Vol. 21, (2), June 1985, pp. 185-187

2. Nance, J.J. (1984), *Splash of Colors*, review appeared in *Logistics and Transportation Review,* Vol. 21 (2), June 1985, pp. 185.

3. Morrison, S. and C. Winston (1986), *The Economic Effects of Airline Deregulation*, review appeared in *Logistics and Transportation Review,* Vol. 23 (1), March 1987, pp. 135-136.

4. Bailey, E.E., D.R. Graham and D.P. Kaplan (1985), *Deregulating the Airlines*, review appeared in *Logistics and Transportation Review,* Vol. 23 (1), March 1987, pp. 135.

5. Shaw, S. (1988), *Airline Marketing and Management*, review appeared in *Logistics and Transportation Review*, Vol. 25 (2), June 1989, pp. 183-185.

6. Small, K.A., C. Winston and C. Evans (1989), *Road Work: A New Highway Pricing and Investment Policy*, review appeared in *Logistics and Transportation Review*, Vol. 25 (4), December 1989, pp. 375-376.

7. Chesen, J.R. (1989), *Canadian-American Air Service Negotiations: Ending the Gridlock*, review appeared in *Logistics and Transportation Review*, Vol. 26 (3), September 1990, forthcoming.

8. Wells, A.T. and B.D Chadbourn (1987), *General Aviation Marketing*, review forthcoming in *Logistics and Transportation Review*.

L. Computer Program Papers and Reference Manuals

1. "Time Series Processor at the University of Wisconsin (TSP-WISC)," Computer manual available from Madison Academic Computing Center, University of Wisconsin-Madison, October 1977, June 1978, [with D.W. Caves].

2. "Econometric Estimation Using the Time Series Processor at the University Wisconsin (TSP-WISC)," SSRI Discussion Paper #7711, Department of Economics, Madison, September 1977, [with D.W. Caves].

3. "Time Series Processor at the University of Wisconsin, Programmer's Reference Manual," mimeo., Department of Economics, University of Wisconsin-Madison, July 1979, [with C. Franklin].

4. *Econometric Programming Language: User's Manual*, Computer manual available from Christensen Associates, 810 University Bay Drive, Madison, WI 53705, November 1980, [with D.W. Caves].

5. Econometric Programming Language: Reference Manual, Computer manual available from Christensen Associates, 810 University Bay Drive, Madison, WI 53705, December 1981.

6. *Econometric Programming Language: Primer*, Computer manual available from Christensen Associates, 810 University Bay Drive, Madison, WI 53705, March 1981.

7. *Econometric Programming Language: Programmer's Reference Manual*, Computer manual available from Christensen Associates, 810 University Bay Drive, Madison, WI 53705, August 1981, [with S.A. Novogoratz].

PAPERS PRESENTED AT CONFERENCES

1. "Total Factor Productivity of U.S. Trunk Air Carriers, 1972-1977," presented at NSF sponsored conference on Productivity Measurement in Regulated Industries, May, 1980.

2. "A Reexamination of Scale Economies for U.S. Trunk Airlines," presented at Econometric Society, Denver, September, 1980.

3. "The Influence of Ownership Form and Regulation on Economic Performance: Canadian and U.S. Railroads in the Postwar Period," presented at IRPP conference on Managing Public Enterprises, Vancouver, August, 1981.

4. "Economies of Density and the Effects of Network: A Revaluation of Scale Economies for U.S. Trunk Airlines," presented at the Econometric Society, New York, December, 1982.

5. "Productivity Effects of Mergers in the U.S. Rail Industry: Economies of Density versus Economies of Firm Size," presented at the Econometric Society, San Francisco, December 1983.

6. "An International Comparison of Airlines," presented at Canadian Transportation Research Forum, Jasper, Alberta, May 1984.

7. "Identifying and Measuring the Impact of Government Ownership and Regulation on Airline Performance," Research Conference on Government Enterprise, Toronto, November, 1984.

8. "Measuring and Identifying the Causes of the Productivity Performance of the Canadian Class I Railroads," presented at Canadian Transportation Research Forum, Toronto, May, 1985.

9. "Hedonic versus General Specifications of the Translog Cost Function," presented at Canadian Economic Association Meetings, University of Montreal, May, 1985.

10. "Hedonic versus General Specifications of the Translog Cost Function," presented at Econometric Society 5th World Congress, Massachusetts Institute of Technology, Boston, August 1985.

11. "An Assessment of the Efficiency Effects of U.S. Airline Deregulation Via an International Comparison," presented at NSF sponsored conference on Regulation of the Crossroads, Airlie, Virginia, September 12-14.

12. "Productivity Differences Between U.S., Canadian and Non-North American Airlines: The Effect of Deregulation," World Conference on Transport Research, Vancouver, May, 1986.

13. "Entry Barriers and Anti-competitive Behavior in a Deregulated Canadian Airline Market," Canadian Transportation Research Forum, Vancouver, May, 1986.

14. "Airline Seat Management," presented at Canadian Transportation Research Forum, Vancouver, May, 1986.

15. "Impact of Deregulation on Railway Labour Employment, Productivity and Compensation," presented at Canadian Transportation Research Forum, St. John's, Newfoundland, June, 1987.

16. "Airline Hub and Spoke Systems," presented at Canadian Transportation Research Forum, St. John's, Newfoundland, June, 1987.

17. "Airport Pricing Policies: An Application to Canadian Airports," presented at Canadian Transportation Research Forum, St. John's, Newfoundland, June, 1987.

18. "The Changing Role of IATA: Prospects for the Future," presented at workshop on "Frontiers in Transportation Research," Washington State University, June, 1987.

19. "Total and Variable Factor Productivities: Relationships to Cost Function Estimation," presented at Canadian Economics Association meetings, Hamilton, Ontario, June, 1987.

20. "Ramsey Pricing in the Presence of Externalities," presented at Canadian Economics Association meetings, Hamilton, Ontario, June, 1987.

21. "Cost Function Estimation, Economists Versus the Practitioners: An Exploratory Analysis," presented at Western Economics Association Meetings, Vancouver, B.C., July, 1987.

22. "Productivity in the U.S. Trucking Industry: The Early Deregulation Experience," presented at Western Economics Association meetings, Vancouver, B.C., July, 1987.

23. "Airline Cost Structure: A Multiproduct Approach for Canadian Airlines," presented at Western Economic Association meetings, Vancouver, B.C., July, 1987.

24. "Economic Performance of the Canadian Pulp and Paper Industry: 1963-1982," presented at United Nations FAO/ECE Working Party on Forest Economics and Statistics, Palais des Nations, Geneva, February, 1988.

25. "Timing Models for Services Marketing," presented at ORSA/TIMS Marketing Science Conference, Seattle, March 1988.

26. "The Canada-U.S. Air Transport Bilateral: Will It Be Freed?" presented at Canadian Transportation Research Forum, Minaki, Ontario, May, 1988.

27. "Duopoly in Canada's Airline Industry: Consequences and Policy Issues," presented at Tenth Annual Conference of the Association for Public Policy Analysis and Management, Seattle, 28 October 1988.

28. "Airport Pricing Principles," presented at Transportation Research Forum, Toronto, 11 November 1988.

29. "Comparing the Productivity Performance of Canada, U.S. and Sweden in the Pulp and Paper Industry," presented at Canadian Pulp and Paper Association 43rd annual meetings, Human Resources Section, Vancouver, 19 September 1989.

30. "Deregulation and Airline Employment: Myth versus Fact," response for book reviewer comments, Transportation Research Forum, Williamsburg, Va., 12 October 1989.

31. "Airline Hub and Spoke Systems," presented at Transportation Research Forum, Williamsburg, Va., 13 October 1989.

32. "Modelling and Testing the Effect of Market Structure on Price: The Case of International Air Transport," presented at American Economic Association meetings, Atlanta, Ga., 29 December 1989.

33. "Canada and the Changing Regime in International Air Transport," presented at Conference on Canada and International Economic Regimes: A Critical Appraisal, University of British Columbia Institute for International Relations, Vancouver, B.C., 31 May 1990.

34. "Price Discrimination and Economics of Scope: Are Current Airline Practices Socially Optimal?" presented at Canadian Economics Association, Victoria, B.C., 3 June 1990.

35. "Canadian Airline Deregulation," presented at Canadian Transportation Research Forum, Saskatoon, June 1990.

36. "Productivity Adjustment to Price Levels in Regulated Rail Markets: Recent Developments in Canada and the United States," presented at Canadian Transportation Research Forum, Saskatoon, June 1990.

37. "Globalization of the Airline Industry and Implications for Canada," presented at Canadian Transportation Research Forum, Saskatoon, June 1990.

38. "Canadian Airline Deregulation and Its Economic Effects," presented at Transportation Research Forum, Long Beach, October 1990.

39. "Technology, Marketing and Policy: The Advent of the Globalized Airline Industry," presented at B.C. Aviation/Canadian Transportation Research Forum annual B.C. Aviation Seminar, Vancouver, 1 May 1992.

40. "Airline Globalization: The Strategic Games of the 1990s" presented at Alliance of Canadian Travel Associations, Winnipeg, 10 May.

41. "The Advent of the Globalized Airline Industry," presented at Canadian Airlines International, European Studies Program, Vancouver, 24 May 1991.

42. "The Logistics of Scrap and Waste Disposal," presented at Canadian Transportation Research Forum, Quebec City, 30 May 1991.

43. "From the People Who Brought You Airline Deregulation, Now Comes Airline Globalization," presented to Association of Professional Economists, Vancouver, 11 June 1991.

44. "Globalization of the Airline Industry," presented at Pacific Rim Council on Urban Development, Vancouver, 7 October 1991.

45. "The Global Context: The Advent of the Globalized Airline Industry," keynote speech, presented at British Columbia Airports workshop, Prince Rupert, B.C., 15 November 1991.

46. "Monopoly versus Duopoly in Canadian Air Transport," presented at Transportation Research Forum, New Orleans, 1 November 1991.

47. "U.S. Railroad Productivity After Staggers," presented at Transportation Research Forum, New Orleans, 1 November 1991 [with W.G. Waters, who made the presentation].

48. "Report of the Ministerial Task Force on International Air Policy," presented to Vancouver International Airport community, 6 March 1992.

49. "Globalization of the Airline Industry," presented at the 1992 North American Avionics Maintenance Conference, Vancouver, 24 March 1992.

50. "Restructuring the Canadian Airline Industry: Historical and Global Perspectives," presented at the annual meeting, Western Transportation Advisory Council, Winnipeg, 26 March 1992.

51. "Changes to Air Transport in the 1990s: Implications for Non-Metropolitan Airports," presented at "Westcoast Vision," 1992 annual conference of the Economic Development Association of B.C., Campbell River, B.C., 6 April 1992.

52. WESTAC

53. "Canada's Airline Industry: Merging, Seeking Foreign Investment, or Going it Alone: Overview," presented at B.C. Aviation Seminar, Vancouver, 14 May 1992.

54. "Global Consolidation Forces in the World Airline Industry," presented at World Conference on Transportation Research, Lyon France, 1 July 1992.

OTHER CONFERENCES

1. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, March 1984. Conference organizer, session chair.

2. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, April 1985. Conference organizer, session chair.

3. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, April 1986. Conference organizer, session chair.

4. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, April 1987. Conference organizer, session chair.

5. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, May 1988. Conference organizer, session chair, rapporteur.

6. Western Economics Association, July 1987, Vancouver. Discussant at 3 sessions, chair of 1 session.

7. Western Economics Association, July 1988, Los Angeles. Discussant.

8. Canadian Network on Productivity, March 31 - April 1, 1989. Co-Director.

9. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, April 1989. Conference organizer, session chair.

10. Improving Grain Logistics: Barriers to Change, conference organized by UBC Centre for Transportation Studies, Vancouver, April 17-18, 1989. Participant.

11. International Northwest Aviation Conference, August 1989, Fairmont Hot Springs, B.C. session chair, rapporteur.

12. Annual B.C. Aviation Seminar, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, 25 April 1990. Conference organizer, session chair.

13. Canadian Economics Association, Victoria, B.C., 1-3 June 1990. Session chair, paper discussant.

14. Alberta Symposium on Future Intercity Passenger Transportation, University of Calgary, 28 June 1990. Panellist.

15. Vancouver International Airport Marketing Development, Vancouver 15 February 1991. Panellist.

16. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, March 1991, Conference organizer, session chair.

17. Annual B.C. Aviation Conference, Vancouver, jointly sponsored by UBC Centre for Transportation Studies, Canadian Transportation Research Forum, and B.C. Aviation Council, March 1992, Conference organizer, session chair.

18. World Conference on Transportation Research, Lyon France, 29 June - 3 July 1992. Program committee, session organizer.

COURSES TAUGHT

Business Statistics
Seminar in Transportation Economics

Air Transportation
Urban Transportation
Business Logistics
International Business Logistics
Project Evaluation (Social Cost Benefit Analysis, and Environmental Impact Statements)
Transportation in Economic Development
Transportation Policy
Introduction to Transportation

SUPERVISION OF STUDENT THESES

Ph.D Committees - Chairman
Martin Dresner - 1989

Ph.D Committees - Committee Member
Jeff McGill - 1989
Mike Li - 1992e

M.Sc. Committees - Chairman
Julie Laviolette - 1987
Kevin Caskey - 1987

M.Sc. Committees - Committee Member
Todd Kurtin - 1984
Chris Christopherson - 1984
Marie Trepannier - 1985
Eva Busza (MA) - 1987
Guy Maclaren (MPlan) - 1991

MBA Paper Supervisor
Greg Saretsky - 1984
Patricia Dusting - 1985
Donna Chin - 1985
David Campbell - 1985
Roger McLaughin - 1985
Peter Kutney - 1986
Gary Jung - 1986
Ming Ho - 1986
Jim Blatchford - 1986
Jeannette Godin - 1986
Nancy Keen - 1987
Susan Sinott - 1987
Terry David - 1988
William Chan - 1988
Edward Chan - 1988
Linda Moore - 1989
Roger Purdy - 1989
John Korenic - 1990
Peter Leighton - 1990
Debra Stephan - 1990
Cheryl Trepanier - 1990
Paul Ouimet - 1991
Mike Bendarz - 1991
Sean Strugnell - 1992
Brett Patterson - 1992
Ted Gadsden - 1992
Bob Beck - 1992
Tumo Adachi - 1993e

EXTERNAL RESEARCH GRANTS

NSERC (1986-1989) ($13,000 per year)
SSHRC (1984) ($20,000)
SSHRC (1986-1989) ($20,000 per year)
SSHRC (1990-1993) ($14,000 per year)
SSHRC (1992-95) ($50,000 per year)
Employment Canada (1986) ($125,000)
Employment Canada (1987) ($98,000)
Transport Canada (1983) ($ 6,000)
Transport Canada (1983) ($20,000)
Transport Canada (1984) ($20,000)
Transport Canada (1985) ($54,000)
Transport Canada (1990) ($19,000)
Transport Canada (1991) ($29,600)
Transport Canada (1991) ($21,000)

Contract research has been conducted for:
Air Crew Association of Canada (1989, 1990)
Alberta Economic Development (1988)
Association of American Railroads (1988, 1989, 1990, 1991, 1992)
B.C. Ministry of Regional Economic Development (1987)
Canadian Airline Pilots Association (1987)

Consumer and Corporate Affairs Canada (1986, 1987, 1988, 1989, 1990, 1991, 1992)
(Bureau of Competition Policy)
Consumers Association of Canada (1987)
Horizon Pacific Management (1988)
Ministerial Task Force on International Air Policy (1990, 1991)
Pemberton Houston Willoughby (1987, 1988)
Stanley Associates Engineering (1986)
Trade and Transportation Group (1987)
Transport Canada (1986, 1987, 1988, 1990, 1991)
U.S. Civil Aeronautics Board (1980)
Vancouver International Airport (1989, 1990)
Western Diversification Fund (1988)

UNIVERSITY SERVICE

Faculty of Commerce:

Appointment Promotion and Tenure Committee (1988/89)
Computing Resources Committee (1984/85-chair, 1985/86, 1986/87, 1987/88, 1988/89, 1989/90)
Curriculum Committee (1989/90, 1990/91-chair, 1991/92-chair, 1992/93-chair)
Faculty Retreat Committee (1990-chair)
Merit Committee (1988,1991)
Teaching Development Committee (1986/87, 1987/88, 1989/90, 1991/92-chair, 1992/93-chair)

Undergraduate Program Review Committee (1991/92)
Instructor in Summer Program in International Business in France (1991, 1992)
Director, Summer Program in International Business in France (1992)
Director of Teaching and Curriculum Development (1992/93)

University:

Member, President's Task Force on Networking (1985/86)
External Review of Computing Centre (1988)
Vice President's Committee on US Long Distance Services (1991)
Senate Curriculum Committee (1990/91, 1991/92, 1992/93)
University Representative, UBC Child Care Society (1988/89, 1989/90, 1990/91)
Treasurer, UBC Childcare Society (1988/89, 1989/90)
Vice President, UBC Childcare Society (1990/91)
Internal Ph.D exam reviewer: G. Papatheodorou (1989)
M. Rushton (1990)

OTHER SERVICE

- Director of Research, Ministerial Task Force on (Canadian) International Air Policy (1990, 1991)
- Co-Director, Canadian Network on Productivity (1988/89)
- Member, Minister of Transport Advisory Committee on Airport Transfers (1988-91)
- Member, user funding committee, Federal Environmental Assessment Review Office (1990)
- Transportation subcommittee, Vancouver Planning Commission (1987)
- Productivity Committee, Association of American Railroads
- Vancouver Board of Trade: Airline Pre-Clearance Task Force (1987)
- Associate Editor, *Logistics and Transportation Review*, (1987-present)
- Advisory Editor, *Quarterly Journal of Economics and Business* (1991)

- Referee for the following academic journals:
  - American Economic Review
  - Bell/Rand Journal of Economics
  - Canadian Journal of Economics
  - Canadian Public Policy
  - Economic Development and Cultural Change
  - International Journal of Transportation Economics
  - Journal of Econometrics
  - Journal of Economic Education
  - Journal of Political Economy
  - Journal of Public Economics
  - Journal of the Transportation Research Forum
  - Logistics and Transportation Review
  - Managerial and Decision Economics
  - Papers of the Regional Science Association
  - Quarterly Journal of Business and Economics
  - Quarterly Review of Economics and Business
  - Social Science and Humanities Research Council of Canada
  - Transport Reviews
  - Transportation Research
  - Water Resources Research
- Reviewer for following publishers:
  - MIT Press
  - North Holland Publishers
  - Transport Research Centre, Australia
- Reviewer for the following funding agencies:
  - Earhart Foundation
  - National Research Council/Transportation Research Board
  - Natural Sciences and Engineering Research Council of Canada
  - Social Science and Humanities Research Council of Canada
- Referee for World Conference on Transportation Research
- Reviewer of tenure and promotion cases at other universities
- Expert Testimony submitted to:
  - Canadian Competition Tribunal
  - Canadian House of Commons Standing Committee on Transport
  - Canadian Labour Relations Board
  - Canadian National Transportation Agency
  - Commission of Inquiry on Canadian University Education
  - Private Labour Arbitration Hearings
  - Royal Commission on Passenger Transportation
  - U.S. Interstate Commerce Commission
- Numerous interviews to radio, television and print journalists
  (long term average of 40 per year)
- Invited Presentations made to
  - Association of Professional Economists
  - Alliance of Canadian Travel Agents
  - BC Airports Workshop
  - BC Aviation Council
  - BC Law Association
  - Canadian Airlines International/Lufthansa
  - Canadian Business Travel Association
  - Chartered Accountants
  - Financial Executives Institute
  - Washington State Air Transport Committee
  - Vancouver International Airport

North American Avionics Maintenance Conference
Economic Development Association of B.C.
Western Transportation Advisory Council
Stetnor (Telecom Canada)
Young Presidents Organization