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## COMPETITION IN THE GLOBALIZING AIRLINE INDUSTRY: LESSONS FROM THE U.S. EXPERIENCE

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### SUMMARY

The international airline industry is undergoing a transformation of historic proportions. Once the domain of high-priced, high-cost state-owned carriers who benefitted from anti-competitive national and international policies, the industry is becoming populated by privately-owned carriers seeking to compete in every major market. In this paper we will explore the reasons for this metamorphosis. The paper argues this transformation has followed inexorably from the adoption of three U.S. policies, which increased the competitiveness of U.S.-flag carriers in international airline markets and which in turn induced competitive responses from foreign carriers and governments to the altered industry environment. It next discusses the structural changes in the international industry that have occurred in the past decade and that are likely to occur in the future. Finally, the paper explores the impact of these structural changes on price and service competition offered international passengers.

## COMPETITION IN THE GLOBALIZING AIRLINE INDUSTRY: LESSONS FROM THE U.S. EXPERIENCE

The international airline industry is undergoing a transformation of historic proportions. Once the domain of high-priced, high-cost state-owned carriers who benefitted from anti-competitive national and international policies, the industry is becoming populated by privately-owned carriers seeking to compete in every major market. In this paper we will explore the reasons for this metamorphosis. Drawing on the U.S. experience, we will assess likely changes in the future structure of the global industry. We then examine the implications of this structural change on price and service competition offered international passengers.

### I. HISTORICAL CAUSES OF GLOBALIZATION

Two decades ago the international airline industry was dominated by state-owned carriers. While generally suffering from high-cost, low-productivity operations, these airlines enjoyed protection from the rigors of competition as a result of national, bilateral, and multilateral public policies adopted at the end of World War II. At a national level, most countries (with the notable exception of the United States and, to a limited extent, in other nations such as Australia and the United Kingdom), eliminated competition among their flag carriers on both domestic and international routes. Access to domestic routes was controlled by national transport ministries wishing to protect the profitability of the state-owned flag carrier. Following the precedent established by the 1946 Bermuda Agreement between the United States and the United Kingdom, access to international routes was granted through bilateral treaties, most of which resulted in creation of duopoly markets served by one carrier from each nation. Secret codicils inserted in many of these bilateral treaties requiring revenue-sharing or traffic-sharing among the duopolists further diminished service competition. An estimated 75-85 percent of intra-European scheduled traffic, for example, was subject to such secret anti-competitive arrangements.<sup>1</sup> Price competition was suppressed by the multilateral consensus to use the International Air Transport Association (IATA) as the mechanism for

establishing international airline prices. Its airline members set fares collusively at the annual meetings of IATA's regional traffic conferences. By consenting to uniform prices within geographic regions, the threat of price competition was eliminated in most major airline markets.<sup>2</sup>

### **The Carter Administration Reforms**

These anti-competitive, pro-consumer policies supporting the carriers' private cartel lasted through the mid-1970s. Beginning in 1977, the Carter Administration launched three programs to make the domestic and international airline industries more responsive to the needs of American consumers:

1. *Deregulation of the domestic airline industry.* Initially implemented administratively by the Civil Aeronautics Board in 1977, deregulation was ratified legislatively with the passage of the Airline Deregulation Act of 1978. As a result of these reforms, regulatory control over entry, exit, and prices was eliminated in the U.S. domestic industry.

2. *The "Open Skies" Policy of 1978.* In order to promote a more competitive and pro-consumer environment in international air services, the United States signed a series of liberalized bilateral treaties with approximately twenty nations, including the Federal Republic of Germany, the Netherlands, Belgium, Switzerland, Singapore, and South Korea.<sup>3</sup> The liberalized bilaterals generally increased the number of U.S. carriers allowed on a route, expanded the number of U.S. gateways and foreign cities that U.S. carriers could serve, improved access to the U.S. market for the foreign carriers, and enlarged the price-setting freedom allowed airlines in these country-pair markets.

3. *The 1978 IATA Show Cause Order.* To encourage more price competition, the U.S. Civil Aeronautics Board issued a "Show Cause" order in June 1978, which challenged the role of IATA in setting international airline prices.<sup>4</sup> As a result of the Show Cause initiative, the power of IATA over international airline prices--at least to U.S. markets--was substantially curtailed. These three initiatives were followed by the passage of the International Air



Transportation Competition Act of 1979, which reiterated the U.S. pro-consumer, pro-competition philosophy.

### **Impact of the Reforms on the International Airline Industry**

The international implications of deregulation of the domestic airline industry was little mentioned in the deregulation public policy debate. While adopted solely for domestic policy reasons, domestic deregulation had important, though unforeseen consequences on international commercial aviation. One key element of domestic deregulation was the freedom it granted carriers to construct efficient, market-oriented route structures and networks. Most domestic carriers abandoned the linear route structures that were an artifact of regulation and created hub-and-spoke route networks. Hubbing allowed carriers better control over on-line passenger feed onto their domestic and international flights and offered them the opportunity to create regional monopolies. Carriers reinforced their dominance at their hub airports by negotiating marketing alliances with commuter carriers through code-sharing, franchising, and/or ownership arrangements, skillful use of computerized reservations systems, and development of customer loyalty programs--e.g., frequent flyer programs and travel agent commission overrides. The competitive advantages generated by such fortress hubs could be used to dominate both domestic and international traffic at the hub.

The impact of freedom of entry on international competition was magnified because it reversed a bias in U.S. domestic aviation policy that had hurt U.S. carriers internationally. Prior to 1977, the U.S. Civil Aeronautics Board consistently focussed on the domestic implications of its route awards, rather than the international effects. For example, the CAB refused to grant domestic route authority to Pan American, which accounted for nearly half of U.S. flag international revenues in 1978. The CAB was concerned that Pan Am would leverage its U.S.-flag monopoly position in international markets to dominate any domestic market it was allowed to enter. Yet the grant of domestic authority to Pan Am would have allowed it to integrate domestic and international operations to compete more effectively against foreign flag carriers in international markets. Similarly, in TWA's case, a weak

domestic route structure limited TWA's on-line feed to its international flights. Yet the CAB did not want to unfairly advantage TWA vis-a-vis its domestic competitors by granting it critical domestic routes in addition to its lucrative international routes. Given a choice between strengthening TWA's competitiveness against Air France or British Airways and maintaining the competitive balance between TWA, United, and American in the domestic transcontinental market, the CAB choose not to upset the domestic applectart.

In short, the domestic route structures authorized by federal regulators were not designed to maximize the competitive positions of U.S. carriers in international markets. Rather, they were developed primarily as a result of domestic policy considerations. Deregulation changed this policy by eliminating bureaucratic discretion over the domestic carrier/route selection process: carriers were free to assemble domestic route networks that could be used to enhance both their domestic and international competitiveness.

Domestic freedom of entry impacted the international industry in a second manner as well. Freedom of entry unleashed a 15 year competitive struggle among U.S. carriers, which ultimately forced a reallocation of international operating authority among U.S.-flag carriers. Carriers--such as Eastern, TWA, and Pan Am--who failed to develop important dominant domestic fortress hubs became financially weakened and were forced to sell off key assets, including their international operating rights. Conversely, stronger carriers, such as American, Delta, and United, who constructed critical fortress hubs, were able to purchase international traffic rights from these weaker carriers. The process of disinvestment and redeployment of the portfolio of international traffic rights "owned" by the United States increased the international competitiveness of U.S. flag carriers viewed as a group--a consequence of deregulation that no expert predicted during the public policy debate.

The Open Skies policy and the IATA Show Cause order reinforced the international impact of domestic deregulation. Able to enter new international markets as a result of the liberalized bilateral treaties, carriers transformed their dominant domestic hubs into international gateways in order to exploit hub-based economies of scope. Of particular

importance has been the growth of service from new interior gateways, such as Dallas and Atlanta. The dominance of American Airlines at Dallas or Delta Airlines at Atlanta in domestic markets is reflected in their competitiveness in international air service involving these cities. Just as domestic carriers have difficulties competing with the dominant carrier in domestic markets involving the fortress hub, so too do foreign carriers have difficulties in competing with the dominant carrier in international markets involving the fortress hub. Effectively domestic deregulation allowed U.S. carriers to shift the competitive battlefield from hubless airports like New York's Kennedy, where they had little competitive advantage over foreign carriers, to airports where they enjoyed a dominant position. For example, Table 1 presents the flow of U.S.-European traffic through U.S. gateways in 1976 and 1988. It discloses a significant shift of gateway traffic away from New York to airports dominated by a single U.S. carrier (e.g., Dallas, Atlanta, Newark, Cincinnati, Charlotte).

The Open Skies policy had another subtle impact on the international market. By expanding the international opportunities available to U.S. carriers, Open Skies reduced the incentives for U.S. domestic carriers to cooperate with foreign carriers. Prior to Open Skies, the number of U.S. carriers serving the transatlantic and transpacific markets was quite limited. Domestic competitive pressures often induced U.S. domestic carriers without international operating rights to assist foreign flag carriers in the foreigners' attempts to capture U.S. international passengers whose origin or destination was other than a gateway city by coordinating their flight schedules. For example, if United and TWA competed in the Indianapolis-Boston market and TWA held international rights to fly Boston-Frankfurt while United did not, United had an incentive to coordinate its Indianapolis-Boston flights with foreign flag carriers who flew the Boston-Frankfurt route in order to compete with TWA for Indianapolis-Boston-Frankfurt passengers. After the signing of the Open Skies treaties, United had the opportunity of competing with TWA on both the domestic and international segments if it so wished, reducing its incentives to cooperative with foreign flag carriers.



The Open Skies policy also interacted synergistically with the IATA Show Cause order. By ending IATA's power to create geographic cartels, the Show Cause order strengthened the leverage that the U.S. gained with the liberalized bilaterals, as pricing freedom increased the diversion of traffic from nonliberalizing countries to liberalizing markets.<sup>5</sup>

By promoting the development and enhancing the strategic value of fortress hubs which integrated domestic and international routes, these three factors strengthened the international competitiveness of U.S. carriers, which has been manifested in several ways. A substantial shift of regional traffic involving U.S. international O&D passengers from non-liberalizing countries to countries signing Open Skies treaties has occurred. The liberalized bilateral treaties have generally brought about more competition in country-pair markets by increasing the number of gateways competing for the country-pair traffic, dramatically shifting traffic flows towards gateways controlled by U.S. airlines and expanding their country-pair market shares. Often the shifts have been so pronounced that the foreign government has threatened to denounce the bilateral treaty. For example, the market share of U.S.-flag carriers in the U.S.-France market has risen from 38% (in 1977) to 70% currently, causing France to seek capacity restrictions on U.S. service to France in Summer 1992, under the threat of the termination of the U.S.-France bilateral treaty.<sup>6</sup>

## II. FOREIGN REACTIONS TO U.S. INITIATIVES

The enhanced competitiveness of U.S.-flag carriers has in turn has created economic pressures on foreign carriers and governments. The U.S. policies raised the opportunity cost of existing foreign practices (particularly with regard to state ownership of carriers) and/or generated competitive advantages for U.S. flag carriers which flag carriers of other nations believed they had to emulate in order to compete effectively in international markets. The current globalization of the international airline industry is the direct result of the strategic responses of individual airlines to the changed industry environment. Foreign carriers and governments have undertaken many new initiatives, including deregulation, regulatory reform,

liberalization of bilateral aviation treaties, strategic alliances, mergers, and cross-ownership of shares. It is interesting to note that all these strategies are designed to promote the development of large hub-and-spoke systems in order to capture network-based economies of scope. The widespread privatization of the industry, including such key carriers as British Airways, Japan Airlines, and Air Canada, reflects the unwillingness of national governments in an era of budget deficits to finance the large aircraft purchases needed to exploit hub-based economies of scope and their inability to continually subsidize inefficient money-losing operations.

Table 2 reports significant examples of the uses of these devices internationally. Interestingly, the strategies adopted by international carriers in the past decade closely follow those pioneered by U.S. carriers in responding to deregulation and liberalization. A common element characterizing these responses is the creation and strengthening of fortress hubs designed to internalize and benefit from network-based externalities and economies of scope.

These network-based externalities are conceptually simple, although the task of capturing them in a competitive environment is of course more complicated. As an example, note that service from point A to point B obviously benefits A-B passengers. But A-B service also benefits passengers who wish to go from point A to point C and can do so by going from A to B and then from B to C. Viewed from the framework of the Douglas-Miller schedule delay model, any increase in A-B service also improves the quality of A-B-C service. Because of the increase in the numbers of A-B-C passengers using the B-C segment as the result of the quality improvement, carriers are likely to increase the number of flights on the B-C segment. Thus an externality benefiting B-C passengers is generated by an improvement in A-B service. Oftentimes, carriers try to internalize these externalities by coordinating their A-B service with their B-C service or by pricing the joint service so that it is cheaper to stay on the original carrier at B rather than switch to a different carrier for the B-C leg of the journey. Carriers also benefit from economies of scope generated by extensive operations at the hub.

As a result of these factors, the dominant carrier enjoys a modicum of monopoly power at the hub. Carriers are able to raise their prices at the hub without fear of attracting a competing hub complex at that airport. A direct frontal assault against a hub is expensive. Moreover, at most airports there are insufficient landing slots or gate spaces to support the multiple banks of flights necessary for a competing hubbing operation even if a potential entrant were willing to assume the economic risks. These economic forces have caused hubs to be near-universally adopted by U.S. domestic airlines. Hubs represent the strategic manager's Holy Grail, the opportunity to obtain a sustainable competitive advantage.

The underlying economic forces which have caused the adoption of the hubbing strategy--the ability to internalize the external economies of providing service on any given spoke, the sustainable competitive advantages they confer upon carriers, and the geographic monopoly power that they produce--operate in international markets as well as U.S. domestic markets. Note in Table 2 how closely the international industry has emulated the U.S. experience.

The economics of hubbing have played a critical role in the globalization of the industry. Because of the economies of scope generated by extensive hubbing complexes, carriers have sought to expand their operations geographically, and by expanding their operations geographically they gain significant competitive advantages. Hubbing thus creates strong incentives for firms to conduct their strategic planning and operations on a global basis. This global orientation is further promoted by the emerging strategy of developing multiple hubbing complexes, one that has been pioneered by U.S. carriers.

### III. GLOBALIZATION AND COMPETITION

In this section we will explore the impact of globalization on competition in the international airline industry. Because the globalization process is just beginning, our assessment is merely speculative. Yet one can observe common structural changes in the U.S. domestic market and the international market. One can also observe the impact of the

structural changes in the U.S. market on the conduct and performance of the U.S. domestic industry. Because of the common structural changes in the two industries--both driven by the inexorable economic forces unleashed by hubbing--we believe that the evolution of competition in the United States provides useful insights into the likely evolution of competition in international markets.

What then has been the U.S. domestic experience? Drawing heavily from the empirical analysis of DOT's 1990 report of the *Secretary's Task Force on Competition in the U.S.*

*Domestic Airline Industry*, it can be summarized as follows:

1. Concentration in the industry has increased, primarily through merger; the industry is dominated by less than a dozen carriers (American, United, Delta, Northwest, Continental, TWA, and US Air).
2. While overall industry concentration has risen when measured on a national basis, the average level of competition in city-pair markets has increased.
3. Carriers have followed a common strategy of creating hub-and-spoke route networks; they then have tried to render their hubs unassailable to potential entrants through such devices as code-sharing arrangements, commission overrides, etc.
4. Few carriers have tried to directly attack the hub of a competitor, thus conferring geographically-based monopoly power on the dominant carrier at the hub.
5. Most carriers have tried to integrate international and domestic operations at their dominant hubs, enhancing their international competitiveness and further strengthening their hubs from domestic rivals.
6. Price competition has been extensive, with pleasure travelers generally benefitting more than business travelers. The percentage of travelers paying full fare is small. Small differences in the resource endowments of carriers are magnified into major differences in pricing philosophies.
7. As air travel becomes more of a commodity, carriers have attempted to build brand loyalty through frequent flyer programs, commission overrides, pricing schema that discourage use of more than one carrier, etc.
8. A strategy of providing ubiquitous service has developed because of the need to build brand loyalty, the economies of scope engendered by hub-and-spoke route networks, and the importance of frequent flyer programs. In response to these forces, carriers are adopting multi-hubbing strategies.
9. Competition among carriers has been manifested in the form of competition among hubs, benefitting passengers who have some freedom to choose which hub they will utilize on their journeys.

These nine characterizations of the evolution of the U.S. domestic industry generally describe what is occurring in the international airline market as well. For example, consolidation is proceeding within the international airline industry, paralleling the concentration process in the United States. This phenomenon is most noticeable in Europe as carriers anticipate EC '92 and the implementation of the European Commission's Third Air Package. The Air France-UTA-Air Inter and the British Airways-British Caledonian mergers exemplify the domestic consolidation process, while the recent partial purchase of Sabena by Air France is an important harbinger of likely consolidation among carriers flying different flags. Similarly, it would appear that there have been decreases in average levels of concentration in international U.S.-O&D city-pair markets--particularly between the U.S. and countries which have signed liberalized bilateral treaties--and milder decreases in non-U.S. O&D markets. As the reforms incorporated in the EC's Third Aviation Package are implemented, city-pair concentration should also decline more significantly in Europe.

The emphasis on hubbing as a strategic weapon is perhaps the most noticeable parallel between the U.S. experience and the international experience. The major European carriers have been strengthening their hubbing complexes through mergers, strategic alliances, and cross-ownership arrangements with other international carriers.<sup>7</sup> Competition among gateways is likely to continue intensifying. Non-U.S. carriers are also now taking the first steps towards developing multihubbing strategies, as exemplified by the battle for Sabena (and control of Brussels' airport) by KLM, British Airways, and Air France<sup>8</sup> and the Iberia's use of Miami to tie together its transatlantic and South American operations--the latter of growing importance because of Iberia's purchase of several privatizing South American airlines.<sup>9</sup>

Multi-hubbing is the first step in the adoption of a strategy of providing ubiquitous service. Implementation of this strategy suggests an increased reliance on frequent flyer programs, commission overrides, computerized reservations systems, sophisticated discriminatory pricing, and other competitive devices designed to exploit geographic breadth of service. American, Delta, and United are well along in their attempts to serve all major

market areas open to them--transatlantic, transpacific, domestic, and Latin American. None of the non-U.S. carriers are as far along as the three major U.S. carriers in the struggle to provide ubiquitous service. Yet several have come close: had the British Airways-KLM merger not fallen through at the last minute, the new carrier, utilizing KLM's equity in Northwest Airlines, would have had a major presence in the European, transatlantic, U.S. domestic, transpacific, and Europe-Asia markets.<sup>10</sup>

### **Implications for Price and Service Competition**

The parallel evolutions of the structure of the U.S. domestic airline industry and the international airline industry suggest that price and service competition in the global airline industry will mirror the U.S. domestic airline experience. International travelers can expect to benefit from extensive price competition among the global carriers. However, these travelers will face elaborate price structures designed to discriminate between business passengers and leisure passengers. As happened in the United States, one can also expect a reduction in the use of joint fares, as carriers manipulate restrictions in fares to encourage travelers to use single carrier-itineraries. Universal adoption of sophisticated pricing structures should also diminish the importance of charter services in international markets.

Globalization of the international airline industry also has important implications for the quality of service offered passengers. Of course, it should be recognized that service quality has multiple dimensions. Without a commonly recognized means of weighting the various dimensions, it is impossible to state whether overall service quality will likely improve or deteriorate. Rather, all we can do is discuss the impact of globalization on individual facets of service quality.

Adoption of multiple hub route networks suggests that point-to-point service will contract, as hubbing initially reduces the number of passengers who can complete their trip on a single flight. In addition, competitive pressures from larger carriers with multiple fortress hubs will prompt numerous smaller carriers to shrink their services, die, or enter into code-sharing arrangements with larger carriers that will effectively make them commuter carriers



offering feeder services for their larger partner at a hub airport. As in the United States, one can expect that as hubbing is substituted for point-to-point service, frequency of service between most city-pairs will increase. Passengers flying from hub to hub will enjoy more frequent non-stop service as the volume of non-O&D passengers utilizing the hub-hub route increase, thereby justifying more flight offerings. Passengers flying from spoke to spoke will have more flight offerings available to them each day, but each one-way journey will take longer because of the substitution of non-stop flights for connecting service. For these passengers, improved frequency of service will be traded off against increased trip time.

The percentage of international passengers utilizing connecting service will obviously rise. Because of the expanded use of hubs, on-line connections will become more important relative to interline connections. We also expect strategic alliances and code-sharing arrangements to grow in number. Smaller communities will receive improved service as the larger carriers seek to exploit economies of scope by enlarging the geographic pool of passengers funneled into their hubs. Increased competitive pressures will also force carriers to enrich their overall quality of service. Unlike the good old days when carriers pooled revenues, carriers will have to compete for traffic by offering more attractive price/quality of service bundles.

#### IV. SUMMARY

As a result of initiatives undertaken by the Carter Administration, the international airline industry is now undergoing a process of globalization. The evolution of the structure of the international industry is driven by the economic advantages to carriers of adopting multiple hubbing as a competitive strategy. Most U.S. carriers have utilized hubs as a strategic weapon in their competitive struggle in the domestic market, and this technique is also being adopted by the larger international carriers in response to the changed economic environment. As a result of the growth of hubbing and the concomitant increase in competition among globalizing

carriers, international travelers are likely to enjoy the benefits of price and service competition similar to that experienced by U.S. domestic passengers in the post-regulation era.

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## FOOTNOTES

<sup>1</sup>OECD, p. 34.

<sup>2</sup>Some price competition remained from non-members, such as Icelandic Airlines, which flew budget-minded travelers from New York to Luxembourg with a stopover in Reykjavik. Charter carriers also provided some competition to IATA members.

<sup>3</sup>See "United States Policy for the Conduct of International Air Transportation Negotiations", August 21, 1978.

<sup>4</sup>U.S. Civil Aeronautics Board, Order 78-678, June 9, 1978. See also Gidwitz, pp. 98f.

<sup>5</sup>See Pustay (1989) for estimates of the extent of the traffic diversion.

<sup>6</sup>McGinley, Laurie. "France Rejects New U.S. Proposal On Airline Service," *Wall Street Journal*, April 17, 1992, p. A5.

<sup>7</sup>See Pustay (LTR, forthcoming) for examples of the use of these techniques.

<sup>8</sup>"Sabena, Air France Sign Pact to Develop Paris, Brussels Hubs," *Wall Street Journal*, April 14, 1992, p. B8.

<sup>9</sup>"Iberia to Inaugurate Miami Hub by Flying to Panama, Mexico," *Wall Street Journal*, April 14, 1992, p. B8.

<sup>10</sup>"The Airline Deal that Did Not Fly," *Financial Times*, February 28, 1992, p. 11.

TABLE 1  
MARKET SHARES OF PORTS OF ENTRY,  
U.S.-EUROPE MARKET  
1976 and 1988

	Market Shares	
	<u>1976</u>	<u>1988</u>
New York	63.4%	46.9%
Chicago	8.6	7.2
Boston	7.2	6.4
Los Angeles	5.7	6.9
Washington	4.0	3.6
Seattle	3.4	1.4
Miami	3.2	6.2
Houston	1.8	1.7
Philadelphia	1.1	.5
San Juan	1.0	.4
Detroit	.4	.6
Anchorage	.3	.2
Atlanta	-	4.5
Dallas	-	3.3
Newark	-	2.9
San Francisco	-	2.6
Orlando	-	1.0
St. Louis	-	.8
Minneapolis	-	.6
Baltimore	-	.5
Cincinnati	-	.5
Charlotte	-	.5
Denver	-	.4
Raleigh	-	.2
Pittsburgh	-	.1
Tampa	-	.1
Total, Listed Cities	99.97	99.90

Source: DOT/INS, U.S. International Air Travel Statistics, Tables IIIa and IIIId, 1976 and 1988.

TABLE 2A  
DEREGULATION/REGULATION REFORM

Canada

Chile

European Community

Japan

Korea

New Zealand

United States

TABLE 2B  
PRIVATIZATION

Aerolineas Argentinas

Aeromexico

Air Canada

Air New Zealand

British Airways

KLM\*

Mexicana

Lufthansa\*

VASP\*

Viasa

\*Partial



TABLE 2C  
LIBERALIZED TREATIES

UK - Belgium

UK - Luxembourg

UK - Netherlands

UK - Federal Republic of Germany

TABLE 2D  
OWNERSHIP CHANGES

Air France - CSA

Air France - Sabena

Ansett - America West

British Airways - Delta Air (Germany)

Iberia - Aerolineas Argentinas

Iberia - VIASA

KLM - Northwest

SAS - Continental

SAS - Linjeflyg

TABLE 2E  
CROSS OWNERSHIP ARRANGEMENTS

<u>Carriers</u>	<u>Arrangement</u>
Air New Zealand	19.9% owned by Qantas 7.5% owned by JAL
Austrian	10% owned by Swissair 10% owned by Lufthansa 1.5% owned by Air France
Euro Berlin France	Joint venture:     Air France 51% Lufthansa 49%
Lan Chile	30% owned by SAS
SAS - Swissair	10% share swap
SAS - Finnair	10% share swap
Swissair - Delta - Singapore	5% equity swap