

# **Airline Management: Strategies for the 21<sup>st</sup> Century**

**Second Edition**

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regulated, airlines would exist in a state of nearly textbook levels of perfect competition.<sup>3</sup> The economic characteristics of the airline industry differ dramatically from the theoretical model of free market perfect competition. After reviewing the theories of perfect competition and contestability, the chapter concludes with a review of the literature on the theory of economic regulation, and an emphasis on destructive competition and core theory. Finally, the economic rationales for safety and environmental regulation are addressed, as well as the natural monopoly characteristics of airports.

What follows, then, is an examination of the essential economic characteristics of the airline industry which explain why supply and demand appear almost perpetually to be in disequilibrium, and cost and price too often intersect at an unprofitable level.

## SUPPLY

### AIRLINES INEVITABLY PRODUCE EXCESS CAPACITY

Excessive capacity is endemic to the airline industry. Whether regulated or deregulated, from the mid 1950s to the end of the 20<sup>th</sup> century, U.S. airlines rarely achieved an average annual domestic load factor exceeding 70% (and in most years load factors substantially less than that, and domestic load factors worse still),<sup>4</sup> meaning

*Wealth of Nations* (1776). The reference here is to the "contestable market theory," that as a revived notion became a premise used to help justify adoption of the deregulatory policy in transportation. The contestable market theory was first identified by Adam Smith in *Wealth of Nations*. *Id.* The contestable market assumption is that there are no significant economies of scale or barriers to entry. Paul Stephen Dempsey, *Killer Trucks: Put brakes on Deregulation*, *The Arizona Republic* (Oct. 1988). Because there are no barriers to entry, the market, even in the absence of actual competition, is threatened (i.e., "contested") by a prospective new entrant. Hence, the market is expected to behave in a perfectly competitive way. It is assumed that potential entrants are as viable in the competitive marketplace as actual competitors. Kyle and Phillips summarize the contestable market theory as follows:

*Put simply, this theoretical framework indicates that in markets characterized by relatively costless entry and exit, the potential for entry, regardless of the actual number of incumbent competitors, will result in competitive behavior and performance. Thus, if (airline) markets are highly contestable, fares should approximate marginal cost, even in a market served by one carrier.*

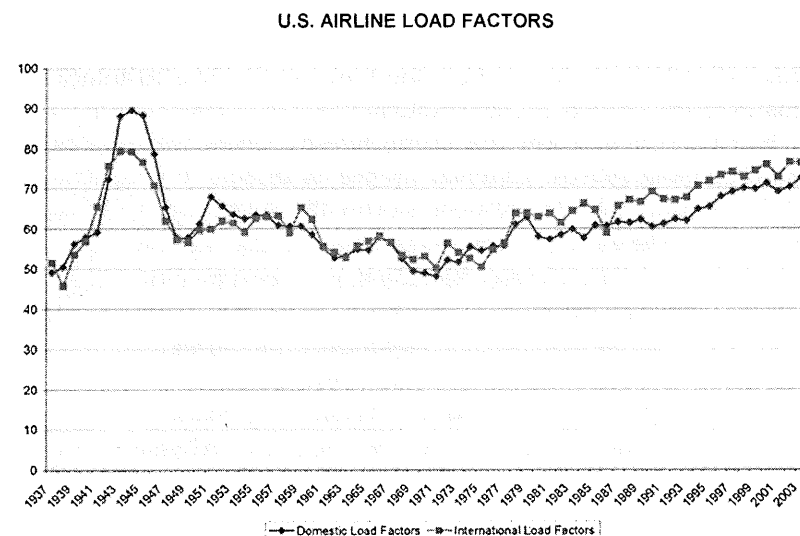
R. Kyle III and L.T. Phillips, *Airline Deregulation: Did Economists Promise too Much or too Little*, *Logistics and Transportation Review* (Mar. 1985), Vol. 21, No. 1.

<sup>3</sup> Michael Levine, *The Legacy of Airline Deregulation*, *Av. Wk. & Space Tech.* (Nov. 9, 1987).

<sup>4</sup> Domestic load factors for U.S. carriers ranged between 60.5% and 62.6% between 1987 and 1993, while international load factors ranged between 65.6% and 67.0% during the same period. Julius Maldutis, *Quarterly Global Aviation Review 2d Quarter 1994* 10-11 (1994). The Associa-

tion of European Airlines reported load factors between 56.7% and 63.8% during the same period. *Id.* at 15.

Figure 2.1—U.S. AIRLINE LOAD FACTORS<sup>5</sup>



The airline industry has always, will always, and probably should always produce excessive capacity, for if airline load factors approached 100%, many people who wanted to fly would be prohibited from doing so. Studies by Boeing show that when load factors average 60%, 7% of flights will be full and unavailable for late-booking passengers. When load factors reach 70%, 21% of flights will have to turn away prospective passengers.<sup>6</sup> Thus, the higher the load factor, the more likely it is that some passengers will experience service inconvenience by finding their preferred departure fully booked.<sup>7</sup> Moreover, demand is highly cyclical, peaking and regressing at dif-

ference of European Airlines reported load factors between 56.7% and 63.8% during the same period. *Id.* at 15.

<sup>5</sup> Data: Air Transport Association.

<sup>6</sup> Michael Tretheway & Tae Oum, *Airline Economics: Foundations for Strategy and Policy* 5, note 3 (1992).

<sup>7</sup> Melvin Brenner, *The Significance of Airline Passenger Load Factors*, *Airline Economics* 35 (G. James ed. 1982).

ferent hours of the day, days of the week, and months of the year. Demand can also ebb and flow, on a directional basis, depending on the season.

As a service industry, airlines are subject to constraints different from that of manufacturing. Professor Newal Taneja notes three differences: "(a) an airline's output (a seat on a flight) cannot be inventoried to match fluctuations in demand, as can most physical products; (b) air services, unlike manufactured goods and products, are produced and consumed at the same time; and (c) the customer participates in the service delivery system."<sup>8</sup>

On the question of why the airline industry produces excess capacity, airline industry expert Melvin Brenner notes:

*The industry has always had excess capacity, even during boom times. Over-capacity results from:*

*(a) the competitive importance of schedule frequency. Since schedule convenience is one of the most important differentiating characteristics of the airline product, all airlines strive for high scheduled frequency on every important route, and*

*(b) the fact that airlines have very high fixed costs and are therefore incentivized to fly their aircraft as much as possible, even if incremental flying does not produce enough revenue to cover fully allocated costs. Whenever a flight covers variable costs and contributes to overhead, the individual carrier is better off flying rather than not flying. However, the accumulation of the many marginally-justified schedules creates overcapacity for the industry as a whole.<sup>9</sup>*

American Airlines' CEO Robert Crandall looked carefully and critically at the factors which suggest that airlines are unique among major industries. On the point of excessive capacity, he observed:

<sup>8</sup> Newal Taneja, *Civil Aviation* 131 (2<sup>nd</sup> ed. 1989).

<sup>9</sup> Melvin Brenner, *Program for Improving Airline Outlook* 5 (unpublished monograph 1993).

*[E]ach time a network-based airline offers a new flight, it commits an additional city to all the others served by the hub and, thus, introduces a number of new products. Additionally, by widening the reach of its network, it strengthens its entire existing product line [of] origin-departure city-pairs, time of departure, airport used and type of service (nonstop versus connecting). . . .*

*In most industries, increased production, by itself, does not enhance an individual competitor's sale potential or competitive position. However, in the airline industry, the fact that more capacity represents more frequency—and thus a more desirable product—gives every airline an incentive to use every airplane as intensively as possible. While this strategy makes sense for each individual carrier, it produces a tendency toward perpetual oversupply.<sup>10</sup>*

Professors Michael Tretheway and Tae Oum give an example of how adding spokes to the hub network geometrically increases the number of city-pair markets which can be sold to consumers: "by increasing the number of stations connected to a hub from 9 to 14 (total stations including the hub rise 50% from 10 to 15), the number of [origin-and-destination] pairs served more than doubles from 45 to 105."<sup>11</sup> Thus, in this example, a 50% increase in capacity (the number of cities added to a hub network) results in a 122% increase of product lines (city-pairs) that can be sold to consumers. Coupled with an ability to satiate consumer demands for increased frequencies by banking flights through the hub several times a day, an airline that adds connecting points to its hub network enjoys not only an arithmetic, but a geometric, increase in product lines, which stimulates passenger and revenue growth.<sup>12</sup> This phenomenon prompted American

<sup>10</sup> Robert L. Crandall, *The Unique U.S. Airline Industry*, in *Handbook of Airline Economics* 4 (D. Jenkins ed. 1995).

<sup>11</sup> Michael Tretheway & Tae Oum, *Airline Economics: Foundations for Strategy and Policy* 25 (1992).

<sup>12</sup> Dan Reed, *The American Eagle* 160 (1993).

Airlines to increase the spokes it flew from Dallas from 32 in 1978, to 73 in 1983, or 128%, while increasing its flights from 111 to 278, or 150%.<sup>13</sup> The larger the network, the more attractive it is to “one stop shoppers” who wish to hold transaction costs to a minimum, and to frequent flyers collecting points for free travel.

Hubbing also allows airlines to take advantage of economies of scope.<sup>14</sup> By offering a flight from city A to hub H, the carrier serves not only the origin-and-destination passenger in the local market, but also serves incremental additional connecting passengers traveling beyond H to destinations throughout the carrier’s network.

Tretheway and Oum point to the “S-Curve” effect of flight frequency on demand and revenue, the essential premise of which is that a carrier that offers consumers a disproportionately larger number of flights in a market *vis-à-vis* its competitors will enjoy an even greater disproportionate advantage in terms of both passenger load factors and revenue.<sup>15</sup> The S-Curve phenomenon was first identified by economist William Fruhan in 1972. Fruhan explained that travelers tend to contact the dominant carrier in the market first, due to its marketing dominance and its greater choice of scheduling options. By virtue of this advantage, carriers are incentivized to add flights to the market. But unless the market for air travel grows, excessive overscheduling harms all competitors in the market by increasing the number of empty seats<sup>16</sup> (see Figure 2.2, “Hypothetical S-Curve”).

Tretheway and Oum posit that a carrier with 60% of the flights may receive 80% of the passengers, and even more of the revenue.<sup>17</sup> This is because of consumers’ preferences for schedule convenience. Table 2.1, “Reasons for Choosing Airlines,” reveals domestic and international passenger preferences in selecting a carrier to serve them.

<sup>13</sup> Melvin Brenner, James Leet & Elihu Schott, *Airline Deregulation* 77-78 (1985).

<sup>14</sup> A firm enjoys economies of scope when the unit cost of producing one more item is diminished because the scope of activity broadens.

<sup>15</sup> William E. O'Connor, *An Introduction to Airline Economics* 107-109 (5<sup>th</sup> ed. 1995).

<sup>16</sup> William Fruhan, *The Fight for Competitive Advantage* (1972).

<sup>17</sup> Michael Tretheway & Tae Oum, *Airline Economics: Foundations for Strategy and Policy* 27 (1992).

Figure 2.2—HYPOTHETICAL S-CURVE

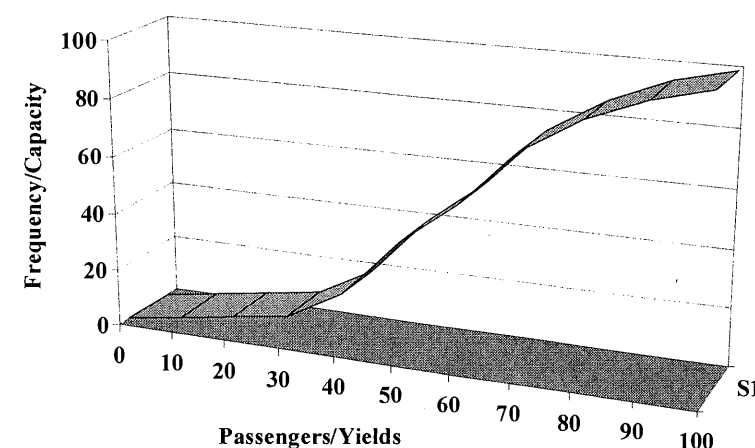


Table 2.1—REASONS FOR CHOOSING AIRLINES<sup>18</sup>  
(percentage of passengers)

Reason	U.S. Residents	Non-Residents
Schedule	20.3	17.5
Price	13.8	11.2
Frequent Flyer Program	11.1	5.1
Airline Loyalty	8.7	11.9
Safety Reputation	8.4	11.5
Cabin Service	7.3	9.5
On Time Performance	6.4	7.3
In-Flight Comfort	5.5	7.5
Airport Facilities	3.3	3.1
Aircraft Type	2.9	3.7
No Choice	12.3	11.7

Flight schedule is a secondary issue for discretionary travelers (for whom price is paramount), but a primary issue for high-yield business

<sup>18</sup> Aviation Daily (Oct. 1, 1991), at 23.

travelers. A person traveling for business typically values his or her time highly, and purchases air travel from the carrier able to offer flights throughout the day to and from important destinations, so that if business plans change, s/he can catch an alternative flight. Because they value their time greatly, business travelers typically are willing to pay more for air transportation than do discretionary travelers. Frequent flyer programs also create a motivation to accumulate miles on the airline with the widest route network, not only because miles can be accumulated faster, but the potential destinations for mileage redemption are more attractive.<sup>19</sup> Moreover, because of the tendency of every airline to follow the price leader, pricing differences are less a factor in product differentiation than is schedule rivalry.<sup>20</sup>

A carrier with a larger presence in a market ordinarily has relatively lower informational costs in distributing its products to consumers, and consumers have lower transaction costs in doing business on a "one stop shopping" basis with the dominant carrier, which has the ability to fly the consumer to most of his or her preferred destinations. Many travelers tend to economize in their search; calling the airline with the most frequencies reduces transaction costs by reducing the likelihood of needing to make a second call. Thus, the carrier with significantly more frequencies and destinations in a market enjoys a disproportionately higher level of passengers and an even greater level of revenue. According to economist Severin Borenstein, "an airline that carries a large share of the traffic originating at an airport will be able to attract a disproportionate share of the traffic on any particular route from that airport."<sup>21</sup> The S-Curve phenomenon incentivizes carriers to offer more capacity in important markets.

Thus, excessive capacity is a product of several factors:

- *Consumer demand for schedule frequency is high, particularly among high-yield business travelers.* As a general rule, the carrier that enjoys a disproportionate comparative advantage in the number of flights in a given market enjoys an even greater disproportional advantage in terms of passenger volume and revenue. Moreover, high-yield

<sup>19</sup> See Michael Levine, *Airline Competition in Deregulated Markets: Theory, Firm Strategy, and Public Policy*, 4 Yale J. Reg. 393, 443 (1987).

<sup>20</sup> Melvin Brenner, James Leet & Elihu Schott, *Airline Deregulation* 93 (1985).

<sup>21</sup> Severin Borenstein, *The Dominant-Firm Advantage in the Multiproduct Industries: Evidence from the U.S. Airlines*, Quarterly J. of Economics 1237, 1239, 1260 (1991).

business travelers tend to select an airline on the basis of departure and arrival time.

- *Adding spokes to a hub network geometrically increases product lines.* Increasing the number of cities served from a hub geometrically increases the number of city-pairs served, vastly increasing the number of products which can be sold. Thus, carriers are incentivized to build ubiquitous hub networks. These competing hub networks offer duplicative and overlapping service, resulting in vigorous price competition for connecting long-haul traffic.
- *New aircraft orders must be placed years ahead of delivery.* There is an old maxim in the industry that "airlines order new planes in good times, and take delivery in bad times." Aircraft prices range from about \$35 million for a new 737, to about \$170 million for a 747. Air transport demand is highly cyclical, on a daily, weekly, seasonal and recession/inflation market cycle basis. This means that airline management, attempting to create capacity to satiate projected peak demands, will have a difficult time gauging real future demand.
- *Investment is often irrational.* The evolutionary economists recognize that market decisions are not always rational. Given the anemic profit margins plaguing the airline industry since deregulation, it is remarkable that new sources of capital have been found, for returns on investment have been extremely poor, and many debt and equity investments have disappeared in bankruptcy. Airlines in the 1980s went through a period of relentless addiction to market share and territorial invasion, each believing it would emerge as King of the Hill, even when it became apparent that the nation was vastly over-hubbed. Airlines remain a glamorous industry, and new airline ventures appear regularly, despite a high infant mortality rate among new firms. Further, aircraft equipment leases enjoy special treatment under the bankruptcy laws, and as a somewhat fungible vehicle of production, may easily be transferred from one carrier to another.
- *Airlines have high fixed costs.* Because most costs are incurred whether aircraft are parked on the ground or not,

airlines tend to send their fleets aloft even during periods of poor demand.

Airlines are not unique in producing excess capacity. For example, telecommunications networks have enormous excess capacity (particularly after having laid fiber optics), a relatively fungible product, and relatively high fixed costs. Hotels and radio and television broadcasting produce excess capacity as well; but among hotels, radio and television broadcasting, there appears to be more room for product differentiation. For airlines, the very means of product differentiation—additional city-pair options, and frequency of service—compel the industry to offer ever more frequency. Adding capacity in the telecommunications industry does not create a geometrical explosion in the number of product lines that can be offered to consumers (in part, because federal regulatory agencies and courts insist on “seamless” connections between rival telecommunications companies, allowing each firm to serve the customers of the other). Furthermore, telephone customers tend to dedicate local and long-distance business to individual firms for long periods of time (months or years), while purchasers of transportation services may freely shift business between competitors on a trip-by-trip basis, thus generating enormous incentive for pricing competition among transport providers.

### **AIRLINE CAPACITY HAS A SHORT SHELF LIFE**

Airline capacity has an exceptionally short shelf life. Once a scheduled flight pulls back from the jet way, any empty seats are lost forever. Airline CEO Stephen Wolf observed:

*When supply exceeds demand, perishable commodities are sold for what they will bring. A seat on a specific flight is no exception. When the flight departs with a seat unsold, the commodity has perished. As a result of trying to fill too many such seats, yields in the airline industry have sunk to the lowest common denominator.*<sup>22</sup>

<sup>22</sup> Stephen Wolf, *Where Do We Go From Here? A Management Perspective*, Airline Labor Relations in the Global Era 18-19 (P. Cappelli ed., 1995).

In contrast, if a manufactured good cannot be sold, it can be left on the shelf or placed in a warehouse for a sunnier day. Hotel rooms are perishable too, but not nearly as perishable as airline seats, for everyone sleeps at the same time; not everyone travels from Boston to Pittsburgh at the same time. A hotel room need be sold only once a day. A domestic aircraft has a fresh inventory of perishable seats every few hours.

Seeking to sell as much of that perishable inventory as possible, carriers often offer at least a portion of their inventory at the price of the lowest price provider in an effort to grasp an ascending and, too often, elusive break-even load factor and to preserve market share. As one source noted, “In a high fixed cost, price sensitive, commodity type business such as this, excess capacity has a devastating effect because it motivates carriers to fill aircraft by cutting prices. Other carriers are forced to match, and fare wars erupt.”<sup>23</sup>

### **EXCESS CAPACITY IS NOT EASILY REDUCED**

As noted above, the acquisition of essential assets involves long lead times.<sup>24</sup> Thus, new aircraft orders must be placed years ahead of delivery, meaning that turning off the valve of growing inventory is difficult and costly, even when passenger demand softens as the market cycle turns south. Further, if demand slackens modestly, an airline cannot reduce capacity by shrinking the size of its aircraft. For example, if demand falls 10% in the Omaha-St. Louis market, an airline cannot reduce its costs appreciably by taking 10% of the seats off of each of its aircraft. Aircraft configurations are relatively static (although sometimes smaller aircraft can be substituted in markets where traffic declines). A carrier might be able to take the capacity out of the Omaha-St. Louis market and reposition it in another city-pair market if demand is growing elsewhere (in the winter, for example, carriers adjust their fleets to add capacity in the north-south Sunbelt markets). But if the 10% decline in demand is a national phenomenon because of recession, an airline cannot curtail its costs by 10% by parking 10% of its fleet on the ground, for fixed costs are relentlessly high in the airline industry. A 10% reduction in a carrier's flights reduces the appeal of its product in the markets where service

<sup>23</sup> J.P. Morgan Securities, *The U.S. Airline Industry* (1993).

<sup>24</sup> Newal Taneja, *Civil Aviation* 132 (2<sup>nd</sup> ed. 1989).

is reduced, weakening its network relative to its rivals, and causing a significant forfeiture of revenue to them, while contributing little to arresting the overcapacity on the remaining 90% of its net-work.<sup>25</sup>

Former TWA CEO Ed Meyer put it this way:

*Since most of the fixed costs could not be eliminated easily you were aggravating your losses by grounding those flights [on which revenue exceeded variable costs, but did not cover fully allocated costs]. We were more often than not talking in terms of real cash losses. The decision to ground a flight became a difficult one, particularly if you thought the situation temporary or you felt the route to be of great strategic value.<sup>26</sup>*

Another source echoed these sentiments with an evaluation of airline price, capacity, as well as variable, fixed, and marginal costs:<sup>27</sup>

*All the airlines set the same price and have excess capacity. The price they set is above the market clearing price, but they still do not make any money because their cost function  $c(*)$  is too large. Since the demand for air travel is basically elastic, any attempt to increase price to increase revenue will fail. In any other industry, participants would, at the next time the first stage rolls around merely decrease capacity. Such behavior is more difficult in the airline industry. If United sets capacity at 100 seats going from Denver to Cedar Rapids, and only 50 people fly there, United has 50 seats of excess capacity. If*

<sup>25</sup> Robert L. Crandall, *The Unique U.S. Airline Industry*, Handbook of Airline Economics 5 (D. Jenkins ed. 1995).

<sup>26</sup> C.E. Meyer, *Cabotage, Foreign Ownership and International Marketing Alliances* (address before the University of Denver/Smithsonian Air & Space Museum Conference on Airlines, Airports & Aviation, Washington, D.C. (May 29, 1992).

<sup>27</sup> Variable costs are costs that fluctuate depending on the firm's level of output. Fixed costs remain the same irrespective of the level of output. Marginal costs are the costs necessary to produce one additional unit of output.

*United knows that only 50 people will fly to Cedar Rapids, it should reduce capacity to 50 in the next first-stage. United may not be able to do that because aircraft have a (more or less) fixed number of seats. If excess capacity is 5 seats, taking those 5 seats out at the next first-stage really doesn't make any difference. Marginal cost for each passenger is minuscule, except for one passenger. In this example, the 101<sup>st</sup> person who wants to fly to Cedar Rapids creates a huge marginal cost for United; they must get another aircraft, fill it with fuel, staff it, feed the passenger, etc. Every passenger after that again has low marginal costs.<sup>28</sup>*

Additionally, network carriers have enormous difficulty downsizing hubs in order to take account of demand declines, because every spoke in the hub feeds passengers to every other spoke in the hub, and vice-versa. Eliminating a spoke has a marginal detrimental impact throughout the system, for many (and often, most) passengers from each spoke connect with flights to other spokes. Instead, carriers typically maintain hub capacity but drop prices during demand downturns in an effort to cover variable costs,<sup>29</sup> deferring the day when prices can be raised until demand improves. In one sense, it is sometimes preferable for a carrier to abandon a hub than to downsize it. But abandoning a hub may be an invitation for a competitive carrier to enter the market.

New airline ventures occasionally spring up like dandelions. While some excess capacity disappears with the collapse of major airlines (e.g., Eastern and Pan Am) and the downsizing of others, many used aircraft and skilled labor simply are recycled into the fleets of new entrants and growing carriers. For example, Delta sold a large number of aging DC-9s, only to see them re-emerge in Atlanta in the fleet of low-cost ValuJet (which, after a crash in the Everglades, was renamed AirTran).

<sup>28</sup> James Lanik, *Stopping the Tailspin: Use of Oligopolistic and Oligopsonistic Power to Produce Profits in the Airline Industry*, 22 Transp. L. J. 509, 522 n. 76 (1995).

<sup>29</sup> Variable costs are costs that change with the level of output, such as raw materials, wages and fuel. Paul Samuelson & William Nordhaus, *Economics* 74 (14<sup>th</sup> ed. 1992).

Chapter 11 bankruptcy also offers wounded airlines a respite from most creditors (except aircraft manufacturers and lessors), allowing them to re-group and shed themselves of shareholder obligations and much debt. Because airlines are networks, their liquidation values are relatively low, making continued operation and cash flow preferable to asset liquidation. The present value of future streams of cash flows generated by the integrated use of equipment, facilities and labor exceed the liquidation value of even an unprofitable airline network.<sup>30</sup>

Financing is available via the equipment manufacturers for both new entrants and carriers emerging from Chapter 11. While the leasing companies may have been disciplined by several rounds of bankruptcies, public sources of capital, in the form of state and local contributions and guarantees, have become increasingly available—to TWA (from Missouri), Northwest (from Minnesota), United (from Indiana), and American (from North Carolina). Foreign airlines also continue to inject significant capital into U.S. firms to take advantage of the domestic feed they provide into their lucrative long-haul wide-bodied international networks (e.g., KLM-Northwest, British Airways-USAir, and SAS-Continental and Air Canada-Continental). For a growing number of airlines, labor has also become the lender of last resort (e.g., TWA, Northwest, and United).

## DEMAND

### ***DEMAND IS HIGHLY CYCLICAL AND HIGHLY INFLUENCED BY EXTERNAL EVENTS***

Long-term and short-term market cycles play a profound role in airline economics. Demand for air transport services has always been highly cyclical, with greater or lesser demand depending on time of day, day of week, and season, and on broader market fluctuations, year to year. For example, discretionary, leisure traffic (which has grown to be the dominant traffic base) peaks in the summer months, thereby allowing the industry to enjoy higher load factors for the second and third calendar quarters, while demand in the first quarter is typically poor. Leisure traffic peaks during Thanksgiving, Christmas,

<sup>30</sup> Robert L. Crandall, *The Unique U.S. Airline Industry*, in *Handbook of Airline Economics* 6-7 (D. Jenkins ed. 1995).