PART III DISCUSSION AND CONCLUSIONS

SUMMARY

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DISCUSSION

Growth Factors

An ideal forecasting methodology or system should be internally logical and recognize explicitly the causative factors at work. Statistical relationships between demand for air travel and relatively abstract economic variables such as Gross National Product are forecasting shortcuts which produce generally satisfactory results but do not focus on the "real" growth factors, which may truly cause changes in the growth rate of demand. For example, it was noted that the statistical relationship between spending on air travel and Disposable Personal Income used by some as a forecast tool has followed an erratic pattern in the last decade, reaching a peak in 1980 then dropping sharply for three years and, in the past five years, rising again. (Table 1)

TABLE 1

U.S. AIRLINE INDUSTRY PASSENGER REVENUE AS PERCENT OF DISPOSABLE PERSONAL INCOME, 1968 TO 1988

1968	1.02	1979	1.32
1969	1.08	1980	1.46
1970	1.07	1981	1.44
1971	1.06	1982	1.35
1972	1.10	1983	1.32
1973	1.08	1984	1.38
1974	1.14	1985	1.38
1975	1.08	1986	1.33
1976	1.14	1987	1.40
1977	1.18	1988(est)	1.45
1978	1.21		

Workshop participants identified three sorts of "real" growth factors that determine the demand for air travel. First are factors concerned with population and income -- total population growth, migration, immigration, emigration, employment, demographic characteristics (especially age and income), and psychographic factors such as taste and life style. These population and income characteristics largely determine the need, desire, and ability to travel by air. Economic variables such as Gross National Product provide only an aggregate description of these population and income factors.

Market research indicates significant differences among various sectors of the population with respect to the propensity to travel by air for both business and personal or pleasure reasons. Ideally, a forecast methodology should try to account for changes in the makeup of the population and changes in the incidence of air travel by sector and trip purpose. Unfortunately, data to perform this sort of analytical forecast are limited.

The second set of variables concerns the cost of air travel. The important factor is the cost of air travel relative to the cost of other things -- often referred to as the "real" cost of air travel. It was noted that the average revenue yield per revenue passenger mile which is often used in forecast equations is probably not representative of the relevant cost for most air trips. Average yield has been reduced significantly since deregulation by the increasing shift to discount fares. Consequently, the average yield in "real" terms (deflated by the CPI) has declined to a greater extent than either the full fare real yield or the discount fare real yield. (See Table 2.)

TABLE 2. DOMESTIC OPERATIONS, U.S. MAJORS

Index of "Real" Yields
(1981=100)

	Full Fare	Discount Fare	Average
1981	00.0	100.0	00.0
1982	3.3	89.6	88.4
1983	4.1	89.7	86.0
1984	04.0	93.8	90.2
1985	05.4	86.4	82.0
1986	09.8	78.9	73.1
1987	12.2	79.6	72.6
1988	17.8	80.6	74.4

Source: Based on ATA reports

It was noted that most forecasts project a continued downtrend in the average real yield. Boeing projects a drop of 2.2 percent per year in the real yield on a worldwide basis from 1987 through 2000. Douglas projects a decline of 1.9 percent. The most recent FAA forecast projects a decline of 0.7 percent per year for domestic U.S. operations and 1.1 percent for international operations by U.S. carriers.

However, it appears that many of the underlying costs of producing air travel may be on the rise so that it may be difficult for airlines to hold increases in fares below increases in the consumer price index. It was also noted that competitive conditions in the industry have changed so that the outbreak of price wars may be less likely than in the early years of deregulation. In any event, FAA forecasting methodology should focus sharply on future fare levels and the causative factors that determine them.

The third set of growth factors which influence the demand for air travel concerns the quality of air service. Over a long period of time, significant advances in speed, safety, comfort, reliability, and convenience have unquestionably increased the demand for air travel. In the 1950s, 1960s and 1970s air travel captured nearly all of the ocean steamer and rail travel market and much of the long distance auto travel market. Improved quality also generated much travel by reducing the elapsed time of long journeys and demonstrating to the public that it was not only glamorous but also safe to fly.

Some recent developments suggest that quality of air service is no longer improving. Average flight times have increased due to system congestion. Seating is more crowded, and load factors are higher. Terrorism and aging aircraft have raised serious safety concerns in travelers' minds. With respect to quality factors, passengers' subjective perceptions are more important than objective measurements of quality.

With the exception of the possibility of a second generation SST some time after the year 2000, there do not appear to be any positive developments on the horizon with respect to the quality of air travel which would suggest a new growth surge in the demand for air travel. The worsening congestion of the airport and airway system may cause a continued deterioration in the perceived quality of air travel.

The experience in the domestic U.S. market in 1988 may be indicative of some negative developments with respect to these three basic groups of growth factors. Domestic air travel was virtually unchanged from 1987 in spite of continued robust economic growth with rising employment. At the same time, travel by private auto and AMTRAK posted healthy gains. It has not been widely noted that the airlines were losing market share to other modes in 1988. The reasons are not surprising: air fares have been rising more than inflation since late 1987, and concerns about safety and congestion have been widespread.

The present FAA forecast methodology does not explicitly consider these qualitative factors either as explaining historical growth or as influencing future demand.

Forecast Reliability

Forecasts have many uses ranging from short-run airline earning estimates to guide investment decisions to very long-range forecasts to support decisions to build new airports or to design new aircraft. The purposes for the FAA forecast are not the same as those of the airlines, airports, manufacturers, and others who also may use the FAA forecast in their planning. The degree of accuracy needed varies with the use of the forecast.

In general, forecasts are needed to make better plans and decisions. However, the central purpose of a forecast is to minimize the risk of making a serious error. Forecasts achieve this by identifying contingencies and focusing on the relevant causal factors so that managers can make plans on a better informed basis. Judging the quality of a past forecast simply in terms of its absolute error is less relevant than determining whether the forecast led to sound decisions.

Some noted that there appears to have been a persistent tendency in recent years for both FAA and aircraft manufacturers to underestimate future demand. The consequences of this alleged conservatism include the shortage of airport capacity, congestion of the airways, and the inability of manufacturers to produce airplanes as rapidly as their customers want them.

However, it was noted that in most cases excessive optimism in forecasts leads to more serious consequences than does conservatism. Overcapacity based in part on overly optimistic forecasts has tended to produce economic

disasters such as destructive fare wars among the airlines. Chief financial officers usually prefer forecasts to be on the conservative side. Airport managers are subject to political criticism if they have an overbuilt "white elephant" on their hands.

One compromise suggested was that short-run forecasts should tend to be conservative, but long-run forecasts should err on the side of optimism. This puts the burden for making reliable forecasts on the federal government which is most concerned with longer-range forecasts. Airlines could plan conservatively in the short run but be able to take advantage of unexpected growth spurts if there are no capacity constraints in effect. Such deliberate biasing of forecasts seems an unrealistic concept at best.

Especially for forecasts prepared by FAA, political credibility is an important consideration. This can be achieved by demonstrating a history of reliable forecasts. It also helps to use "objective econometric models" which give the appearance of freedom from bias. In fact, it was acknowledged that such models are not free of the need to make subjective assumptions regarding many key input factors. Successful use of models depends on getting good input data and the best available assumptions on judgmental factors. FAA noted that they have received good cooperation from airlines and others on those occasions when they have requested a review of forecast assumptions. Forecasts based on a consensus of experts have proved to be superior to individual predictions over the long run.

Market Maturation

Considerable discussion was directed toward the issue of whether the market for air travel has matured to a degree that relatively robust growth expectations will turn out to be unrealistic. The case for slow growth and a mature market is supported by the experience of 1988 in the United States, where the expectation of rising costs and fares and air travel survey results suggest that the demand for air travel has leveled off. (See Table 3.)

Optimists pointed out several reasons for expecting continued strong growth: about two out of three adults in the U.S. do not fly in any given year although many have the means to do so; virtually all analyses indicate an income elasticity greater than 1.0 which indicates that spending on air travel should rise faster than incomes; population migration will continue to stimulate travel growth; the globalization of business will stimulate international travel, and rising incomes in the rest of the world are leading to the development of middle classes with the means to travel. The truth of the matter may be that there are both mature and growing sectors within the total air travel market.

TABLE 3. ATA/GALLUP SURVEY

Percent of Adult U. S. Population

Survey Year	Ever Flown	Flown During Last 12 Months
1971	49	21
1972	54	23
1973	54	25
1974	55	24
1977	63	25
1979	65	27
1981	65	24
1983	66	22
1984	70	27
1985	70	28
1986	72	31
1987	72	30
1988	73	29

Most airline marketing activity seems to be directed at gaining market share, especially share of the frequent business traveler market which accounts for a majority of passenger revenue. Future growth may depend on increased airline marketing effort targeted at potential growth sectors in addition to the lucrative but mature business travel market. Market research to discover and exploit such growth sectors is need; for example, demographic trends indicate that future population growth will be greatest among the elderly who have a relatively low propensity to use air travel according to surveys but could represent the best growth opportunity. The strategy of market segmentation which is common in many sectors of business holds promise for stimulating future growth of air travel. It is not clear how this possible development can be utilized in forecasting.

Forecasting Air Transport Costs

The cost of air travel is a critical input factor to all forecasting methodologies. There is uncertainty as to the impact on airline pricing of the recent concentration of the U.S. airline industry and the evolution of hub and spoke

route systems. Some believe that oligopolistic competitive conditions and the absence of low fare airlines such as People Express will mean that air fares will remain relatively high. Others point out that oligopolies in other industries have not precluded fierce price competition.

It was observed that the airline industry has not experienced a downturn in the business cycle since becoming fully deregulated in the United States, or "liberalized" in other parts of the world. Profit-oriented airlines in a free market environment, free from government control and protection and with a lowered public-utility type of obligation to meet societal needs, may respond to a drop in air travel demand by seeking to protect profitability even if service to the public suffers. It was suggested that there is a possibility that new low-cost carriers could arise from a recession using surplus airplanes to fill service gaps created by contraction of major carrier service. This is an example of an alternative scenario which could have a profound impact on the aviation industry.

There is current evidence that if airlines appear to be engaged in price gouging or other anti-competitive behavior, government may intervene to restore more competitive conditions. Congress has expressed displeasure with the loss of low fare service, threats to Essential Air Service, safety problems, alleged harmful effects of airline controlled computer reservation systems and dominance of airport hubs by one or two "mega-carriers." The Justice Department may take a more restrictive view of proposed airline mergers or route trades. It may be realistic to assume that a combination of political pressure and market conditions will prevent a significant rise in "real" air fares in the United States.

Even though there is no evidence of a strict linkage in the short run it was agreed that in the long run air fares must reflect changes in unit operating costs. A review of individual cost and productivity factors indicates that most will put upward pressure on unit costs and, ultimately, fares. Specific factors include the following:

1. Wage rates, especially for skilled workers, have bottomed out. Future labor shortages may cause some wage rates to increase more rapidly than the cost of living. Labor productivity should continue to increase and the hiring of new workers at "B" scales will also hold down labor costs. The most recent ATA cost data show that airline industry average compensation per employee increased about 4 percent in 1988 following an increase of only 1.6 percent in 1987 and a decrease of 2.1 percent in 1986.

2. Fuel prices have risen recently as a result of OPEC production cutbacks and the effect of the Alaska oil spill. In the long run, most forecasters expect relatively stable oil prices in real terms for at least the rest of the century. However, the threat of increased taxes on petroleum products cannot be dismissed. New aircraft will increase fuel efficiency, but it now appears that the breakthrough promised by propfan technology will not take place soon.

3. Capital costs will be affected by interest rates, the increased tendency to lease rather than buy airplanes, and the enforced reduction in average utilization due to ATC system constraints. Some airlines fear that stringent new noise rules may force premature retirement or retrofit of noisy airplanes, which will raise capital costs. The cost of expanding airport capacity will be passed along to customers in the long run.

4. Airline productivity may be near its peak in some areas. Passenger load factors are at historic high levels. Aircraft utilization is actually lower. Seating density is probably at its limit. Average trip speeds are held down by system delays. Only an increase in average airplane size holds much promise for higher productivity. Recent orders indicate a continued preference for small jets to serve smaller hubs and to open new transatlantic gateways.

These cost and productivity factors need detailed consideration in order to forecast where future cost levels will be. The statistical relationship between unit costs and average yields may be expressed for analytical purposes by the breakeven load factor. For the large U.S. carriers, the breakeven load factor in 1988 was 59 percent. The range among 15 airlines was from 54 percent to 65 percent. Actual load factor was 62.4 percent with a range of 58 percent to 68 percent. (Table 4)

If unit costs should rise, either fares must rise also or the breakeven load factor must rise. If market conditions rule out a significant increase in already high load factors, airline strategy will

strongly favor passing along higher unit costs to customers. The question is whether oligopolistic competitive conditions will allow such cost pass-throughs.

TABLE 4. LARGE U.S. CARRIERS, 1988

Airline	Passenger Load Factor Actual	Breakeven	Spread
American	63.5%	56.2%	9.4 pts
United	68.0	61.1	6.9
USAir	60.3	54.5	5.8
TWA	61.9	56.6	5.3
Delta	58.0	54.0	4.0
Northwest	65.5	62.1	3.4
Pan American	63.3	65.2	(1.9)
Texas Air	61.0	63.3	(2.3)
15 Airlines	62.4	58.9	3.5

Source: Aviation Consulting Services

The problem of predicting future price levels thus involves a combination of detailed analysis of voluminous objective cost and operating data and the exercise of judgment as to airline management's probable response. FAA's methodology should encompass both aspects. Previous efforts to predict fares by objective models have not been satisfactory.

Market Research Support for Forecasting

In the United States, as a legacy of CAB regulation, public data on air travel are much more detailed than in the rest of the world. However, compared with other industries, there are relatively little data available to identify, measure, and track the various segments of the air travel market. These segments vary widely in their marketing characteristics and their growth potential.

Four major segments are:

Nondiscretionary business travel

Discretionary business travel

Nondiscretionary personal travel

Discretionary pleasure travel

The key marketing characteristics which distinguish these market segments include:

Size of market,

Frequency of travel,

Price sensitivity,

Service and schedule sensitivity and flexibility,

Lead time in travel decisions,

Experience level, sophistication,

Brand loyalty,

Demographics -- age, sex, income, race, etc., and

Seasonality -- day of week, season of year, time of day.

This information is relatively easy to obtain by market research survey methods, and at least two major U.S. airlines conduct regular in-flight passenger surveys which produce this type of data. However, the industry as a whole has not supported an industrywide survey in the past. FAA would have great difficulty in getting airline cooperation in instituting such a survey. The Census Bureau has no plans to revive the Census of Transportation which might include such a survey. Until and unless a private sector initiative succeeds in this area, most airlines will continue to lack essential data for the forecasting and planning which is commonplace in many industries.

CONCLUSIONS

The present FAA forecast procedure appears to be generally satisfactory under the circumstances. Inaccurate forecasts were not seen as a primary cause of present difficulties of the air transportation system. FAA did acknowledge that it failed to anticipate the initial growth stimulus generated by deregulation and that it has erred in anticipating a revival of general aviation. It should be recognized by the government that the FAA forecast, which is primarily intended as a tool for FAA to plan activities and to allocate resources, is widely used by the aviation industry for a variety of other puposes.

There is a need to use the forecast process to explore more thoroughly possible contingencies and alternative scenarios. Some of these contingencies include business cycles, large swings in the price of jet fuel, imposition of noise rules, higher or lower yields, and system capacity constraints. The forecast methodology should be able to estimate the sensitivity of various aspects of the aviation system to such contingencies.

No strong need was expressed for the development of improved forecast models although the recent effort to appraise the quality of the existing models was applauded. The primary needs are for broader and better data concerning market characteristics and an expanded effort to obtain a broad consensus on critical assumptions from a representative cross-section of industry experts. It was recognized that some of this improvement depends on private sector cooperation or initiative. Specifically, it was noted that airline participation in the workshop was less than would have been desirable since so much of the raw data and analysis are generated by the airlines.