PART I   PRESENT AVIATION FORECASTING METHODOLOGIES

SUMMARY

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Methodologies:

Federal Aviation Administration.   Christopher J. Mayer, FAA, reviewed current FAA forecasting methodology and relevant literature and presented an analysis of the biases and omissions in many commonly used forecasting methods. He offered alternatives to the basic forecasting equation presently used by FAA and recommended that future research be directed toward improved understanding of the structure of fares and the role of traffic concentration at major hub airports. He also advocated less use of "intuition" in the forecasting process. His remarks were well received both in terms of his quantitative discipline in analyzing methods and his insights into the evolving aviation industry. Mayer stated that using pre-deregulation data in current forecasting methods could produce under-forecasts of demand, which has been a problem in recent FAA forecasts.

Airline. Paul Biederman, TWA, drew upon his experience in commercial aviation and airline revenue forecasting at TWA. He described the realistic process used at TWA which "...includes a large dose of judgment and number massaging to any econometric output before a forecast is formalized." The accuracy of revenue forecasts for the past two years in both domestic and North Atlantic sectors attests to the utility of a process that uses both judgment and analytical methods. Biederman described the TWA process that begins with cost factors, traffic mix, and yield and results in estimates of TWA market share and forecasts of passenger miles and revenue. These are used directly at the corporate level for financial planning as well as for staffing decisions and sales goals.

Aircraft Manufacturer (U.S.). Jack Howard, Boeing, presented the key steps used in preparing Boeing's market forecasts which start with economic conditions on a global basis and end up with product forecast by type of aircraft, capacity needs, and available lift. Howard stated that it was important (a) to be explicit in the identification of key assumptions,

(b) to use variations of judgmental assumptions to test their sensitivity, (c) to assess constraints, such as airport congestion, that affect demand, (d) to consider the financial health of the airlines and the manufacturing industry, and (e) to be as realistic as possible knowing that to err on the side of excessive conservatism or on the side of excessive optimism presents equal dangers. The long-term nature of Boeing's forecasts (15 to 20 years) and the significant investments necessary to support new aircraft warrant careful review by many managers within the firm.

Aircraft Manufacture (European). Didier Lenormand, Airbus Industries, presented the results of a recent study, "Short and Medium Term Requirement for Jet Aircraft in North America". Lenormand described the Airbus forecasting process which includes (a) factors affecting the pattern of aircraft orders, (b) elasticity of demand, (c) airline planning factors, and (d) the factors influencing orders for new aircraft. He described the Airbus "base case" approach, which included likely cycles of the economy and fuel prices through 2003. Lenormand also discussed an increased congestion scenario which, if it becomes reality, would result in U.S. flights constrained at no more than 60 percent above current levels. Scenarios are used within Airbus to test the sensitivity of key factors or barriers, such as congestion, and to obtain a better understanding of industry dynamics.

Airport Operator. Alice Herman and Johannes G. Augustinus discussed forecasting methodology at the Port Authority of New York and New Jersey. Herman indicated that forecasts are prepared to meet two pragmatic objectives: financial planning and facility planning. The substantial modernization under way at the three major New York - New Jersey area airports attests to the need for accuracy and realism in forecasts of airport revenue, costs, and capital programs. She also noted that both airside and landside planning depend on aviation activity forecasts. The Port Authority uses a blend of econometric and demographic approaches. Alternative scenarios have also been helpful in understanding the influence of key assumptions more clearly. Herman discussed new hubbing forecast methods as well as several new short-term forecasting approaches

under study. The Port Authority is required to make long term forecasts to the year 2050.

Discussion

Three themes ran through the discussion of present methodologies.

1. <u>Financial objectives are driving the industry to spend considerable effort on short-term forecasts and methods.</u>

o   Paul Biederman stated that 95 percent of his forecasting efforts were oriented toward the short term, since much of his revenue and cost projections went into profit and loss statements issued monthly.

o Alice Herman pointed out that large capital expenditures at the Port Authority had increased the need for accuracy in short-term forecasts.

o David Raphael stated that most DHL forecasting is focused on producing annual budgets and monthly marketing financial targets.

o Ed Greenslet cited airline management need to produce near-term profits as a factor in focusing on the short run.

o Several participants felt that conservative forecasts had become popular in the aviation industry in the past four years, due in part to the near-term orientation of aviation managers.

2. <u>There is a continuing shift to less sophisticated forecasting models and approaches.</u>

o Christopher Mayer recommended the use of one to three equations in modelling, and warned against the use of simultaneously solved equations due to biases that arise.

o Jack Howard stated that air traveler income and airline yield variables have proven useful in making traffic forecasts that, in turn, serve as the basis of projections of the new and replacement aircraft markets.

o   Alice Herman said that they used a single equation forecast for each of several key trends such as revenue passenger miles per capita, regional share of domestic enplanements, and New York region domestic traffic forecasts.

o   Marilyn Block, from the Naisbitt Group, cited the use of simple extrapolation in assessing new trends driven by consumer needs and concerns (See Part II).

o   James MacKenzie, from the World Resources Institute described their environmental forecasts as straightforward extrapolations.

3. <u>The use of scenarios, judgment, and market segmentation analysis can help deal with the considerable uncertainties of aviation forecasting.</u>

o   Jack Howard discussed the use of scenarios at Boeing to test key assumptions. Paul Biederman uses scenarios to assess the impact of economic conditions and competition. Didier Lenormand applies scenarios at Airbus to assess potential barriers to growth. John Fischer stated that he uses scenarios to assess "what if" questions at the Congressional Research Service. Gerry Pronk applies market scenarios at Fokker. Richard Mudge described the use of decision analysis techniques under conditions of uncertainty. David Raphael uses financial scenarios at DHL to assess the viability of new express cargo services.

o   <u>Judgment</u> continues to play an important role in aviation forecasting, both in establishing reasonable input assumptions and in interpreting or adjusting forecast results. Adam Pilarski of Douglas Aircraft cited the use of judgment in developing economic and traffic forecasts for specific regions. Bruce McClelland of British Aerospace and Louis Gialloreto of Air Canada apply both "reason" and judgment, which they consider especially important in forecasting international activities. Bill Nesbit also noted the use of judgment in his aviation consulting practice, as does Paul Biederman in his revenue forecasts.

o   <u>Market segmentation and airline strategies</u> were seen as new important directions that forecasting methods might usefully employ. Nawal Taneja called for the use of regional analysis to improve forecasting accuracy. Bill Nesbit and Christopher Mayer both recommended additional attention to understanding the structure of pricing and the effects of hubbing. Louis Gialloreto discussed the importance of understanding the effects of economic and business cycles.