

The largest number of Section 418 certificates have gone to small contract carriers which contribute very little to industry totals. Tonnage shipped by all-cargo commuters increased by almost 34 percent in 1978. This segment of the industry has had excellent growth since 1973, but as mentioned before, Federal Express statistics make up the major portion of commuter traffic.

SRI decided that the only way to present a picture of the present state of the industry was to rely on descriptions of what was happening to individual airlines rather than try to fit incompatible pieces of data together. Hearings on air cargo oversight were held in both the House and the Senate in the spring and summer of 1979. Testimony presented at these hearings provided data on Flying Tiger, Federal Express and Evergreen International. Witnesses from CAB and DOT also provided useful information in their testimony. This testimony, together with articles in the trade press and conversations with members of the industry and government agency staff, seemed to be the main data sources at that time.

A major problem was finding numbers showing the effects of deregulation on belly cargo. Oddly enough, there was no testimony on this during the hearings, although wide publicity had been given to cutbacks in the amount of belly cargo carried when passenger airlines were deregulated.

The profitability of domestic all-cargo operations was next to impossible to track because the CAB drastically reduced reporting requirements for all-cargo services in November 1978. Another problem concerned the allocation of ton-miles in Flying Tigers' 1978 data. What appears to be a large increase over 1977, turns out to be an adjustment to factor out all freight and express revenue ton-miles previously allocated to international all-cargo service. The change is attributed to Flying Tigers' addition of Anchorage to its domestic system.

So at the time the OTA study was being finalized, it was not possible to put together a complete picture of the state of the cargo industry. When the CAB reduced its surveillance of the industry and eliminated reporting requirements as a result of air cargo deregulation, it left both government and the public with no way of monitoring the performance of the industry under deregulation. In September 1979, the Air Freight Forwarders Association requested that the Board re-establish some minimal reporting requirements for forwarders and airlines that would at least provide data on where freight is moving and where traffic is developing. Senator Cannon supported this view. The Board held a meeting in December, 1980 concerning this issue and a decision is expected shortly. The Board is considering adjusting its T-8 schedule so that both domestic and international profit and loss information can be identified.

With the advent of Form 291 reporting requirements, it will now be possible to make data aggregations from information submitted by the 418 certificate holders. At present, it is difficult to determine how valuable such tabulations are, since it appears that only a very few carriers' information was included in such aggregations. The CAB has stated that it will consider bringing this group under Form 41 reporting requirements. Whether the implementation of such suggested alterations and others proposed by the Board's Information Planning Project Team will improve the availability of information on the entire air cargo industry is difficult to determine.

According to responsible CAB officials, it is presently impossible to generalize about the history

of the greater air cargo industry on the basis of reports available. It is possible to say something about segments of the industry, such as 418 operators (domestic all-cargo) and about certificated international all-cargo operators, but no industry-wide aggregate data have been available.

DEREGULATION AND FORECASTING: USES AND MISUSES OF DATA

Robert E. Dunn, USAir

Summary

Forecasts which have always played an integral part in carrier decisions, have become an even more critical management tool under deregulation. Because of rapid changes in the industry and in the probable level of competition, forecasting has become more difficult, yet more frequent, timely and accurate forecasts are now required than formerly. USAir routinely prepares route, station, and aircraft forecasts using Civil Aeronautics Board passenger, cargo and aircraft data as the primary input supplemented by other data sources. Other examples of the use of CAB data are in preparing corporate budgets, estimates of airport charges and in financial analyses. The CAB's Origin-Destination Survey of Airline Passenger Traffic is the only source of a passenger's true origin-destination and is the primary data used in route forecasting. Service segment data is also one of the most important data sources. Future reporting requirements have not yet been determined but in any event should be equitable as between the newer carriers and the established carriers.

Increased Importance of Forecasts In A Deregulated Industry

In late 1978 something happened that was to significantly impact the task of airline forecasting. Forecasts which, in the past, could be relied on as valid for two-three years or even longer, were suddenly rendered obsolete on October 24, 1978 by the official deregulation of the airline industry. Whether deregulation went far enough, as some say it has not, particularly with respect to passenger fares, or went too far, too fast, as some contend it has with respect to routes, is not of great moment to my topic. The fact is, with deregulation of routes as envisioned by the Airline Deregulation Act of 1978, opportunities existed, for the first time since 1938, for airlines to take rapid action with respect to entering or leaving routes.

Forecasts have always played an integral part in the decisions carriers make about a variety of matters. These decisions include, among many, which routes to operate, what airplanes to buy, when to expand or contract, what probable revenue and expense levels will be on a corporate basis, and so on. But, the Deregulation Act, which allowed carriers to rapidly enter new markets, also necessitated accurate, timely and more frequent forecasts. Further, the more rapid changes in the industry have caused forecasts to become out-of-date much sooner than in pre-deregulation days,

while also making forecasting an even more important, and critical, management tool.

Pre-Deregulation Approach

Prior to deregulation, carriers' route structures were chiefly the product of routes that had been authorized by the passage of the Civil Aeronautics Act of 1938 plus new ones which the Civil Aeronautics Board awarded, usually after lengthy hearings. Prior to November, 1978, the primary means of route expansion was to apply for a new route to the CAB, and that usually took time for it to be granted -- 18 months to two years was not unusual. In addition, the routes carriers operated were protected from unlimited entry on the part of other carriers, because the Board usually decided that if competition was warranted, it should generally be from only one or two other carriers.

Forecasting in this period was fairly straightforward. For example, if you were the only, or even one of only two carriers on a route in the domestic area, the task of forecasting usually was not too difficult. Granted, there were then, and still are, many variables affecting a forecast, but one key ingredient was fairly certain -- the number of competitors on the route. Likewise, the entire domestic route structure, in terms of competition, was a fairly stable, identifiable ingredient. Fare levels, strictly controlled by the Board, could also be projected with reasonable certainty. Knowing the probable level of competition and fares for at least the near to intermediate future, for example, 2-3 years, reasonable forecasts could be developed. The projections also could be expected to remain valid for a few years.

Current Approach

Passage of the Airline Deregulation Act of 1978 substantially altered that key ingredient of traffic forecasts -- probable level of competition.

With the automatic market entry and dormant route authority programs, this act, almost overnight, changed the scope of the industry. No longer could carriers be fairly confident that only a few of their routes might be subject to competition in the next year. What one carrier might not be able to operate successfully could be very profitable for another carrier with a different route structure, different equipment, and so forth. Requests for dormant route authority numbered in the hundreds and they were not limited to trunk or local service carriers. Commuter carriers, too, took advantage of this program.

In the spirit of deregulation, the Board moved toward completely open domestic route authority in another way -- by inaugurating its restriction removal program, whereby, in phases extending over only eighteen months, carriers certificated at domestic cities would ultimately be able to fly nonstop between any two of those cities after December 31, 1980. Almost complete freedom to operate between any two domestic points, whether on carrier certificates or not, will be effective after December 31, 1981.

What this all meant was that carriers were suddenly in a new arena. The number of competitors on a particular route may have been no more than the CAB might have picked, but the number of a carrier's routes subject to competition was vastly increased. For example, USAir entered markets such as West Palm Beach-Philadelphia, West Palm Beach-Pittsburgh, Baltimore-Orlando, Baltimore-Tampa, Washington-Orlando, plus Washington-Tampa. Historically, these had been dominated primarily by Eastern and Delta with United and National Airlines in one or two

markets. Not only was Eastern faced with USAir's entry into some of its more important Northeast-Florida markets, but Air Florida, TWA and United, also began service in several Florida markets from the Northeast area. As each carrier began its Florida services, it often served not just the "gateway" market but other "beyond" markets on a one-stop or two-stop basis.

What did all this activity mean for forecasting and the use of forecast information? Let us explore the available statistics from which decisions in this new era could be made. The statistics fall into three general categories covering passengers, cargo and aircraft with the primary data source being the Civil Aeronautics Board, which compiles and publishes statistics based on carrier reports. In addition, the Air Transport Association and other government groups such as FAA, DOT, and Immigration and Naturalization Service are other data sources.

Use of Passenger Statistics in Airline Forecasting

In forecasting, carriers chiefly use passenger or passenger-related statistics such as revenue passenger miles (RPM's). In this area, however, the variety of data can be confusing. Terms such as true origin-destination, on-board loads, local boards, on-flight origin-destination, segment or sector data, etc., can lead to utter frustration for someone not familiar with their definitions. In pre-deregulation CAB domestic route cases, incumbent carriers were frequently asked to supply much of this data from their internal records. However, not all carriers had the same type of data, and occasionally the same label was applied by different carriers to different types of statistics.

When preparing market or route forecasts, passenger statistics are probably those most frequently used. When developing overall system or industry projections, most people do not use individual market passenger data as their basis. It is simply too voluminous and outdated for those purposes. Through the Air Transport Association, the industry's trade group, and the CAB, carrier data on a system basis, including revenue passenger miles and available seat miles is available. These are used by carriers, the ATA, CAB, financial analysts, and others to project general industry or specific carrier trends.

These figures, whether on a market or system basis, reflect actions already taken by carrier managements with respect to their operations, such as aircraft types operated, markets served, prices charged (including discounts), and the general economic factors which were present. The latter, though playing a major role in carrier results, are not usually within a carrier management's control.

Cargo and Aircraft Statistics

From the cargo standpoint, much less data is available than in the passenger area. Except for some true origin-destination data provided in connection with certain CAB rate and related cases, continuous cargo true origin-destination data is not available. All-cargo carriers and carriers with all-cargo aircraft, face a much more difficult task when forecasting than do those involved with passengers. Individual carriers usually maintain cargo information for their operations on an on-flight or online basis and in terms of tons and/or ton miles. Service segment data, prepared by the CAB provides ton and ton mile figures on a segment by segment basis for all carriers -- individually and collectively.

Revenue tons or revenue ton miles are the most commonly used statistics for cargo projections and the only data available on an industry basis.

Aircraft statistics are also a key ingredient in any forecast -- passenger or cargo. You need to match the forecasted traffic with the proper aircraft and schedule in order to produce profit or loss estimates.

The number of available seats, the range/payload capability, direct and indirect costs, by category, investment and associated costs are items which must be known in order to translate a passenger or cargo forecast into a financial estimate. Most often, carriers have their own internal sources for this information if they operate the aircraft type. For comparative purposes, CAB Form 41 data is available for developing costs of aircraft operated by other carriers. The Forms 41 also contain information which, either directly or through computation, shows average stage length, average hours per hop, average seats per aircraft, etc. Aircraft and engine manufacturers are sources of anticipated costs for new aircraft types. From these, comparisons of one aircraft type versus another can be made, whether on a carrier by carrier basis or otherwise.

Understanding Available Data

The airline industry is said by some to provide more data to the Federal government than any other transportation industry. This wealth of statistics, however, is meaningless if it is not understood and correctly interpreted. The differences between true versus online origin-destination, on-flight versus on-board, and other items, is significant. For service segment data, on-board versus "local board" passenger numbers may be the same or different, depending on flight itineraries.

A short explanation of some of the more important statistics is worthwhile.

Origin-Destination Statistics

First and foremost, the only source of a passenger's true origin-destination is the CAB's origin-destination survey of airline passenger traffic, the O-D surveys. In addition to true O-D data, the Board also provides online O-D data: that is, that portion of the passenger's journey on a carrier-by-carrier basis. The latter statistics are classified as either "local", meaning the passenger's entire true O-D journey was via a single airline, or "connecting" which means that the passenger used two or more carriers in completing his or her true O-D journey. Each component is separately identified by carrier and labeled "connecting". In this way, the user knows that the passenger had a true origin-destination other than the market shown.

A simple example may help differentiate the two. Prior to USAir's entry into Florida, a passenger from Binghamton to West Palm Beach could have flown USAir between Binghamton and Pittsburgh and then United between Pittsburgh and West Palm Beach. The passenger's true O-D journey was Binghamton-West Palm Beach, but he was also two online passengers -- one for USAir in the Binghamton-Pittsburgh market and one for Eastern or United in the Pittsburgh-West Palm Beach market. In both markets he would be labeled as "connecting."

When analyzing the potential of a Pittsburgh-West Palm Beach route for USAir, we relied primarily on true O-D as a data base. This told us the volume of traffic whose entire journey was between Pittsburgh and West Palm Beach and the true O-D traffic between other cities on our system that could use Pittsburgh as a gateway to West Palm Beach. Forecasts developed using true O-D provided realistic

estimates of anticipated total "on-board" passenger loads for USAir's Pittsburgh-West Palm Beach flights.

Service Segment Data

This is one of the most important information sources available. Among other items, it sets forth -- by nonstop segment, the aircraft type operated, number of aircraft departures scheduled and performed, and inter-airport distances. Also included are the number of passengers boarded at one station and their deplaning stations and number of total on-board passengers. Either directly or through computation, information on revenue aircraft miles, revenue block or airborne hours, revenue passenger miles, available seat miles, load factor (either enplaning or total on-board), and average seats or passengers per departure is also available. Passenger statistics are also available by class or service. Cargo ton and ton mile information, shown separately for freight, mail and express are included.

For both origin-destination and service segment data, the significance, or lack of it, with respect to international traffic must be understood. Many international passengers who use a domestic flight as part of their total trip are included in domestic statistics. A few examples will highlight this. A Pittsburgh-London true O-D passenger who flies USAir between Pittsburgh and New York and then Pan American or TWA to London is included in CAB domestic O-D figures as a "portion of an international journey" passenger, but the printed O-D tables do not separately identify that passenger. Table 12, on microfilm or microfiche, is the first to do so. The Pittsburgh-London passenger who used TWA for the entire journey and changed planes at New York is counted in the domestic surveys as a Pittsburgh-New York passenger whose domestic leg was a part of an international journey. Even if the passenger used one-plane service on TWA all the way between Pittsburgh and London but went via New York, he is still counted in the domestic O-D surveys as a portion of an international journey passenger for the Pittsburgh-New York leg.

Identifiable domestic portions of international journey trips are not included in domestic service segment data so TWA's Pittsburgh-New York loads will not include the Pittsburgh-London O-D passenger who traveled via New York.

Immigration and Naturalization and Other Statistics

Immigration and Naturalization Service (INS) data is frequently used when preparing international forecasts. These figures show passenger movements by port of debarkation/embarkation, by scheduled versus charter service, by flag or carrier, and by U.S. versus foreign citizenship, among other ways.

The other statistics frequently used in forecasting include items such as aircraft and passenger-related costs, and general socio-economic figures including population, effective buying income, median household income, and so on.

Primary Uses of Data in Forecasting

The primary uses of the preceding data include, but are not limited to, three major areas:

1. Route forecasts -- how many passengers will be carried assuming specific aircraft types? Will the route be profitable?
2. Station forecasts -- what will or should be the aircraft departures, available

seats, and passenger originations or enplanements on an airport by airport basis?

3. Aircraft forecasts -- how many planes should be flown? How many seats should they have? Should they be single class, dual class or something else? What are the payload/range comparisons versus a system's needs? What are the costs of operating the different aircraft types? And, what is the effect of changing a current aircraft seating configuration to have more or fewer seats?

The route forecasts may be the most familiar. They entail the preparation of passenger estimates for a particular market, assuming a specific schedule which includes anticipated departure and arrival times, type of aircraft, online connecting opportunities, and finally, a profit and loss estimate.

Sometimes, it may be necessary to forecast in and out of an airport or city, a part of the system, (for example, Florida operations), or an entire system's results.

Examples of other applications include using data to develop:

- A. Facility forecasts - how many gates and how much ticket counter or baggage space are needed? What will staffing requirements be?
- B. Airport charges - what is the carrier's operations or passenger level versus the total for all carriers and on what basis should the charges be assessed?
- C. Presentations to financial or lender institutions.
- D. Development of corporate budgets.

If someone has this vast array of data available and knows what its uses are, why is forecasting not a relatively simple matter? The answer to this may be as varied as the data itself, but apart from major variables such as the national or international economic climate and demographic factors, there are several specific ones that make forecasting an inexact process including failure to correctly understand or interpret the basic data.

Common Pitfalls Arising From Not Knowing Data's Limitations

This discussion will now highlight some of the more likely, but not necessarily obvious areas where a lack of understanding of available data and its limitations can lead to erroneous conclusions - sometimes with considerable adverse financial implications.

Much of the data in the airline industry is already "outdated" by the time it becomes publicly available. This is not meant as a criticism, rather as a fact of life. The latest currently available CAB O-D data is for the period ending March 31, 1980. Service segment data is current through the month of September, 1980.

Quite often, events which are no longer applicable, such as work stoppages or aircraft groundings, affected those data bases, or more recent occurrences such as service inaugurations or withdrawals, have changed conclusions which might be drawn from that history.

One example involves new market entry that changed the basic composition of traffic shown in service segment reports. One nonstop route USAir entered since deregulation was Pittsburgh-West Palm Beach. United was the incumbent nonstop carrier in this market and its service segment data included on-flight and on-board passenger figures. Both numbers include inter- and intra- line connecting passengers as well as passengers whose sole journey was Pittsburgh-West Palm Beach. In analyzing this data, one has to remember that USAir's service at Pittsburgh is different from that of United, both in terms of number of cities served and number of flights operated.

Suppose you were determining the feasibility of an Albany-Pittsburgh-West Palm Beach single-plane flight routing for USAir and forecasting both Pittsburgh and Albany-West Palm Beach traffic. Albany passengers who formerly flew USAir between Albany and Pittsburgh, and then United between Pittsburgh and West Palm Beach were part of United's Pittsburgh-West Palm Beach on-flight O-D. For USAir, however, these passengers would become an Albany-West Palm Beach on-flight O-D passenger. No longer would they be boarding at Pittsburgh. United's historic Pittsburgh-West Palm Beach data had to be adjusted to remove those Albany passengers or else they would be counted twice -- once as Albany-West Palm Beach and once as Pittsburgh-West Palm Beach. Failure to remove this duplication would result in much higher anticipated Pittsburgh-West Palm Beach passenger loads that, in reality, would materialize. To anticipate average Pittsburgh-West Palm Beach load factors of 65 percent, for example -- which would be profitable -- and realize only 40 percent -- which would be unprofitable -- is not a result likely to instill confidence in the forecaster's ability.

A similar traffic duplication exists if one uses both CAB true and online O-D statistics when preparing a forecast. The historic Albany-West Palm Beach true O-D passenger who was also interline connecting for United in the Pittsburgh-West Palm Beach market, in the future would be only one passenger with an identical true and online origin-destination, Albany-West Palm Beach. No longer would he be included in online O-D statistics as Pittsburgh-West Palm Beach. Thus, new route operations can significantly alter historic data.

As other examples, consider traffic statistics for U.S.-Canadian routes and Immigration and Naturalization Service traffic figures. Several years ago, the U.S. and Canada reached agreement whereby Canada would collect, edit and publish traffic figures for these routes reflecting routings on carriers of either or both countries. The U.S. passenger statistics would continue to be published but would not contain all passengers on the routes (i.e., passengers whose total journey was on Canadian carriers are not included). When developing statistics for these routes, therefore, one cannot add the figures from the U.S. surveys to those from the Canadian surveys. To do so results in some duplication and overstatement of total traffic in many markets.

INS data, in large part, represents traffic flows, i.e., movements between one point of embarkation and another point of debarkation. New York-London statistics include not only New York-London true O-D passengers, but (a) New York passengers using London as a gateway to other European points, (b) passengers from U.S. points beyond New York who used New York as a gateway to London, and (c) passengers from points beyond New York to points beyond London who travelled via New York and London as one leg of their journey. Military traffic is included in several Immigration Naturalization Service

statistics. For example, rest and recuperation or "R&R" movements, may be an unidentified part of the published total traffic figures but separately identifiable in the unpublished data. Passenger statistics in some major Pacific markets were especially affected by this traffic during the 1960's. Failure to recognize that these passenger movements were only of a temporary nature could lead to conclusions of atypically high growth rates.

Other pitfalls which sometimes go unrecognized and unaccounted for include:

- Determination of traffic trends or averages from airport activity statistics which are affected by strikes, inauguration of service and the increase or decrease in operations at other nearby airports.
- Determination of trends in markets where former or current intrastate carrier operations make superficial analyses of CAB data very misleading. Until recently, carriers such as Pacific Southwest Airlines and Southwest did not report their O-D passengers to the CAB. Though CAB data may have shown several intrastate markets as having stable or declining passenger volumes, that may not have been correct. Total market traffic, including passengers carried by the intrastate carriers was in fact growing in most cases.
- Failure to remember that fares and special promotional programs play an important part in traffic analysis. The 1979 coupon program offered in several transcontinental markets by some carriers, but not others, is thought to have produced different carrier market shares than would have existed without those programs. Likewise, the \$99 and \$109 transcontinental fares in 1980 probably shifted to those routes some passengers who might have flown elsewhere and also generated traffic which otherwise might not have flown at all.

The preceding suggest the need to be aware of and, where necessary, adjust for these types of situations.

Future Data Requirements

With the sunset of CAB coming not too far in the future, the questions of what current data requirements should continue are being addressed. This topic is currently under discussion by several groups including carriers, the Air Transport Association, CAB, manufacturers, consultants and academic people, to name a few. The outcome is not yet clear and probably will not be for some time to come.

Some believe that in a truly deregulated industry, there should be, for example, no reporting requirements for passenger statistics on a market by market basis; that operating and related costs, and aircraft indices are basically privileged and private information -- the business of no one but the particular carrier itself. Others think that all or much of the current statistical information should continue, albeit reported to other governmental agencies or perhaps a non-governmental data collecting body after CAB sunsets.

Some of the CAB's programs, such as essential air services that will shift to other areas of the Federal government may require continued reporting of selected data. But, for many other statistics the solution is not readily apparent.

One point that should be remembered in this discussion is that reporting requirements should not be biased in favor of continuing current reports by established carriers to the exclusion of requiring comparable data by the newer carriers. The present level of traffic and service detail for reports such as service segment data, provide a wealth of market information to new or aspiring carriers which do not yet have to file comparable data themselves. Rather than allow this, would it not be preferable, and indeed, much more equitable, to reduce the present level of detail for carriers filing this information? If new carriers file summary information only, not on a flight-by-flight basis, should not existing carriers be allowed to reduce their reports to this level as well?

This reduction can probably be accomplished without sacrificing information which the Board, or other governmental groups, need in order to carry out their prescribed programs.

Conclusion

Forecasting in a deregulated industry has presented a new challenge to anyone involved with the airline industry. The necessity for more frequent analyses due to changing industry conditions is apparent. The need for variable type forecasting, for example, forecasts assuming more than one condition such as the number of flights and carriers in a market, is more evident now than in the past.

Management must plan -- for investment purposes, for aircraft acquisitions and retirements, for profitable operations. To do this it needs to know where it can best operate and how much its profit level will be. The rapidly changing environment in which airlines now function highlights the importance of accurate forecasting. Forecasting is not getting any easier but it is certainly more interesting, challenging and less predictable.

USES AND LIMITATIONS OF CAB TRAFFIC FLOW DATA PROGRAMS

Harley J. Unger, U. S. Department of Transportation

Summary

Traffic flow statistics have essential non-regulatory uses for the airline and aerospace industries and may be essential to whatever responsibilities and functions regarding air transport the United States government continues to exercise in the post-CAB era. U.S. data are also an essential ingredient of major international aviation statistics programs. Current CAB data programs are well-designed and efficient and the areas where improvements in traffic flow data are most needed in many cases are non-CAB data sources. Thus, there is a need not only to preserve those portions of the CAB traffic flow statistics that are considered to be essential but also to improve the traffic flow data originating from sources outside the CAB.

Introduction

It is important to take a good look at the Civil Aeronautics Board's major traffic flow statistics programs in terms of the critical decisions that will have to be made in the next two years regarding