are a maze of qualifications and exceptions noted by the auditing firm that reviewed the balance sheets, then the union will need to be aware of that information. State corporate reports and product line reports filed with state or federal agencies also give information that is readily available to researchers. The general health of the industry is determinable from periodic Census Bureau statistical reports and from the Bureau of Labor Statistics documents published by the Department of Labor.

Contract information is routinely available to unions and to managers from the Bureau of National Affairs publication "Collective Bargaining Negotiations and Contracts". The employer and union parties to a contract generally permit public release of basic information about a contract, including wage information, term of the contract, workers covered, locations, etc. The results of union elections are routinely distributed by the NLRB's election statistics office. That organization publishes the monthly election reports, which the NLRB is required to publish. Listings are by union, company name, number of employees eligible, outcome of the vote, and Standard Industrial Code (SIC) applicable to the unit in which the voting took place.

By the use of the published services and generally available library sources, a union knows the employer's financial position, the general health of its market, its record with union elections, the existing and new contracts governing its workers, and the sites at which particular union successes or failures have occurred. The employer has access to the same information and can plan to respond to a campaign with information on subjects such as criminal conduct by union officials, losses suffered by the union in related firms' elections, and weaknesses in other contracts for other facilities.

At that point, the public sources may be exhausted, and the amount of information that the union can gather through direct observation may be exhausted. The statutes and the contractual obligations governing normally undisclosed information become essential to successful bargaining - if they can be understood and managed. For the employer, defending some of the same data against disclosure may likewise be essential to successful bargaining positions on important issues.

So begins the use of information law to assist in the collective bargaining process.

Duty To Disclose In Collective Bargaining Process

The subject of information exchange is a controversial one in every case in which information withheld is power denied.

The option that "knowledge is power" captures the spirit with which information sharing is imbued in the context of collective bargaining. The legal system recognizes the truth of the axiom as it applies to the bargaining responsibilities of transportation corporations subject to the Railway Labor Act. Employers and employee organizations are required to exchange all information relevant and useful in the collective bargaining process. The duty to share information has been developed and expanded over the five decades since the enactment of the Railway Labor Act. Section 3 paragraph (i) "disputes between a group of employees and a carrier ... concerning rates of pay, rules of working conditions shall be handled ... with a full statement of the facts and all supporting data ... "

In other industries, the exchange of information can be long, the burden of furnishing the data great, the form in which the data is furnished inconsistent and costs due to delays in bargaining high. Some industries rely on the Primary Act of 1974, the Freedom of Information Act, and other legal recourse due to a need to force employers to provide relevant data and in so doing, competitively sensitive data has sometimes become public and hurt the company.

Contract, state law or federal regulations, currently give unions much greater power to obtain employers information and examine many sensitive aspects of employers' affairs. Until and unless society sorts out the privacy concepts, proprietary protections of business data, union access rights, and government passage of data from one competing firm to another, all concerned should work together to preserve the existing CAB's Uniform System of Accounts which does not give away competitive information, which provides sufficient data for labor purposes and which minimizes the reporting burdens.

AIR CARGO TRAFFIC AND FINANCIAL DATA CONTINUITY PROBLEMS AND USES

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Summary

In studies of the U.S. air cargo industry and of the impacts of advanced aircraft technology on the future of the industry, requested by the Congress, Civil Aeronautics Board data and publications have been the primary sources. Lack of consistency and compatibility in the data and changes in reporting requirements tended to degrade the quality of the analysis. The elimination of CAB data reporting requirements for air cargo in 1978 has made it extremely difficult to make a comprehensive evaluation of the state of the industry or to monitor its performance under deregulation. 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.

Introduction

Congress has been increasingly concerned with the growing threat posed by subsidized foreign competition to U.S. built aircraft in civil air transport markets, such as the multinational A-300 that has captured 30 percent of new transport aircraft sales. The Office of Technology Assessment (OTA) was charged by House and Senate committees with analyzing the impacts of advanced aircraft technology on several air transport areas, including the air cargo system, over the next twenty to thirty years. SRI assisted the OTA in defining the research problems involved in the air cargo analysis and provided chapters on the history of the air cargo industry (1949-1977) and on the state of the industry since deregulation.

SRI examined impacts of major past aircraft technological developments on air cargo operations as an indication of the effects that might be expected from future advances in technology. In this analysis it was attempted to determine the effects, if any, of these developments on total air cargo traffic, on the distribution of cargo traffic between all-cargo and the belly compartments of passenger (combination) aircraft, and the impact on costs, revenues and profits.

SRI had hoped to present the OTA with a clear, concise statistical picture of the air cargo industry from its beginnings after World War II through the present deregulated environment. Unfortunately, the condition of our source materials and limitations of both time and budget did not permit this.

The primary sources for information were the Civil Aeronautics Board's "Handbook of Airline Statistics" for U.S. statistics and ICAO's "Civil Aviation Statistics of the World" for world figures. Year end issues of the Board's "Air Carrier Financial Statistics" and "Air Carrier Traffic Statistics", as well as the CAB "Supplement(s) to the Handbook of Airline Statistics", were used to update the primary "Handbook" beyond 1972. For more detailed U.S. industry data, CAB publications entitled "Trends in Airline Cost Elements" and "Trends in Scheduled All-Cargo Service" were used. ICAO publications entitled "A Review of the Economic Situation of Air Transport", which presented information for the years 1963 through 1976, were also utilized.

Air Cargo Data Needs

The study required operating revenue and ton-mile totals for U.S. domestic, U.S. international, total U.S., and world (ICAO) operations. The items to be totalled to match the CAB definition of air cargo were freight, express and mail. Excess baggage was excluded.

The task might have been shortened had the air cargo data elements been consistently available and compatible over the historical period. The numerous adjustments that had to be made to reported data to produce comparable tables may seem of minor importance when considered individually, but when taken as a whole they tend to complicate and degrade the quality of data available to support the work. For example, ICAO data excludes mail but uses the terms "freight" and "cargo" interchangeably. SRI had to add in mail, standardize terminology, and convert tonne-kilometers to ton-miles to facilitate comparisons with the more extensive CAB air cargo data. Since ICAO included USSR and PRC data only for a recent period, these were excluded to avoid misinterpretation of longer-term historical trends.

The many changes in the definition and tabulation of U.S. air cargo data, reporting requirements, industry composition, and air carrier classification also demanded consideration and explanation in the analyses and data presentations.

Three developmental periods were chosen for analysis -- the period of the introduction of long-range aircraft in the 1950s, the introduction of jet combination and later jet all-cargo aircraft in the 1958-1969 period and the introduction of wide-bodied jet all-cargo aircraft in the 1970s.

During the first analytical period, 1949-1957, long-haul, piston-powered aircraft were introduced with true U.S. transcontinental and long-range international capability. The study concentrated on the analysis of U.S. air carrier operations. All-cargo carriers, then certificated, began reporting traffic, expense, and revenue data to the CAB in 1949. Combination carriers reported cargo traffic and revenue data during this period, but were not required to estimate all-cargo expense and profit data until the 1960s.

While data on the amount of freight carried in the belly compartments of combination flights were not readily available, the preponderance of the combination carriers (who then offered very limited all-cargo service) in the total air cargo traffic picture left little doubt that most cargo was then moving in combination flights.

It was possible to compare the relative growth rates and market shares of all-cargo and combination operations both domestically and internationally and analyze the growth in air cargo traffic generally. But the study could not determine with any assurance from the data available whether this growth was due to:

- The availability of longer-haul aircraft
- The availability of all-cargo carriers
- The continued stimulation of the Korean War
- Other unidentified factors

Impact of Technology

The fundamental purpose of the analysis -- to determine the impact of advanced technology aircraft on air cargo costs and revenues -- therefore, could not be accomplished for this analytical period.

The jet era includes two major aeronautical technological developments. The first and most important in terms of impact on traffic and costs was the introduction of jet-powered aircraft in combination service in 1958 and in freight service in 1963. The second was the introduction of wide-bodied aircraft in passenger/cargo service in 1970 and in freighter service in 1974.

The study was more successful in assessing the impact of the original introduction of jet aircraft than that of either long-range piston or wide-bodied jet aircraft. Two of the cost impacts of the introduction of jet aircraft were well known throughout the industry when this analysis was begun. Sharp reductions in maintenance expense resulted from the essentially simpler structure and lengthened time between overhauls of jet engines. Fuel expense also declined. There were other economies as well. When taken together with the increased speed and capacity of jet aircraft over piston aircraft they replaced, these factors could be expected to produce decreasing unit costs in maintenance and fuel despite the increases in traffic during the period. Analysis of 1957-1972 individual cost element data (for total airline operations, not all-cargo alone) display the expected decline in fuel and maintenance as a percent of total costs and a general decline in the operating expense unit cost curve. Since passenger and cargo jet aircraft were the same general types, an analysis of raw Form 41 data on individual carrier all-cargo operations could be expected to show a similar pattern.

In comparisons of the traffic, expense, and profit performance of all-cargo and combination carriers after the introduction of jet aircraft, the study relied on a CAB publication, "Trends in Scheduled All-Cargo Service". In this, the CAB combined data for 1963 - 1977 from all-cargo carriers with data that combination carriers reported on their all-cargo operations for 1965 - 1977 on CAB Form 242. Reporting on Form 242 was discontinued in 1978.

This report enables the tracing of the total all-cargo as well as the relationship of all-cargo to combination carriers in traffic, expenses, revenues and operating ratios for both domestic and international operations. It further presents statistics in tabular and graphic form on the distribution of domestic and of international cargo traffic among different aircraft types. From this the study was able to trace the growing dominance of jet cargo carriage during the 1960s, the growth in stretched DC-8 traffic to 40 percent of the total by 1974, and its decline to 24 percent in FY 1978 following the advent of the B-747F in 1974. By FY

1978, the B-747F carried 57 percent of domestic U.S. all-cargo traffic and 81 percent of U.S. international all-cargo traffic.

This report also presented figures that purport to represent the percentage of all-cargo to total trunk and all-cargo carrier cargo traffic, including the traffic in the belly compartments of carriers not operating all-cargo aircraft. There is some disagreement about the exact meaning and scope of these data.

With all these comprehensive data available on the U.S. air cargo industry, what was the problem in assessing the impact of jet introduction and of the wide-bodies?

The industry experienced normal shifts in company composition over the years as carriers attempted and then withdrew from all-cargo service. Braniff and Delta do not appear in domestic statistics until FY 1965, Northwest in 1967. Delta dropped all-cargo service in 1973 and Eastern in 1975. Continental operated all-cargo service for only four years and Western for two. TWA discontinued all-cargo service in 1978.

Of the four all-cargo carriers certificated in 1949 -- Slick, Flying Tiger, U.S. Airlines and Airnews -- only Flying Tiger remains. Of the two international all-cargo carriers, Aerovias Sud Americana and Seaboard, only Seaboard remains and it has merged with Flying Tiger. U.S. Airlines was succeeded by Riddle which had some Carabbean rights already. It later changed its name to Airlift, bought some of Slick's routes and absorbed Aerovias. Slick's operation had been an off-again-on-again affair since its abortive merger with Tigers in the mid-fifties. Now Airlift's future may be in doubt.

The most important change in international all-cargo statistics was due to classification of operations. In 1969, when Hawaii and Alaska became domestic points, carrier traffic to these areas previously grouped with international became domestic. This included part of Pan American's Pacific traffic. Now the new cargo deregulation act makes traffic with Puerto Rico domestic. Add to this that the data are chopped off by the discontinuance of the combination carriers reporting on Form 242 in 1978 and that we have little continuous data on new 418 cargo carriers like Zantop and Evergreen. The biggest gap is Federal Express, that reported only data required of commuters before deregulation, despite the fact that it has been a significant factor in the U.S. domestic small package market since 1973.

Assessing the impact of wide-bodied aircraft was very difficult. Despite the problems in interpreting the available data, the study was able to determine that the advantages of jet speeds, capacities and costs over piston aircraft stimulated cargo traffic and revenue growth as they did the passenger sector. But the wide-bodied impact could not be determined. There were many reasons. When wide-bodied aircraft entered passenger service in 1970, air traffic had been slipping for over two years. Few routes could support the B-747 -- the largest and unfortunately the first to operate. Traffic was not much better two years later when the DC-10 and L-1011 came in. When the B-747F freighter entered service in 1974, the United States was beginning to recover from the effects of the Arab oil embargo. During the embargo, carriers actually grounded the wide-bodied jets, using the fuel saved to operate two frequencies of smaller older jets. Since the embargo, there has been an escalation of fuel prices and of many other airline costs. Inflation in labor, materials, supplies, and capital costs are, to some extent, attributable to oil price increases.

In the face of these exogenous factors, it proved impossible to isolate the impact of wide-bodied aircraft on costs or revenues. It could be shown that the B-747 had become the preponderent international freighter and that it was dominant domestically. But did it stimulate traffic, slow cost increases or revenue declines? And as the U.S. approached a period of temporary slackening oil price increases and booming air traffic in 1978, the basic profit and loss data for all-cargo service operated by the combination carriers were cut off.

Impact of Deregulation

When the study attempted to describe the state of the industry since deregulation, none of the usual statistical publications were found adequate. Federal Express, for example, was probably the most active all-cargo airline under deregulation, expanding routes and beginning the operation of large aircraft. Historical data for Federal Express, however, were, as noted, reported with commuter airlines. These cargo data are not compatible with the cargo data reported for Section 401 carriers (trunks, local service and the three major all-cargo carriers). Some large charter carriers also were becoming prominent in air cargo with the same problems of lack of continuity in the data.

The domestic scheduled all-cargo industry experienced seven years of losses during the period 1970-1976. As a result, American and United reduced service and Delta, Eastern and Continental eliminated freighter service altogether. During the first year under deregulation, Pan American was the only trunk carrier to begin new cargo services. TWA discontinued its all-cargo operations and there was little activity from other CAB certificated carriers. Six supplementals received the new 418 (air cargo) certificates, but only two (Evergreen and Zantop) began new service. As expected, the previously certificated all-cargo carriers, Airlift, Flying Tigers and Seaboard, took advantage of the new route freedom. Tigers was especially aggressive in expanding its operations.

Beginning in November 1978, any citizen of the U.S. interested in operating an all-cargo airline may apply for a certificate under Section 418 of the Federal Aviation Act. Carriers certificated under Section 418 are unrestricted as to markets served, equipment utilized, and rates charged in the conduct of domestic all-cargo operations. This enabled such major air freight forwarders as Emery and Airborne to receive certificates, but most forwarders have been reluctant to get into the direct carrier operations. Delta, Continental, and other major airlines have received 418 certificates but have initiated little action. Pan American and Seaboard, primarily international carriers, extended all-cargo service to a number of domestic points.

SRI found that it would not be meaningful to update the charts that had been used. A different approach was needed to show what was happening in the industry. There had been no rush of new entrants to the air cargo industry. High startup costs and the cost of freighter aircraft discouraged this. The carriers that were operating freighters after deregulation were, for the most part, the same ones that operated freighters before deregulation. The act permitted Federal Express to expand its operations by purchasing large aircraft. It enabled Evergreen and Zantop, both of which had formerly provided only charter services, to move into scheduled domestic service.

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 deregultion 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,