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Job Flight and the Airline Industry:
The Economic Impact of Airports on Chicago and Other Metro Areas

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"It is not uncommon for airport development to be curtailed due to citizen opposition; in fact, economic impact studies are often commissioned to convince nay-sayers of the advantages of airport development." (National Council for Urban Economic Development 1989)

What does O'Hare Field mean to the Chicago area economy? It means jobs and plenty of them, at least according to a steady stream of studies flowing from the offices of the City's Aviation Department, Airline Trade Associations, and Airport Planning Commissions. But how many jobs are enough and how vulnerable is Chicago's economic health to the expected rise in air travel congestion during the 1990s? Local leaders and state representatives are being asked to carefully consider these questions as the proponents of an expanded O'Hare marshal their forces to push for programs that can ease the region's air travel delays. Such programs may include added runways, a new terminal, and Western road access to the O'Hare Field in addition to installation of more advanced air traffic systems and lighter work loads for overburdened traffic controllers.

Some of these solutions will be accompanied by significant costs and burdens as well, thereby making the choices over whether to expand very difficult. Expanding airport capacity by adding flight operations may add to total aircraft noise which neighboring suburbs have become less tolerant of in recent years. So too, some argue that further airfield growth at the O'Hare location would not yield great benefits because large portions of the Chicago area are ill-served by their inaccessibility to O'Hare. Therefore, it is contended solutions to Chicago's increasing air travel delays should concentrate on siting a third airport at a distant location.

In this manuscript, we add to the local public debate by explaining the method by which airport planners arrive at "economic impact" of airfields. Although "economic impact" contributes significantly to the public's understanding of the role of airports to regional economies, it is also true that decision making can easily confuse "economic impact" (as typically measured) from "economic benefits". The two are not the same because "economic impact" usually includes items that are not net benefits to the community. At the same time that "impact" overstates benefits, however, still other important economic benefits are often neglected in using standard airport planning practices. In particular,

the value of air passenger travel and air cargo convenience to many businesses are neither recognized nor counted in economic impact studies.

Using previous studies of airport activity in the Chicago Area and in other large metro areas, we illustrate the difficult road that must be traveled in evaluating the economic importance of airport activity in the region. At the same time, we examine the basis for the Chicago economy's successful growth during the 1980s, and the degree to which extensive air travel facilities have been a critical element in the region's success.

Cost-Benefit Analysis

Economic analysts have developed both a rigorous methodology and have compiled a large body of actual applications in comparing the costs and benefits of those projects that are ultimately decided by public consent. Cost-benefit analysis attempts to account for all possible costs and benefits to society, properly weighted by time, in connection with a public project. Large projects invariably involve losses to some people and gains to others. Such transfers are not usually considered in the cost-benefit calculations by economists but are laid out and presented separately for consideration by policy makers. Economists have nothing much to say about how the fruits of society should be distributed or what is "fair" so that cost benefit analysis generally guides the policy maker with the proviso that the distributional effects are not a hindrance. These "fairness" considerations, along with the general exigencies of politics and law, has generally meant that airports are almost never decided on the basis of strict cost-benefit criteria alone.

It is little wonder, then, that the typical analyses of "the economic impact of airports on metro economies" are to be found as separate studies or chapters within larger regional efforts to decide whether to build or expand a local airfield (see Table 1). Moreover, the "economic impact" of airfields has become a routinized methodology; but one that often may not be the primary consideration in the decision.

Economic Base Multipliers and Input-Output

Two general methods of estimating the induced economic impact of airport activities are commonly used. The most common adapts a crude sort of "multiplier" from a body of economic theory known as "economic base" theory. Multipliers are simply the factor that, when multiplied by direct and indirect employment or income, arrives at the total employment and income emanating from the air travel-related industry. The idea of economic multipliers is derived from "economic base" theory which posits that, to a rough order of

Table 1**Summary Features of the Economic Impact Studies
of Major Airport Developments**

<u>Location of Airport</u>	<u>Conducted by . . .</u>	<u>Economic Impact Total</u>
New York-New Jersey Metro Area	C-E-I-R Associates for the Port Authority of New York in 1960	121,000 jobs \$683 M payroll (1959)
Los Angeles Int'l Airport	Waldo and Edwards Inc.	102,000 jobs (1970)
Dallas/Ft. Worth Regional Airport	Regional Science Research Institute	47,000 jobs (1970)
Chicago O'Hare & Midway	Landrum & Brown	124,780 jobs (1977)
Portland, Oregon "Port of Portland"	Economics Research Assoc.	40,693 jobs (1970)
3rd London Airport	Roskill Commission	190,000 jobs (1966)
Houston's Hobby Airport	Peat Marwick	7,200 jobs (1987)
All U.S. aviation	Wilbur Smith Assoc. Commissioned by Partnership for Improved Air Travel	\$522 Billion (5.6% of GNP) (1987)

approximation, the total economic activity of a metro area or region owes its existence to "basic" industries. For the most part, basic industries have been designated to include manufacturing, agriculture, and mining, although certain services can also be eligible (e.g. tourism) provided they are sold to outside residents. Multipliers are inferred by observing the ratio of total regional income to that of basic industries. In the theory, basic industries (i.e. often referred to as "export" industries) generate an initial round of local income as demand for the products arise from outside the region. Subsequent rounds of spending of this income in the region (including payroll spending by local workers in basic industries) generates nonbasic employment and income. In this way, total regional income and employment depends on basic industry performance and growth.

In many studies, airport activities are treated as basic industries; their level of economic activity is factored upward by regional multipliers to arrive at induced and total regional activity (see Pittsfield 1981 for a review). A problem with this approach is that the economic base theory itself is extremely crude. In short, it is mistaken to believe that all regional income arises from out-of-region demand for basic industry product. Instead, specialization and trading **within** the region, as well as productivity enhancements within the region's borders, can be very significant factors in regional growth and development. Secondly, the process of arriving at the regional multipliers by discriminating basic from nonbasic industries can be capricious at best. Some manufacturing industries, such as bread-baking and beer-bottling, are locally driven whereas many service industries, such as investment banking or R&D, may be serving external demand. Both of these problems lead to inaccurate measures of the multiplier effect that is applied to enhanced airport activity. As if that isn't enough, many economic impact studies of regional airports do not even calculate the region's specific multiplier but rather "borrow" multipliers that were applied in other regional economies (see Al Chalabi 1988, for example). But the basic/nonbasic relation may differ greatly from region to region.

A smaller number of impact studies use input-output models as their basis (see Waldo & Edwards 1970; Economic Research Associates 1979; Wilbur Smith Associates 1989; Regional Science Research Institute 1970). Input-output models must first construct an extensive table of the region's market transactions between industry sectors, between industry and household sectors, and between regional sectors and the outside world. Arithmetic manipulation of the transactions table yields a set of multipliers that can, for instance, produce the ultimate product, income, or employment resulting from a demand stimulus in any given sector. Thus, an increase in airport activity can be regarded as an initial demand stimulus whose impact is distributed amongst industry and

household sectors. The input-output model then produces the final output-income-employment impacts as the initial spending impulses percolate through the local economy.

Input-output tables are used less frequently because they are costly to build owing to the large amount of data and information needed to construct the transaction table. However, regional models can be constructed from the national I-O table and the Bureau of Economic Analysis stands ready to assist in these efforts (U.S. Dept. of Commerce 1981). Many analysts question the reliability of this process of "regionalizing" the national table because regional economies differ so dramatically from the nation in their interindustry transactions. In response to this problem, some recent efforts to build regional I-O models using local data have been undertaken for the Chicago area and elsewhere (e.g. Israilevich 1990).

Even when a proper model can be accessed for the regional economy, however, precautions should be heeded with respect to induced impacts and "created jobs". Analysts do not always recognize that capacity constraints can be encountered in the regions so that either:

- 1) the induced economic impacts will not be realized in the local area due to capacity constraints, or
- 2) the induced impact will be realized in the local area, but only because significant in-migration of capital and workers occurs.¹

Studies of the Chicago Area

Studies of the economic impact of air transport in the Chicago area have been no less plentiful than other metro areas, although other studies including those conducted for the Dallas-Ft. Worth and New York-New Jersey areas have been somewhat more extensive and sophisticated (Table 2).

The first extensive study of the Chicago area was conducted by the Real Estate Research Corporation (1968) in considering the impact potential sites for a third Chicago-area airport. At that time, Mayor Richard J. Daley proposed a third airport site in Lake Michigan which was being compared to several land locations. The study estimated that the third airport would add upwards of only 17,300 jobs by 1985, a paltry number by the standards of later studies (and of existing studies at other metro areas in its day).

The assumptions that lie behind the study's findings help to explain its modest findings. At that time, airfield capacity was straining but modest by

Table 2

Economic Impact Studies of Airports in the Chicago Area

<u>Study and Year</u>	<u>Findings</u>
<u>Chicago Airport Site Selection Study: An Analysis of Some of the Major Considerations</u> ; Real Estate Research Corp., March 1968.	A third Airport, equivalent in size to O'Hare, would add 9,000-17,300 jobs by 1985.
<u>The Economic Impact of Civil Aviation on the U.S. Economy</u> Wilbur Smith Assoc. Commissioned by Partnership for Improved Air Travel 1987.	Civil Aviation's economic impact for Ill. equaled \$30.8 billion in 1987, \$9.1 billion in earnings, and 459,000 jobs. Chicago Metro area accounted for \$20.2 billion in activity, \$6.7 billion in earnings, and 349,000 in jobs (behind NYC and LA)
<u>Chicago Airport Capacity Study</u> Illinois Department of Transportation & Peat Marwick; al Chalabi Group Ltd. as subcontractor for economic impact 1988. (Impact of Third Airport)	Total impacts in the \$3-5.6 billion range are found for a range of Chicago area sites (year 2020).
<u>Airport Impact Study: Airport Master Plan Study</u> , (Chicago O'Hare Int'l Airport 1979, Landrum & Brown; Booz Allen & Hamilton.	O'Hare and Midway contributed 124,780 jobs in 1977. Total economic impact was found to be \$4.65 billion in 1977. Forecasts for 1985 and 1995 using inflation and aviation demand forecasts are also made. These fall in the \$10-11 billion range for 1985.
<u>Economic Impact of Chicago O'Hare Int'l Airport on Region</u> ; City of Chicago Aviation Dept. 1987.	O'Hare contributed \$9 billion a year to the regional economy. 186,000 jobs created by the field with 40,800 directly employed.
<u>Lake Calumet Airport Proposal</u> , City Department of Aviation 1990.	Development of a Lake Calumet airport by 2010 estimated to generate 22,000 person-years of employment and \$1.5 billion in regional expenditures on material and equipment during construction phase. When open in 2010, 200,000 jobs created, 40,000 permanent jobs at airport site.
Now under bids, a 1990 Contract will be awarded by the City of Chicago Dept. of Aviation, for detailed and comprehensive study of economic impact of air travel on Chicago region.	None yet.

comparison to today's situation. At the same time, forecasted demand was not so robust. An assumption of that study was that air travel demand in the Chicago area would be met *regardless of whether a third airport was built*. Accordingly, net new jobs arose only because an alternative site from O'Hare would provide additional or enhanced service to certain segments of Chicago population and because it was felt that a third airport was capable of spinning off the type of intensive land and business development that was previously spurred by O'Hare.

As with many studies of this kind, the methodology behind the net job creation remains rather nebulous. Passing reference to a "basic multiplier" can be found, but the details are not published.

A more extensive study and forecast of economic impact was conducted by the consulting firm of Landrum & Brown in 1979. That study used standard planning techniques in estimating economic impact and it did so for both Midway and O'Hare fields. In estimating economic linkages and impacts, the study conducted surveys of airport travelers to determine origin, length of stay, purpose, of trip, and expenditures of visitors. Survey data from air cargo and air freight companies were also gathered along with local-area purchases by airport operations.

The 1979 study employed multipliers that were said to be derived from the economic base type of methodology. As reported, the two fields contributed 124,780 jobs in 1977 and an additional 75,000 "induced" jobs. In all, the study reported that air travel was responsible for 5.3 percent of the Gross Regional Product.

Long term forecasts (which included inflation) were also made based on existing travel demand forecasts and under four alternative scenarios for the region's future airfield development. Under the robust development scenario, which included the main elements of the City's development plans for Midway and O'Hare, forecasted regional product was estimated in the \$10-11 billion range for 1985.

These forecast numbers, along with the spade work conducted then on airport-economy linkages, have formed the basis of most subsequent impact studies for the Chicago area. A 1988 study conducted under the auspices of the Illinois Department of Transportation (IDOT), evaluated the economic impacts of potential sites for a third regional airport. The study considers alternate sites and ranks them on individual economic criteria including accessibility to regional office centers, accessibility to areas of high unemployment (and to

households and employment generally), and distribution of indirect and induced jobs. In so doing, the study borrows multipliers from the 1979 Landrum and Brown study, although independent analysis is also conducted for other segments of the study. General findings indicate that third airport sites would generate economic impact in the range of \$3-5.6 billion by 2020 (presumably this figure is not adjusted for future inflation).

Studies conducted by the City of Chicago itself have also subsequently relied heavily on the 1979 Landrum and Brown study on at least two occasions. A 1987 update of the 1979 study focused on the O'Hare field and concluded that O'Hare was responsible for 186,000 direct, indirect, and induced jobs in the Chicago area economy. Moreover, completion of the City's current airport development plan would result in a \$13 billion per year impact by 1996 while otherwise, 46,000 jobs would be lost.

More recently, the City has announced its intention to consider a third airport surrounding Lake Calumet rather than supporting the four alternatives chosen by the 1988 IDOT study. With this location the City envisions 13 million enplaning passengers and 340,000 flight operations at the site by 2010. When opened, the airport could create 40,000 direct jobs and 200,000 total jobs for the Chicago region. The City argues that, because its proposed site is closer and more accessible to population and business than the proposed alternatives, jobs and development will be greater than the alternative sites which include Gary, Peotone, Kankakee, and a site on the Indiana-Illinois border.

The City is now in the process of commissioning an extensive update of the economic impact of the aviation industry on the region's economy. Presumably work will begin during the first half of 1990.

One other notable study has covered the Chicago region, that being a 1987 nationwide study commissioned by the Partnership for Improved Air Travel. The study employed the RIMS II input-output model which is produced by the BEA. This model was "regionalized" to each of the 50 states and to major metro areas. In doing so, a multiplier of around three times direct airport jobs is found for the airport industry. According to the methodological discussion, the study followed impact guidelines as suggested by the Federal Aviation Administration (FAA 1986).

The 1987 study concluded that all local civilian aviation (which included manufacturing segments) accounted for \$20.2 billion in the Northeast Illinois region and 349,000 jobs. In its estimation, the Chicago area ranked third among

metro areas, behind New York City and Los Angeles, in aviation economic impact.

In evaluating studies of the Chicago area, it is safe to say that the studies' findings are not generally out of line with studies in other locales or in comparison to the sole externally-sponsored study of Chicago area aviation. Still, in observing the wide range of study findings here and elsewhere, it is also evident that little confidence can be placed in the reported economic impact to any precise degree of accuracy. Coupled with the weak methodological underpinnings of Chicago area and almost all other studies, which suggest that economic impact and economic benefits are *not* one and the same, it would be advisable for policy makers to be cautious before considering "economic impact" as benefits to be compared to costs.

Redeeming Value of Economic Impact

While it is true that estimates of economic impact should be viewed with caution, it is also true that these studies serve an important function. That is to illustrate and increase public awareness of the linkages and importance of air travel to regional economies. Impact studies illuminate these connections even if it is not strictly true that all reported jobs owe their existence solely to existence of the airport. To this extent, it can be argued that, as a result of economic impact studies, more informed decisions will be made in deciding to invest in further airport capacity. In the process of attempting to quantify economic impact, specific interactions between air travel and the region's well-being become clearer in the public thinking. For example, indirect jobs related to convention/tourism industry are clearly linked to wide-ranging, frequent, and low-priced air travel connections.

Moreover, in most existing studies, many significant economy-airport linkages are neglected, perhaps because the linkages are difficult to quantify with any degree of certainty. From time to time, airport impact studies do, in fact, mention these benefits and linkages in passing, noting that, if the attendant benefits were to be counted, economic benefits would surely be higher than those that are reported therein. But if such economic linkages are important enough to be mentioned, they are surely worthy of closer examination.

Airports and the Business Traveler

Many types of businesses highly value accessibility to a major airport for its effectiveness to their work product. The ability to send out sales force or maintenance crews or management specialists with convenience and low cost can undoubtedly make or break some businesses.

However, because airport quality is but one of many important local business conditions, it is difficult to quantify its relative importance. A promising starting point in this respect is to identify those business facilities and industries that are most dependent on high quality air travel. Air passenger facilities are essential to many service-type facilities and industries while certain goods-producing industries are also highly-dependent on air cargo facilities.

Survey Findings

Most of the survey and statistical work on firm location decisions that has been conducted to date has focused on plant location decisions. These tend to rank airport access as only a minor consideration, if it is mentioned at all (see Schmenner 1982, for example).

With the rising importance of white collar employment in the U.S. and abroad, much more attention is now being given to the factors involved in siting office facilities (e.g. Daniels 1979). Office facilities vary widely in their role and function, with most offices interacting with nearby customers. For this reason, the locations of the general or generic "office" have not come to be closely associated with access to airports. Nonetheless, one important site selection factor can be broadly construed to encompass air travel. "Locational access to markets, customers, and clients" is reported to be highly valued. For example, the survey of 403 CEOs of large corporations ranked the Chicago area very high in two categories that can be interpreted as associated with air travel (see Table 3). The first category listed therein, "access to markets, customers, and clients" finds Chicago ranking as excellent and good. No doubt, much of Chicago's convenience reflects market access within the Chicago area or nearby driving distance and therefore does not reflect any air travel or air cargo characteristics of the region. However, Chicago also ranked well in "international access" which, aside from telecommunications infrastructure, more likely implies that the region's international air connections are a big drawing card to many office-type facilities.

It is only when we look at specific types of office activity that the importance of air travel comes to the fore. One study conducted by Dow Jones & Co., Inc. in 1977 surveyed the relative importance of site location factors for each of several types of company facility. In doing so, the survey differed from previous surveys by distinguishing plant facilities from distribution centers, regional division offices, R&D facilities, and corporate headquarters (see Table 4). Across *all* types of facilities, airport facilities ranked 7th out of 14 factors. However, in considering offices devoted to purely administrative, corporate control, and research and development functions, airports ranked extremely

Table 3

**Ratings of Chicago Area for Office Location--
Survey of 403 Major Corporations, 1987**

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Not Sure</u>
<u>Chicago</u>					
Office Facilities					
Access to markets, customers, clients	39%	39%	8%	2%	12%
Cost and availability of labor	15%	31%	29%	8%	17%
Government created business climate	7%	30%	27%	11%	25%
Quality of life	13%	41%	27%	7%	12%
International access	26%	33%	10%	2%	29%

Source: Cushman & Wakefield Inc.

Table 4

Importance of 14 Major Relocation Factors by Type of Facility

	All company facilities		Manufacturing plant		Distribution center		Regional divisional office		R&D facility		Corporate headquarters	
	Rank	%*	Rank	%*	Rank	%*	Rank	%*	Rank	%*	Rank	%*
Availability of labor	1	93	1	79	4	43	6	31	4	18	5	18
Tax abatements/incentives	12	56	10	49	9	33	9	20	8	13	6	17
Transportation facilities												
Air	7	64	13	41	7	34	1	38	2	20	1	26
Highway	3	90	3	75	1	60	2	37	3	19	2	24
Rail	6	66	6	59	6	43	13	14	14	8	12	10
Water	14	39	14	34	14	23	14	13	13	8	13	9
Availability of raw materials	8	63	5	61	13	23	12	14	12	11	14	8
Accessibility to markets												
Established	4	85	4	65	2	58	4	33	10	11	10	13
New	5	77	7	55	3	53	5	31	11	11	11	12
Availability of financing	13	51	12	46	11	31	10	20	9	13	7	16
Large land area	9	63	9	53	10	32	11	18	6	13	8	14
Right to work laws	11	58	8	54	8	34	8	20	7	13	9	14
Availability of executive/professional talent	10	62	11	46	12	29	3	34	1	22	3	22
Availability of energy/fuel	2	91	2	78	5	43	7	29	5	18	4	20

*Weighted Response. On a four-point scale; a critical rating (1) by a respondent received 100%; a very important rating (2) received 75%; a somewhat important rating (3) received 25%; and a slight or of no-importance rating (4) received 0%. Thus, if all respondents rated an item 2, it would have 75% weighted response.

Source: "Business on the Move," Dow Jones & Co., Inc., Market Research Dept., 1977.

high. In particular, airports ranked as the *first* priority for regional division offices; it ranked *second* (behind availability of professional talent) for R&D facilities; and ranked *first* again for corporate headquarters facilities.

Of these administrative-type establishments, corporate headquarters have been studied most intensively to date. Corporate headquarters facilities have been reported as especially reliant on excellent air connections. A recent study of the headquarters locations of the nation's companies having greater than \$100 million in sales was conducted by M. Ross Boyle (1990). The study reiterated the belief that "the ability to maintain contact with those facilities and markets through air passenger transportation and telecommunications services" was among the most strongly influential factors in determining headquarters locations.² And in a recent survey of the major business users of Hobby Field in the Houston area, headquarters facilities reported especially heavy reliance on passenger aviation. In Houston, for example, these included the Schumberger Technology Corporation (a specialist in petroleum exploration and production employing 2000), and Texas Eastern Transmission Corp. (a diversified natural gas pipeline and petroleum services company). Both of these corporations originated heavy and frequent travel by its headquarters employees.

The Chicago area ranks second among U.S. metro areas in its concentration of corporate headquarters of industrial companies, hosting such industrial bulwarks as Amoco, Sara Lee, Motorola, Baxter International, Quaker Oats, and Abbott Labs. (see Tables 5 and 6). In addition, headquarters of service firms are also well represented (Table 6).

Aside from corporate headquarters, appropriate statistical information concerning administrative establishments from region to region is quite scarce. Statistics are not generally collected by type of *facility*, but focus instead on employment or sales or establishments by type of *industry*. One exception, however, can be found in the County Business Patterns (CBP) data which reports on an amalgam of specific facilities which are, coincidentally, closely related to those same categories of interest here. The CBP category of "auxiliary and administrative establishments" records employment at R&D facilities, corporate headquarters, regional division offices, and other auxiliary facilities of companies and it does so for each broad industry category. All of these facility types ranked airports high in the Dow Jones survey.

In examining the employment concentrations of auxiliary employment in large MSAs, it can be seen that these facilities comprise an inordinately large share of metro area economies (see Table 7). It is too simplistic to think that superior air connections is the only feature that draws corporate headquarters and similar

Table 5**The Fortune 500 Largest U.S. Industrial Corporations
in the Chicago Area--1990**

Rank		Company, City & State	Sales
1989 - 1988			(millions)
12	12	Amoco - Chicago, IL	24,214.0
34	34	Sara Lee - Chicago, IL	11,738.3
48	52	Motorola - Schaumburg, IL	9,620.0
63	64	Baxter International - Deerfield, IL	7,399.0
87	88	Quaker Oates - Chicago, IL	5,724.3
90	94	Abbott Laboratories - Abbot Park, IL	5,453.5
94	122	Stone Container - Chicago, IL	5,360.7
111	57	Beatrice - Chicago, IL	4,498.0
113	113	Navistar International - Chicago, IL	4,296.0
117	116	Inland Steel Industries - Chicago, IL	4,146.7
118	119	Whitman - Chicago, IL	4,023.8
113	136	FMC - Chicago, IL	3,461.0
143	149	R.R. Donnelley & Sons - Chicago, IL	3,127.6
159	137	Brunswick - Skokie, IL	2,826.1
169	159	Zenith Electronics - Glenview, IL	2,610.7
170	178	Premark International - Deerfield, IL	2,600.6
182	181	Tribune - Chicago, IL	2,454.8
194	183	Morton Thiokol - Chicago, IL	2,269.0
198	152	USG - Chicago, IL	2,201.0
200	213	Illinois Tool Works - Chicago, IL	2,172.7
234	233	Square D - Palatine, IL	1,722.0
240	247	Dean Foods - Franklin Park, IL	1,686.0
242	237	Outboard Marine - Waukegan, IL	1,678.0
243	251	Sundstrand - Rockford, IL	1,666.1
247	*	Great Amer. Mgmt. & Inv. - Chicago, IL	1,643.1
292	333	Fruit of the Loom - Chicago, IL	1,320.9
294	304	Hartmarx - Chicago, IL	1,312.0
304	*	IMC Fertilizer Group - Northbrook, IL	1,232.7
321	338	Newell - Freeport, IL	1,122.9
329	335	Nalco Chemical - Naperville, IL	1,093.9
341	343	Amsted Industries - Chicago, IL	1,014.3
345	357	WM Wrigley Jr. - Chicago, IL	1,010.7
352	254	Int'l Minerals & Chemical - Northbrook, IL	982.9
373	345	CF Industries - Long Grove, IL	855.9
374	280	AM International - Chicago, IL	855.1
375	377	Pittway - Northbrook, IL	854.0
407	412	Gaylord Container - Deerfield, IL	746.0
412	443	Alberto-Culver - Melrose Park, IL	717.4
425	437	Commerce Clearing House - Riverwoods, IL	692.2
449	*	Helene Curtis Industries - Chicago, IL	629.2
454	447	Bell & Howell - Skokie, IL	622.6
484	497	Molex - Lisle, IL	575.7
492	458	Allied Products - Chicago, IL	564.6

Table 6**Fortune 1000 Headquarters Locations in 26 SMSAs -- 1984**

	Industrial 500	Service 500	Total
NE ILLINOIS	46	32	78
Anaheim-Santa Ana	2	5	7
Atlanta	7	8	15
Baltimore	4	5	9
Boston	10	10	20
Cleveland	13	8	21
Dallas-Fort Worth	12	22	34
Denver-Boulder	3	5	8
Detroit	12	9	21
Houston	11	18	29
Indianapolis	2	5	7
Kansas City	1	4	5
Los Angeles-Long Beach	16	37	53
Miami	1	6	7
Milwaukee	7	4	11
Minneapolis-St. Paul	13	14	27
Nassau-Suffolk	1	2	3
New York	84	61	145
Newark	8	12	20
Philadelphia	10	10	20
Pittsburgh	15	5	20
St. Louis	9	8	17
San Diego	2	4	6
San Francisco-Oakland	10	17	27
Seattle-Everett	2	6	8
Washington	4	10	14
NE ILLINOIS RANK	2	3	2

Source: Fortune, April 30 and June 11, 1984, as reported by the Northeast Illinois Planning Commission, A Comparative Guide to Northeastern Illinois and 25 other Metropolitan areas.

Table 7**Concentration of Employment in Auxiliary - Type Facilities
in Major Metro Areas in 1986**

	Employment	Concentration Relative to the U.S.	Number of domestic cities served by direct flights
Atlanta	82,749	1.84	141
Baltimore	27,283	2.86	109
Boston	94,767	1.32	106
Chicago	204,169	1.79	175
Dallas-Ft. Worth	93,652	1.99	141
Denver	35,079	1.29	134
Houston	115,042	2.36	109
Indianapolis	22,665	1.22	64
Memphis	17,908	1.33	84
Milwaukee	24,150	1.08	63
New York	181,734	1.37	151
Philadelphia	91,430	1.32	109
Richmond	22,230	1.73	30
San Francisco	37,203	1.14	110
Washington D.C.	46,331	1.12	143

Source: U.S. Department of Commerce, County Business Patterns; and Official Airlines Guide, North American Edition, April 1990.

facilities to large metro areas. Yet, it is highly probable that large hub-type airports are an important necessary condition. Three cities that are noted for their large scope of air connections--Atlanta, Chicago, and Dallas-Ft.Worth--all enjoy notably high concentrations of these facilities. Furthermore, the statistical correlation between the number of "auxiliary and administrative employees" and the measure of air travel scope listed in Table 5 registered a positive correlation of .56 which is statistically significant at the 3 percent level.

The Chicago area's employment concentration in auxiliary facilities is greater than that of the nation in most industry categories (see Table 8 and Figure 1). Overall, for all categories, Chicago's concentration is almost twice the nation's and exceeds New York and Los Angeles. More importantly, Chicago has added over 33,000 jobs from these facilities from 1976 to 1986, a period that paralleled rapid growth at O'Hare. Employment growth within four categories of auxiliary facilities--construction, trade/communication/utilities, wholesale trade, and service--outperformed the nation and they did so at a time when Chicago's overall employment was growing by less than half of the national rate of growth.

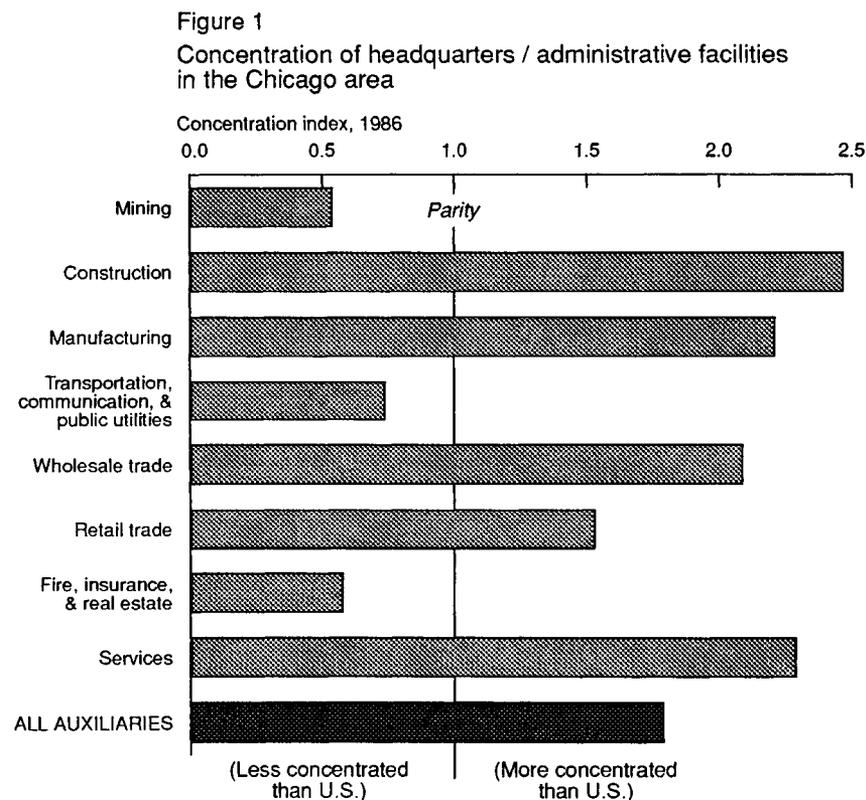


Table 8**Employment at Auxiliary Establishments in the
Chicago Area--1976 to 1986**

	Employment 1986	Concentration Index 1986	Growth 1976-86	Relative* Growth
Mining	2,440	.54	600	1.34
Construction**	1,735	2.47	1,360	40.9
Manufacturing	103,374	2.21	4,014	1.04
TCPU**	5234	.74	2,974	3.47
Wholesale Trade**	21,969	2.09	7,366	3.30
Retail Trade	43,363	1.53	2,127	.25
F.I.R.E.	3692	.58	1,768	1.74
Services**	22,362	2.29	13,517	2.71
All Auxiliaries	204,164	1.79	33,726	1.30

*Ratio of (sector growth/total job growth) in Chicago area to similar ratio for the nation.

**Indicates sector where Chicago area percent growth exceeded the national from 1976 to 1986.

Source: U.S. Department of Commerce, County Business Patterns.

Survey findings also reported that airports can be as important in bringing in business associates and customers as in sending out sales people and managers. The National Aeronautics and Space Administration (NASA) in Houston heavily relies on Houston's Hobby Airport for its own employee business travel but an equal amount of incoming passengers are represented by contractors traveling to NASA. Houston's Methodist Hospital, the nation's seventh largest, cited the convenience of Hobby as a critical factor in attracting patients from throughout the Southwest.

The importance of airport infrastructure to service firms helps to confirm an important economic trend that has only recently become apparent. Increasingly, service-generating industries have become the engine of economic growth in many large metro areas including Chicago. Formerly, analysts commonly considered services to be outside the "economic base" of large cities. Instead, manufacturing, trade, and transportation were often highlighted as generating urban jobs while services were derivative from the income generated from basic industries. Later, spatial separation of facilities within manufacturing companies, i.e. corporate headquarters and R&D from production plants, accelerated across the U.S landscape and urban analysts began to recognize that administrative service facilities of industrial companies (e.g. corporate headquarters and the specialized business service firms who serve them) often comprised a significant part of the urban economic base (Stanback & Noyelle 1982). More recently, studies of the Puget Sound, Northeast Ohio, and Montreal areas have documented the fact that services are exported widely from metro areas (Beyers and Alvine 1985; Goe 1990, Harrington and Lombard 1989; and Polese 1982). Findings from Northeast Ohio further indicate that these service industries just as often sell to other service firms as to goods-producing industries (Goe 1990). This economic transition has been especially helpful for metro areas in the Northeast and Midwest regions such as Pittsburgh, Cleveland, Indianapolis, and Chicago that have been heavily impacted by declining manufacturing sectors, although for some, such as Buffalo, New York, no such economic transition has yet unfolded.

These recent studies also identify those producer service industries that most intensively sell to customers outside of their region of domicile. In the Chicago area, these industries are well represented as measured by employment in 1986 (see Table 9 and Figure 2). Advertising, computer and data processing, accounting and auditing, management/public relations and legal services all display employment concentrations that are greater in the Chicago area than the nation. By implication, commercial passenger travel by air is a critical factor for these industries who must either send out service agents or bring in customers by air. *This is not to say that Chicago's excellent air connections*

Figure 2

Concentration of business service industries
in the Chicago area (with strong linkages to air travel)

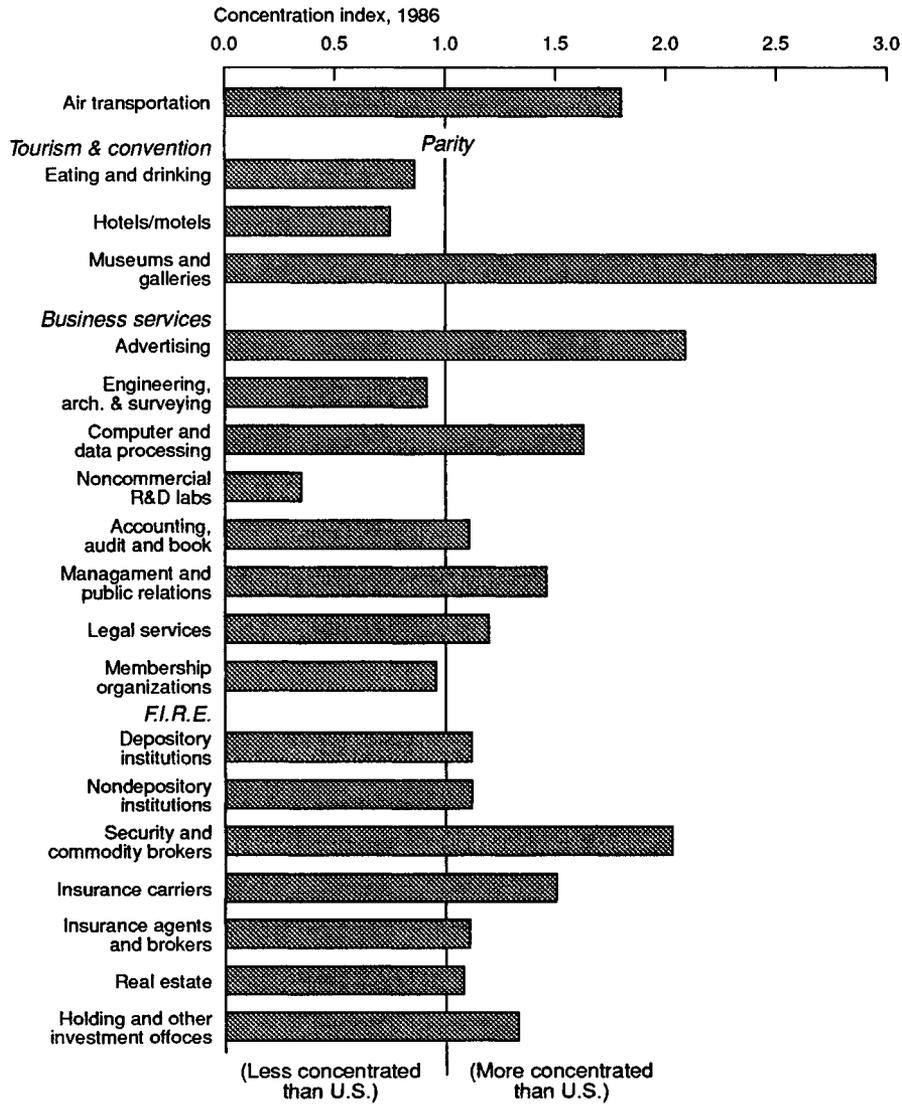


Table 9**Other Industries with Linkages to Passenger Air Travel
in the Chicago Area--1986**

	Employment 1986	Concentration Index 1986	Growth 1976-86	Relative* Growth
Air Transportation	33,150	1.80	10,484	2.08
<u>Tourism & Convention</u>				
Eating & Drinking	172,472	.86	42,669	1.27
Hotels/Motels	34,208	.75	6,949	1.15
Museums & Galleries	3,955	2.95	2,010	4.24
<u>Business Services</u>				
Advertising	14,133	2.09	2,810	.94
Engineering, Architecture and Surveying	7,017	.92	23,461	.98
Computer and Data Processing	32,567	1.63	25,221	3.79
Noncommercial R&D Labs	152	.35	893	2.66
Accounting, Audit & Book Management & Public Relations	17,267	1.11	5,172	1.05
Legal Services	29,546	1.46	15,561	1.70
Membership Organizations	32,247	1.20	16,128	2.28
	59,077	.96	8,734	.71
<u>Finance, Insurance & Real Estate</u>				
Depository Institutions	66,504	1.12	11,686	1.61
Nondepository Institutions	32,848	1.12	11,350	1.64
Security & Commodity Brokers	27,619	2.03	14,516	2.26
Insurance Carriers	71,218	1.50	7,938	1.40
Insurance Agents and Brokers	24,007	1.11	7,968	1.82
Real Estate	47,671	1.08	5,900	.69
Holding & Other Investment Offices	10,104	1.33	4,466	5.21

Source: U.S. Department of Commerce, County Business Patterns.

have created these industries but only that the relation between the two activities is symbiotic, each depending on the other. It is also noteworthy that these industries have grown rapidly over the 1976-86 period. In fact, with regard to Chicago's overall employment growth *relative to the nation*, many of these producer service industries have been the growth leaders for the region including banking, security and commodities brokers, insurance, investment offices, management and public relations, legal services, and accounting/auditing/bookkeeping.

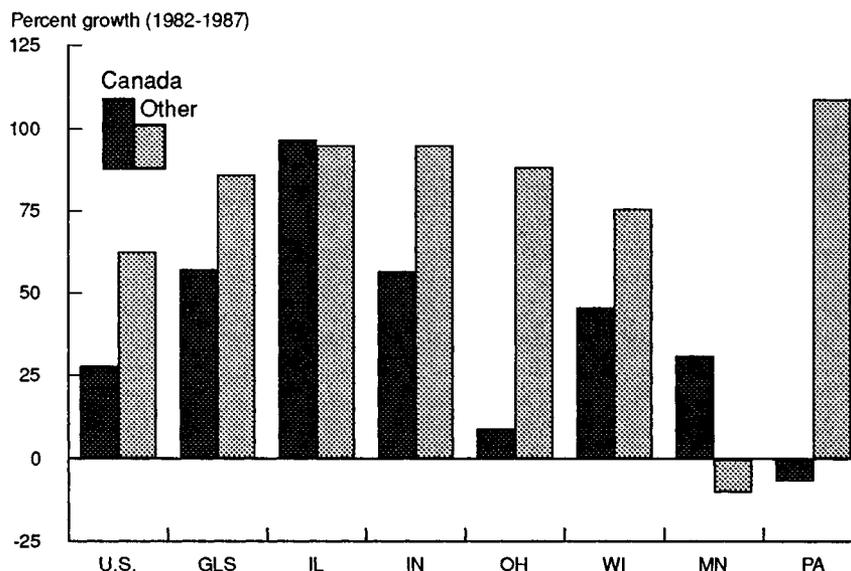
Foreign Offices and Investment

To date, studies have found that the locational decisions of foreign direct investment facilities in the U.S. are generally driven by the same forces as domestic investment, e.g. market growth, costs of doing business, availability of skilled labor, and access to transportation for shipment (Glickman 1989; Kahley 1987). However, a study of the Southeast England area of the U.K. has clearly demonstrated that foreign offices value proximity to major international airports as important in linking home offices with branch locales (Hoare 1975). In that study, the need to be within a certain time distance from Heathrow Airport gave rise to a notable locational clustering of foreign-domiciled firms in Southeast England. Closer to home, a research team at Carnegie-Mellon School of Public Affairs recently evaluated the presence of international air connections on local area economic development. The study examined Dallas-Ft. Worth's international service and concluded that "international service at DFW is considered to be responsible for creating over 25,000 regional jobs and attracting 140 foreign-owned companies between 1984 and 1986".³ In deciding on facilities locations within regions, then, access to air travel can be important to foreign offices and investment.

Foreign Trade Zones (FTZs) are also noted as an important catalyst for foreign investment, especially in conjunction with major airports (CUED 1989). These trade zones allow foreign imports to be brought into the country for further processing without imposition of import duties. If imported FTZ products are re-exported, duties need never be paid. So far, airports such as Akron-Canton and Dulles in the Washington D.C. area have acquired FTZ status.

From 1982 to 1987, Illinois has led all other Great Lakes states in attracting FDI (see Figure 3). At the same time, the Chicago area remains the Midwest focus of foreign-based banking. Owing to the area's favorable regulatory climate for foreign banks, along with quality infrastructure including air travel, Chicago hosts 53 foreign banks.

Figure 3
Foreign direct investment in the U.S.



The U.S. and Canada have recently scheduled the drastic lowering and, in some cases, elimination of trade barriers. Some analysts believe that this action will spur the growth of "second cities" such as Toronto and Chicago as the locus of economic activity shifts away from coastal export centers such as New York and Los Angeles and toward mid-continent (Kresl and Morici 1989). Moreover, one analyst views Chicago and Toronto as key competitors in achieving dominance as the administrative/financial center of the expanded continental market (Kresl 1989). As part of its economic development strategy, Toronto has commissioned a study to guide it in its international linkages. One very major element of this strategy is its "Headquarters Program", which is designed to convince foreign corporations to set up their main North American offices in Toronto.

With respect to international air travel facilities, Toronto has the jump on modernizing its facilities. Its new terminal is now under construction and will open during 1991. While Chicago has recently moved to expedite the construction of its new and expanded international passenger terminal, the facility will open during 1994 at the earliest.

Convention and Tourism

Expenditures by tourists and convention visitors are commonly and correctly included in economic impact studies. The importance of the convention/tourism trade to the Chicago area study probably exceeds most other metro areas with

the exception of resort-type or tourist communities such as Miami and New Orleans. The convention/trade show business in Chicago has grown apace with O'Hare (and Midway before it), making Chicago known as the one of a handful of premier convention/trade show areas in the nation (see Figure 4). Within the Midwest region, Chicago reportedly drew well over three times the number of convention and trade show delegates as its closest competitor, Detroit, in 1987 (see Table 10).

Figure 4
Attendance at conventions, trade shows, and corporate meetings

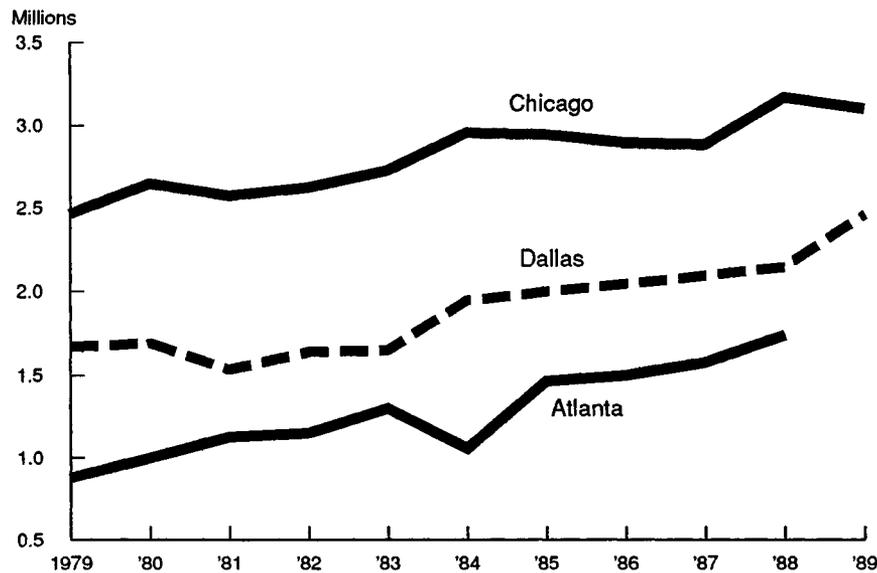


Table 10

**Recent Attendance at Conventions/Trade Shows
for Major Great Lakes Cities--1987**

	City	Conventions Trade Shows	Delegates
Illinois	Chicago	863	2,321,039
Indiana	Indianapolis	141	450,067
Michigan	Detroit	514	653,000
Minnesota	Minneapolis	258	261,869
Ohio	Cleveland	253	84,619
Wisconsin	Milwaukee	204	201,974

Source: Great Lakes Commission.

The Chicago Convention and Visitors Bureau reports that all three categories of business traveler attendance--conventions, trade shows, and corporate meetings--have grown significantly over the 1980s (see Table 11). Spurred by expansion of display facilities such as McCormick Place, trade show attendance has grown by almost 50,000 per year from 1983 to 1989. Trade show visitors are especially coveted as business travelers. Estimates made by the International Association of Convention Bureaus report that trade show visitors spend the most money during visits and stay the longest period of time.

Table 11

**Chicago Attendance at Conventions, Trade Shows,
and Corporate Meetings--1983-1990(est.)**

	Attendance in Thousands		
	Conventions	Trade Shows	Corporate Meetings
1983	445.9	1,472.0	815.3
1984	510.5	1,559.8	885.6
1985	483.7	1,596.2	868.7
1986	495.4	1,531.3	870.0
1987	505.3	1,528.8	860.3
1988	538.3	1,782.9	862.4
1989	503.8	1,769.3	841.1
1990(est. *)	550.0*	1,850.0*	870.0*
Annual growth per year 1983-89	9.7	49.6	4.3

Source: Chicago Convention & Visitors Bureau Inc.

Air Cargo Facilities

Air cargo is no less important to economic development than passenger service. Recently, several air cargo hubs have been developed with great success and fanfare in medium-sized metro areas. The City of Memphis has expanded its air field and become the air hub center for Federal Express. Similarly, Louisville has invested many millions of dollars in expanding its airport and ground transport infrastructure so as to retain a large United Parcel Service facility. The latter is notable because many residents, neighborhoods, and businesses were uprooted as the cost of the airport expansion. In turn, these metro areas have used the air cargo facilities as a magnet and marketing tool to attract related and connected industry. Air cargo expansion has recently peaked with the opening of Fort Worth's Alliance Airport. Backers of the project are touting the air facility as the first major airport exclusively serving industrial customers.

Generally speaking, manufacturers choose to ship high-value low-weight products by air. Many such products are produced by the so-called high tech industries including computers, electronic components, semiconductors, and telecommunications equipment (see Table 12). The private-public partnership behind Ft. Worth's recent Alliance Airport venture has recognized this high tech attraction and related area development includes the Maguire Thomas-IBM corporate campus and a 250,000 square foot Tandy Corp. manufacturing plant.

High tech industry tends to concentrate in large metro areas such as Boston, Los Angeles, the Bay Area, New York, and Chicago. The high quality of air service--both cargo and passenger service--hardly constitutes a sufficient condition for these industries. Numerous studies have revealed that the availability of skilled labor, access to capital, quality of life, and access to similar industry and specialized business services are also paramount. Nonetheless, air cargo and passenger travel are part and parcel of the complex of factors that make such industries viable there. It is equally true to say that such industries cause airport growth as the other way around. But a better understanding is to recognize that the airport and high tech industry are mutually dependent.

Not only high tech products but also many mundane high-value low-weight products choose to ship by air (see Table 13). These include printed materials, footwear, and leather products.

Many of the heaviest users of domestic air freight display high concentrations of employment in the Chicago area as of 1986 (see Table 12 and Figure 5). These include medical instruments, communications equipment, instruments, printing

Table 12

Industries Shipping Domestic Freight By Air 1983
(as measured by percent of tons)

Industry	Percent in U.S. by Air	Employment Concentration Index 1986	Employment	
			Chicago	U.S.
Footwear	26.0	.10	-84.1	-48.6
Medical Instruments	20.7	1.10	-32.1	33.8
Communications Equip.	15.1	1.43	-3.1	53.2
Instruments	13.6	1.28	-21.7	17.8
Leather Products	10.1	.37	-57.8	-45.1
Printing & Publishing	9.8	1.48	4.4	34.1
Computer & Office Equip.	9.7	.48	-16.9	60.3
Aircraft and Parts	8.7	.05	43.3	40.8
Greeting Cards	7.0	1.13	-3	38.1
General Ind. Mach.	6.3	1.65	5.5	-4.4
Footwear Cut Stock	5.9	.05	n.a.	-36.1
Motorcycles, Bicycles	4.7	.30	-92.6	-26.7
Manifold Bus. Forms	4.3	1.13	33.4	29.9
Household AV Equip.	4.2	1.22	-84.1	-36.4
Industrial Mach.	4.0	1.21	-20.7	-.5
Electronic & Elect. Equip.	3.5	1.26	-18.8	25.2
Photographic Equip.	3.3	1.16	-51.2	-2.1
Drugs	3.2	1.69	-11.1	16.3
Electric Lighting Equip.	3.0	2.28	11.2	6.7

Source: U.S. Department of Commerce, Bureau of Census, Commodity Transportation Survey.

Figure 5
Chicago area concentration of manufacturing industries shipping domestic freight by air

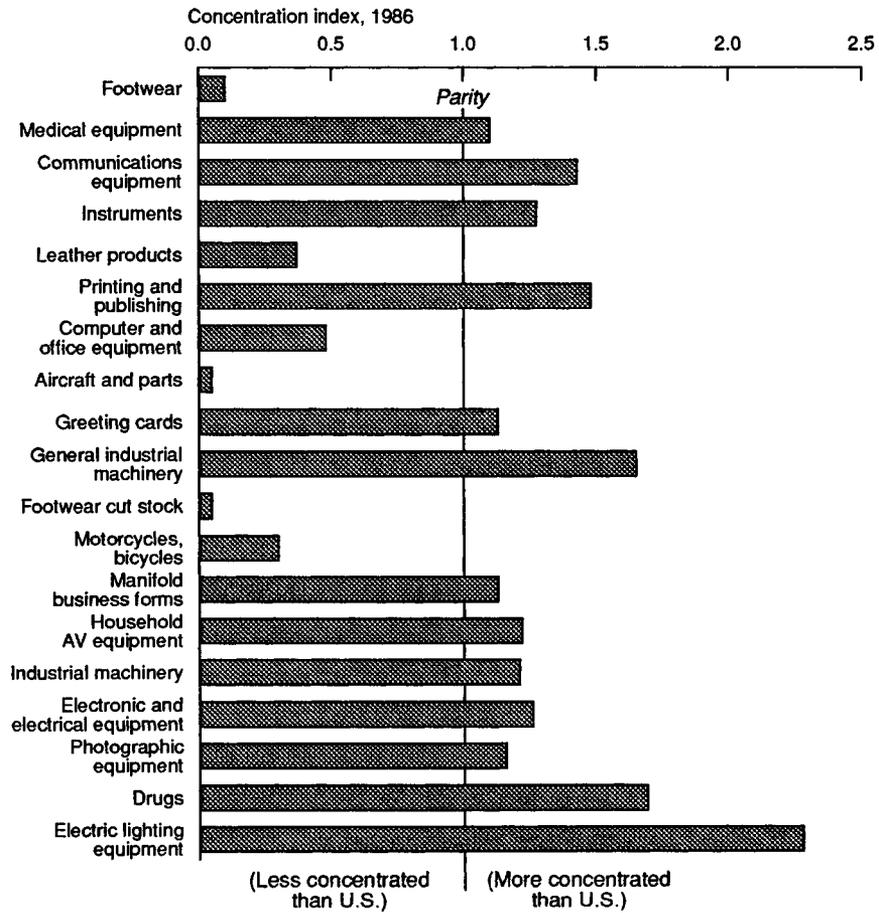


Table 13

**U.S. Industry Exporting Abroad By Air 1988 and Chicago Area Employment 1986
(as measured by percent of shipment value)**

Industry	Percent in U.S. by Air	Employment Concentration Index 1986	Employment Percent Change 1976-86	
			Chicago	U.S.
Elec. computer equip.	84.7	.05	36.8	87.8
Aircraft engines	84.4	.08	2.7	36.8
Office & computer mach.	82.4	.48	-16.9	60.3
Measuring devices	76.6	1.68	-6.0	21.8
Drugs	74.2	1.69	-11.1	16.3
Instruments	73.4	1.28	-21.7	17.8
Musical instruments	63.4	1.55	-77.8	-48.1
Watches & clocks	57.4	2.19	260.6	-52.5
Switchgear	56.9	2.05	-17.1	-13.5
Special ind. mach.	48.9	1.04	-41.2	-9.5
Turbines	43.3	n.a.	n.a.	-51.3
Printing machinery	43.0	2.56	19.3	27.7
Apparel	33.9	.29	-36.5	-18.2
Aircraft & parts	33.1	.05	43.3	40.8
Hand tools	32.4	1.22	-18.3	-7.9
Food prod. mach.	26.9	2.59	18.5	-14.5
Printing	26.7	1.48	4.4	34.1
Toys & sporting equip.	26.3	1.30	-49.5	-26.0
Metalworking mach.	26.2	1.92	-11.1	-4.3
Textile machinery	25.9	.12	18.3	-38.2
Pumps	25.0	1.09	-55.6	-16.9

Source: U.S. Department of Commerce, Bureau of Census,

and publishing, general industrial equipment and machinery, drugs and pharmaceuticals, electronic equipment, and photographic equipment and supplies. Despite a general expansion of airport operations over the 1976-86 period, however, these industries have performed similarly to the Chicago area's overall manufacturing base. As measured by employment, the Chicago area's manufacturing job base has declined.

Not surprisingly, overseas shipments display an even greater propensity for air transport (see Table 13). The most important of these industries in the Chicago area include measuring devices, drugs, musical instruments, watches and clocks, switchgear, printing machinery, hand tools, food production machinery, metalworking machinery, and toys and sporting equipment (see Figure 6).

Many service industries are also heavy users of air cargo service, although these industries are difficult to identify by standard classification. The vast majority of inter-regional bank transactions (via paper check) continue to rely on air service for verification of transactions. Similarly, it is not uncommon to find claims processing and data entry by insurance companies and financial companies are shipped overseas by air freight. For example, New York Life ships many of its domestic insurance claims to Ireland for processing.

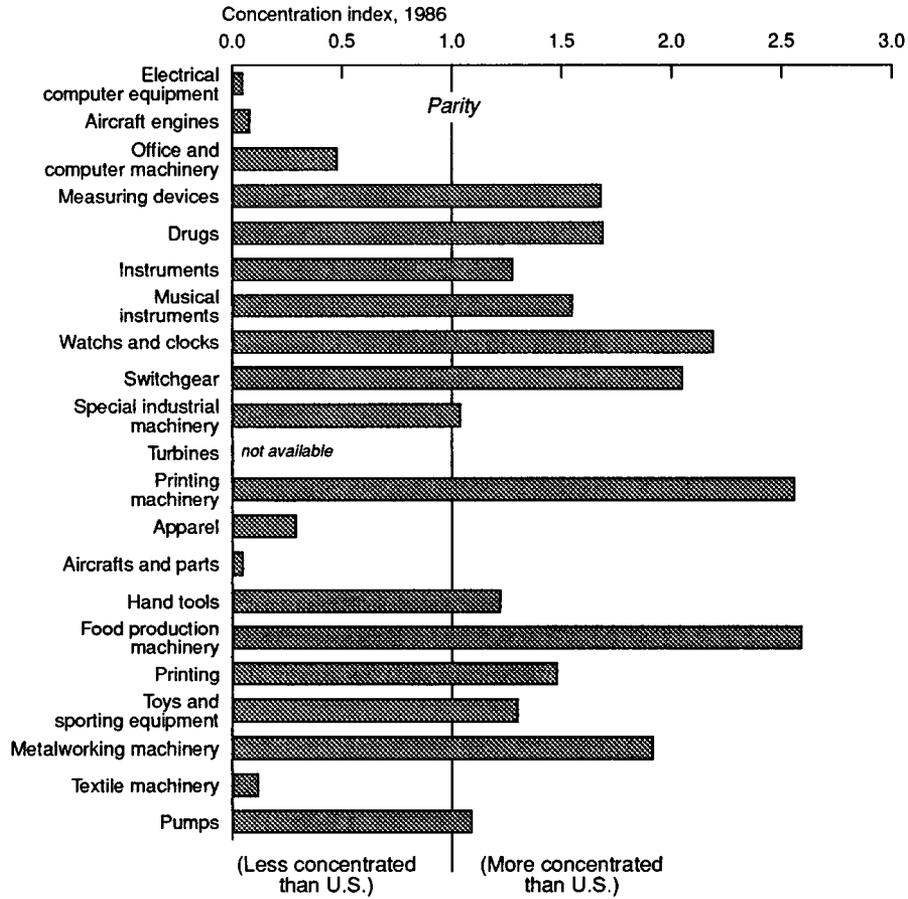
Ending Remarks

A recent surge in air travel, spurred perhaps by the deregulation of the industry, has left the nation's air traffic system straining at capacity. For Chicago, the question of strained capacity is not merely that of passive interest as one of several key hubs on the national wheels of transport and commerce. Owing to the Chicago economy's sharp transition away from old-line manufacturing industries, the region's second and dual role as a wholesaler, transporter, and provider of specialized business services has become more crucial to its economic vitality. This role maintains a high degree of dependency on much of its public infrastructure including its roads and bridges, its public transit, its meeting and entertainment facilities, its telecommunications ability, and its airport facilities.

With regard to airport infrastructure, the Chicago area's policy makers face a multitude of difficult decisions. Air capacity in the Chicago area has been strained to a greater degree than the nation while the capacity of the air transport system means more to the Chicago area's economy than it does to most other metro areas.

Chicago must plan both long term and short. A third airport will ease capacity constraints in the far future but many believe that this will take up to 20 years to

Figure 6
Chicago area concentration of manufacturing industries shipping foreign exports by air



achieve. Other metro areas such as the Denver area have recognized that existing airport facilities must be expanded even while ambitious new plans are proceeding. In the near term, then, the Chicago area must consider and evaluate expansion at its existing airfields. In addition, the choice must be made whether to expand *via* construction of new facilities versus potential regulatory, economic, and technological solutions to its existing but congested airways. As always, the process of political and social concensus will be the most difficult hurdle toward this end.

A Note on Economic Impact

Economic impact has come to mean those expenditures, payroll, or income that can be linked to existing or impending airfield activity. "Economic impact" does not really translate into "economic benefits" at all (although impact is often used interchangeably with "benefits" in several consulting reports). Important distinctions are to be made between these "impacts" and economic benefits. Generally, benefits are *only those jobs and income that would not arise in any other form and that do not accrue to outside residents*. Yet, economic impact often includes the former along with *bona fide* economic benefits.

Three types of economic impacts that are identified by virtually every airport study.

Direct: These include jobs and expenditures made by air travel providers who are usually but not always located on-site including airlines, fuel and equipment, food service, concessions, government administrative agencies, maintenance, and airport operations.

Indirect: These often include activities related to air travelers and air cargo. For example, ground transportation such as taxis and buses, air cargo and air freight businesses, hotel/motel employees, entertainment and restaurants, convention facility workers, and sometimes the activities of private businesses in booking air travel for their employees or in preparing their products for shipment by air.

Induced: These are the so-called "multiplier" effects that are assumed to arise when the payroll of local employees (as enumerated in "indirect" and "direct") proceed to spend their earnings locally on goods and services. This additional spending percolates through the local economy, giving rise to additional jobs and income, until the spending peters out through "leakages" outside the region.

In considering all of the above as benefits, some problems are generic to all three. To begin, the implicit assumption of these studies is that the airport-related jobs are net additions to the region's job stock. Certainly, this cannot be

the case. In a freely-functioning market economy, there are almost always substitutes available. Needless to say, a modern, healthy metro area would be deficient without large scale and accessible air transportation. However, to consider all air travel jobs as net gains is to say that, in a scenario without the airport (or without the airport expansion), the demand for transportation would not be partly fulfilled by alternative means. Surely, it would not be difficult to imagine that, in the absence of air travel facilities, train and bus stations would be larger if only to shuttle passengers to nearby substitute air facilities. Similarly, employment in trucking would rise, if only to shuttle high value cargo to nearby air cargo or rail facilities. And it is important to point out that any downward revision to direct and indirect "job creation" would correspondingly reduce any "induced" jobs or income arising from multiplier impacts on the local economy.

In addition, there are offsetting forces mitigating the estimates of actual reduced air travel convenience that would emerge in those instances when the choice is made not to expand existing airport infrastructure. Rising congestion at existing air travel facilities would lead to a rise in the local price for air travel. If so, originating passengers would desire less travel and they would purchase alternative goods from local businesses, thereby raising some offsetting employment losses. And for many existing air facilities, high congestion of limited facilities would finally induce local officials to impose more rational pricing policies on the use of airport gates and runways. Market-based pricing of gates and runways would induce airlines to schedule those flights with fuller loads and to re-route less-used operations. Moreover, the practice of charging higher operations fees during peak travel hours would induce airlines and travelers to take some trips during less congested hours, thereby relieving delays and expanding capacity. More generally, the higher priced air travel associated with congestion, and higher prices for attendant airport gates and departures, would force out (or force elsewhere) lesser valued or less profitable air operations including (perhaps) near-empty commercial planes and general aviation operations such as private/corporate flights. This would lessen the harmful economic impacts of congestion. Congestion costs would be diminished by eliminating lesser-valued flights and by truly maximizing the capacity of existing infrastructure.

Even when net new jobs actually do materialize within the local area as a result of airport construction or expanded airport operations, these jobs should be carefully scrutinized. One should be careful not to believe that each job that materializes will be filled by existing residents. Because many jobs are highly specialized, especially those that pay well, jobs created will often be filled by in-migrants to the region. Jobs related to the construction phase may be especially

ephemeral. Contractors often come from outside the local area. Moreover, construction projects are often conceived by political leaders as a countercyclical jobs program when the local labor market is slack and unemployment is high. However, in many cases, the local area labor market has recovered by the time construction commences so that jobs are merely shifted among potential projects rather than "created".⁴

This is not to say that such growth is detrimental. For one reason, a higher demand for labor will tend to lift wages throughout the affected labor markets. So, too, even if jobs are ultimately taken by in-migrants, we can believe that the second-round or induced jobs may, in many instances, give rise to jobs for local residents. Overall caution should be used, however, in counting jobs where labor markets are already tight and unemployment is low. For such regions, both direct and induced jobs will tend to be filled from outside so that the idea that such jobs are net benefits should be discounted.⁵

Footnotes

¹There is a substantial body of studies related to the relation between gross employment increases and net increases associated with public works projects. For a review, see Federal Reserve Bank of Chicago, *High Speed Rail in the Midwest: An Economic Analysis*, 1984, (Chapter 5). A recent study of regional labor markets indicates that local area unemployment can be longer-lived than previously believed so that potential job creation has now become more credible. See Timothy J. Bartik, "The Effects of Demand Shocks on Local Labor Markets", W.E. Upjohn Institute for Employment Research, Kalamazoo, MI, 1990.

²See M. Ross Boyle, "Corporate Headquarters: An Elusive Economic Development Target", *Economic Development Commentary*, Volume 13, No. 4, Winter 1990, pg. 30.

³As cited in *Airport Growth: Creating New Economic Opportunities*, National Council for Urban Economic Development, December 1989, p. 32.

Critiques of I-O models also say that the models must assume constant returns to scale production technology and that this assumption should be treated with harsh skepticism. However, Israilevich (1990) has recently demonstrated that this assumption is not necessarily implied by the I-O framework.

⁴For a discussion see Roger Vaughn, *Public Works as a Countercyclical Device: A Review of the Issues*, The Rand Corp., Santa Monica Cal., 1976.

⁵Ibid, *High Speed Rail in the Midwest*.

References

Baer, Herbert, William A. Testa, Donna Vandenbrink, and Bruce Williams, *High Speed Rail in the Midwest: An Economic Analysis*, Federal Reserve Bank of Chicago, Chicago, 1984.

Bartik, Timothy J., "The Effects of Demand Shocks on Local Labor Markets", working paper, W.E. Upjohn Institute, Kalamazoo, Michigan, 1990.

Baxter, Nevins D., E. Philip Howrey, and Rudolph G. Penner, *Public Investment in General Aviation Airports: An Application of Cost-Benefit Economics*, Mathematica, Princeton, New Jersey, 1967.

Beyers, W. and M. Alvine, "Export Services in Post-industrial Society", *Papers of the Regional Science Association*, 57: 33-45, 1985.

Boyle, M. Ross, "Corporate Headquarters: An Elusive Economic Development Target", *Economic Development Commentary*, Vol. 13/Number 4, Winter 1990, pps. 20-30.

Browning, Jon E., *How to Select a Business Site*, McGraw-Hill, New York, 1980.

Butler, Stewart, and Lawrence Kiernan, *Measuring the Regional Economic Significance of Airports*, U.S. Dept. of Transportation, Federal Aviation Administration, Office of Planning and Programming, Washington D.C., October 1986.

Carnegie-Mellon University, School of Urban and Public Affairs, *Airport Development Project: A Comparative Analysis of Airport-Led Economic Development*, Pittsburg, Pennsylvania, December, 1988.

Cullerton, Richard C., *A Study of Airport Economics*, Institute of Transportation Studies, University of California, 1979.

Daniels, P.W., *Spatial Patterns of Office Growth and Location*, John Wiley & Sons, New York, 1979.

De Neufville, Richard, *Airport Systems Planning*, The MIT Press, Cambridge, Mass., 1976.

Goe, W.R., "Producer Services, Trade, and the Social Division of Labor", *Regional Studies*, forthcoming.

Harrington, J.W. and J. Lombard, "Producer Services Firms in a Declining Region", *Environment & Planning A*, vol. 21, pps. 65-79, 1989.

Hoare, Anthony G., "Foreign firms and Air Transport: the Geographical effect of Heathrow Airport", *Regional Studies*, Vol. 9, pps. 349-367, 1975.

Israilevich, Phillip R. *Construction of Input-Output Coefficients with Flexible Functional Forms*, Working Paper Series, Federal Reserve Bank of Chicago (WP-90-1), January, 1990.

Kahley, William, "Direct Investment Activity of Foreign Firms," *Economic Review*, Federal Reserve Bank of Atlanta, Summer 1987, pps. 36-51.

Kresl, Peter Karl, "Variations on a Theme: The Internationalization of Second Cities", in Earl H. Fry ed., *The New International Cities Era: The Global Activities of North American Municipal Governments*, Center for International Studies, Brigham Young University, 1989, pps. 185-198.

Landrum & Brown, *Master Plan Study, (City of Chicago), Forecasts of Aviation Demand*, Working Paper No. 2, October 13, 1989 (draft).

Landrum and Brown, *Airport Master Plan Study, Economic Impact Study for Chicago O'Hare International Airport and Chicago Midway Airport*, Volume 8, Prepared for the City of Chicago, October, 1979.

Massey, David, "The Modern Hub's Impact on Communities", *Commuter Air*, May, 1987, pps. 12-20.

National Council for Urban Economic Development, *Airport Growth: Creating New Economic Opportunities*, Washington D.C., December, 1989.

Peat Marwick, *Chicago Airport Capacity Study*, Prepared for Illinois Dept. of Transportation, May, 1988.

Peat Marwick, *Chicago O'Hare International Airport Expansion Analysis*, Prepared for Illinois Dept. of Transportation, June 1988.

Peat Marwick Main & Co., *Economic Impact of Current Airport Activities, Airfield Analysis Study, William P. Hobby Airport*, Prepared for Dept. of Aviation, Houston, Texas, July 1988.

Pittsfield, D.E., "The Economics of Airport Impact", *Transportation Planning and Technology*, Vol. 7, 1981, pps. 21-31.

Real Estate Research Corporation, *Chicago Airport Site Selection Study: An Analysis of Some of the Major Considerations*, Prepared for the City of Chicago, 1968.

Regional Science Research Institute, *Economic Impact of the Dallas-Ft. Worth Regional Airport on the North Central Texas Region in 1975*, Philadelphia.

Schmenner, Roger W., *Making Business Location Decisions*, Prentice-Hall, Englewood Cliffs, New Jersey, 1982.

Shea, William F., and Mary L. Brugo, *Overview of Methodology Used to Determine the Economic Impact of Port of Portland Aviation Facilities*, Transportation Research Circular, Transportation Research Board, National Academy of Sciences, Washington D.C., No. 259, July 1983.

Transportation Research Board, *Future Development of the U.S. Airport Network*, National Research Council, Washington D.C., 1988.

U.S. Dept. of Commerce, Bureau of the Census, *County Business Patterns*, (various years), Washington D.C.

Wilbur Smith Associates, *The Economic Impact of Civil Aviation on the U.S. Economy*, Prepared for the Partnership for Improved Air Travel, Washington D.C., June 1989.