

Airports as Centers of Economic Activity: Empirical Evidence from Three US Metropolitan Areas

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1 INTRODUCTION

In terms of gross area, Schiphol Airport in The Netherlands is larger than the extended historic center of nearby Amsterdam and the Dallas-Forth Worth Airport in Texas is larger than the island of Manhattan. These two, of many similar, seemingly strange empirical realities conjure up the possibility of radically altering common images and perceptions of region-wide spatial structure and/or understandings of spatial economic organization. Airports and their surrounding areas are emerging as major nodes of economic activity in the 21st century metropolis. This paper focuses on identifying and measuring theoretically driven elements of airport focused or airport centered economic activity.

The emergence of airports as centers of economic activity should not be surprising. Garreau (1991) designated airports and the economic activity around them as “edge cities” in thirteen of thirty six American metropolitan areas he studied. At the metropolitan scale, Giuliano and Small (1991) identified five airport areas as significant employment nodes among a total set of thirty two. Tsamboulas and Dimitropoulos (1999) examined the role of “freight villages” in the European context. More recently, Kasarda (2006, 2001, 2000) coined the term “aerotropolis” to characterize the potential of these airport centered agglomerations. While aerotropoli are compelling notions from the normative or planning viewpoint, less clear are both theoretical considerations and empirical calibrations of what is happening on the ground in and around these airport centers. For example, are these nodes of activity simply concentrations or are they the design of purposeful economic clustering strategies? The purpose of this paper is to begin to examine this question from both a theoretical (based on the twin notions of polycentric metropolitan forms and economic cluster theory) and empirical (based on case study evidence of selected airport centered economic concentrations) basis.

This paper is organized as follows. The next section briefly outlines underlying concepts of polycentric metropolitan form and economic cluster theory, concluding with identification of a set of issues to be explored in terms of airport centered or focused economic agglomerations. In consideration of these gaps, the research problem focuses on the empirical assessment of major airports in three US metropolitan areas – Atlanta, Dallas, and Memphis. Results and analysis are followed by several overall conclusions and speculations about the both urban form and areas of further study.

2 URBAN FORM, ECONOMIC CLUSTERS, AND AIRPORTS

Three interrelated streams of research seem fruitful in thinking about the character of economic activity at and around airports. The first focuses on concepts and issues of polycentric metropolitan form. The second focuses on concepts and assertions from economic clustering theory. The third focuses on the role of airports and air transport within the overall global economy.

2.1 Polycentric Metropolitan Morphologies, Edge Cities, and Aerotropoli

The first theme is polycentric metropolitan form and/or morphology. Polycentricity as a feature is used in two distinct ways. In the European context, polycentricity describes systems of independent cities that are interrelated (usually in a networked organization), the Rhine-Ruhr area being perhaps the dominant image (CENTROPE in Central Europe is an emerging polycentric region). Within North American and perhaps the UK, polycentricity is a feature of the metropolitan region (or city-region). It focuses on multiple centers within a continuously built up urban fabric. The basic dynamic is that as urban places grow into metropolitan complexes the domination of the old core as the primary generator of regional wealth is replaced by a polycentric morphology composed of many centers each contributing to regional growth and wealth.

Although multiple centers have existed in metropolitan regions for a long time (Harris and Ullman, 1945), the beginning of popular study of them is normally attributed to Garreau’s (1991) *Edge Cities*. Garreau not only generated the specific phrase “edge city” but attempted to provide a precise definition: (a) five million square feet or more of leasable office space – the workplace of the Information Age; (b) 600,000 square feet

of leasable retail space; (c) more jobs than bedrooms; (d) is perceived by the population as one place; and (e) was nothing like “city” as recently as thirty years ago (1991, p 6-7). Each criterion could provide a basis for analysis; and some, such as “perceived as one place” could be equated with the branding of locational attributes, a dominant feature of development planning in the late 20th / early 21st century. Giuliani and Small (1991) identified five different kinds of centers in their study of Los Angeles: specialized manufacturing; mixed industrial (one is actually labeled LAX); mixed services; specialized entertainment; and specialized services. Significantly, airports ranked 5th, 6th, 14th, 17th and 18th in terms of employment. Bingham and Kimble (1995) reported similar patterns of differences among “edge cities” around six Ohio cities. McMillen and Smith (2003) and Bogart (2006) apply trade theory and notions of competitive advantage and mutual dependency to characterize subcenters. This literature is satisfactorily reviewed by Sarzynski et al. (2005). Within this mostly economic-driven literature, little attention is given to multi-nodal physical form (Jacobs, 2001) or internal physical morphology of places (Scheer and Petkov 1998).

Kasarda’s (2000) aerotropolis is a specific version of the edge city or center within a polycentric spatial structure. His brief definition of aerotropolis is that it is a new urban form comprising aviation-intensive businesses and related enterprises extending up to 25 km outward from major airports.

2.2 Economic Cluster Theory

The second stream of research that seems relevant is economic cluster theory. Economic cluster theory is in vogue both among policy makers and spatial economic researchers, right up there with “creative economies,” “IT knowledge networks” and “branding.” Two attributes of cluster theory are particularly important. First, that “clustering” is normatively the (only) mechanism that could guarantee economic success. Notice that a cluster does not necessarily guarantee economic success, but success cannot be achieved without clustering. Second, that there is NOT a direct correlation between “concentration of economic activity” and “economic cluster.” Magnitude of employment in a specific place may or may not be for example a competitive arrangement but simply co-location of activities. The case of a declining shopping center is sufficient to make the point.

Three cluster theorists provide guidance for how to know and measure the existence and value of a set of economic activities. Porter’s industrial cluster theory (2002) and its application to urban areas (1995) appear most appropriate for the design of new cluster. Yet clusters are more than unsubstantiated policy tools and can be empirically verified. At the evaluation level, Van den Berg et al. (2001) provides a clear set of intuitive criteria to assess existing and emerging clusters. Focusing on different sectors (cultural, electronics, telecommunications, health, media, and tourism), Van den Berg et al. lay out three broad potential criteria. They, and their components, include: (1) spatial economic conditions (strong local demand, intra- and inter-regional accessibility, quality of life, and ‘cultware’); (2) cluster specific conditions (initial size and development, cluster engines, strategic interaction, and level of new firm formation); and (3) organizing capacity (strong shared vision, political/social support, and public-private partnerships). Mommaas (2004) is concerned with “place-based (cultural) development.” Although not comparable on the surface, emphasis on “place” make the arguments somewhat general. Mommaas’ criteria to evaluate clusters include: horizontal aspects; vertical aspects; internal organization factors; external organizational factors; integration and/or openness; specific development paths; and spatial organization. These are all recognizable terms in the language of agglomeration and urbanization economics (cf. Bogart, 1998). Mommaas then examines these criteria in terms of five attributes of overall development practice including: (1) strengthening the identity, attraction power and market position of places; (2) stimulating a more ‘entrepreneurial approach, (3) stimulating innovation and creativity, (4) finding a new use for old buildings and derelict sites, and (5) stimulating cultural diversity and cultural democracy.

2.3 Airports and the Fifth Wave

Kasarda and others are found of using the phrases “fifth wave of development” and “fifth wave of transport” to describe the relation of transport mode to city form. From ports to rivers to train to car to air, each mode of transport has severe implications for the movement of goods as well as for the territorial or morphological organization of space. So, just as Times Square in New York developed due to accessibility provided by numerous crossing subways, airports and their surrounding areas are developing as centers of metropolitan form. Burke (2004) has examined the overall impacts of airports in Europe.

At a global scale, Lindsay (2006) has produced a map that identifies aerotropoli in various stages of development from “existing” to “in development” to “planned” to “rudimentary.” Eight are in Asia (one existing, six in development, and one planned), one each “in development” in the Middle East, Europe, and Latin America, and five (two planned and three rudimentary) in the US. The European aerotropolis “in development” is at Schiphol in The Netherlands.

2.4 Questions Raised About Airports as Centers of Economic Activity

The brief review suggests a number of concepts that need further elaboration. Foremost among them is the question of “concentration” versus “cluster” as a characterization of the economic activity around airports. Subcenter researchers typically focus on either total employment (as a percentage of regional workforce) to identify centers or on industrial employment distributions (to define functional differentiation). The “character” theme remains elusive, particularly if it is used to mean dynamic or mechanisms of internal organization of the places themselves. Moreover, the role and significance of the larger regional economy on what happens at the airport must be considered. Analysis of an airport center in a multi-scalar analysis would consider three levels of information: the regional economy, the economics of the center itself, and some discussion of its internal physical morphology.

3 RESEARCH PROBLEM AND METHODS

The objective of this paper is to begin to build a theoretically-informed (from polycentric urban form and economic cluster) understanding of the “character” of economic activity in and around airports. The intent is to provide, by executing a multi-scalar research design, some insight into the “concentration v. cluster” discussion as well as to, somewhat serendipitously, discover new questions. More specifically, the research problem focuses on developing case study material for the principal airport in three metropolitan areas in the US: Atlanta (population = approximately 5 million in 2005); Dallas (population = approximately 6 million in 2005); and Memphis (population = approximately 1.3 million in 2005). The choice of the US context is based on familiarity and data. The choice of specific airports is based partially on their early identification by Garreau as edge cities (Garreau had identified the Memphis airport as an edge city, the Hartsfield International Airport area in Atlanta as an “emerging one” and did not include DFW in Dallas at all); by Lindsay (2006) as aerotropoli in various stages of development (Dallas and Memphis being designated as “rudimentary”); by their general visibility in the world of airport and airport real estate organizations and publications; and, by what I thought were intuitive parallels between them and similar situations in Europe, to be elaborated in the conclusion.

The analysis begins, interestingly, from the air from where images of the metropolitan area and polycentric form are evident. Simple aerial images from Google Earth provide both an overview of regional form as well as the location of these airports. The aerial images and data layers from Google Earth provide the basis for choosing airport areas. This is accomplished at the scale of the zip code. The following rule is used: zip codes are “in” the airport area if they are at or adjacent to the airport or if it apparent from the air that they are part of a continuous band of development from the airport site.

National level agencies provide economic data at the zip code scale. Two sources are used. First, the Department of Labor’s servlet (http://data.bls.gov/LOCATION_QUOTIENT/servlet/lqc.ControllerServlet) allows calculation of location quotients down to the metropolitan area and below. Location quotients (LQ) measure, somewhat crudely but effectively, the economic competitiveness of a particular industrial sector in a particular region (Peters, 2004). In this model, economic competitiveness is equated with importing wealth into the region. The second is County Business Patterns, a survey conducted annually in March for all non-government and non-self-employed individuals. In addition to providing overall establishments, employment and payroll, detailed data for number of firms and size distribution of firms is available for all industrial categories represented in the North American Industry Classification System (NAICS). These data are used to calculate and calibrate a number of features of the employment in an around airports. In particular, the overall size of the employment concentration (following the major analytical procedures outlined above) is counted, and particular attention is paid to the existence of large firms (after Van Den Berg et al). Size is reported as four levels, with emphasis being placed on the first three: very large (greater than 1000 employees), large (greater than 500 employees), medium (greater than 250 employees), and small. Interpretation is also focused on the particular distribution of firm types.

4 RESULTS AND ANALYSIS

Results are presented in three stages. Reflecting the multi-scalar research design, the first stage assesses the employment structure of the three metropolitan regions. The second describes the economic “character” of the economic activity in the airport nodes. The final stage is a comparative analysis.

4.1 Some General Results at the Scale of the Metropolitan Region

The Atlanta region (formally the Atlanta-Sandy Springs-Marietta MSA) comprises a population of 4.92M in 2005 and total employment (non-government) of 1.932M in 2004. The major industrial sectors, defined in terms of total employment are administrative and support services (NAICS 561, 179,603 employees in 2004), food services and drinking places (NAICS 722, 169,496), and professional and technical services (NAICS 541, 147,261). All of these are typical urbanization economy sectors. Significantly below these are three other sectors with over 55,000 employees: merchant wholesalers for durable goods (80,228), ambulatory health care (72,331), and hospitals (59,860). Aside from healthcare (another urbanization economy sector), the importance of durable goods wholesalers portends insight into the regional economy. In terms of location quotients, thirty NAICS sectors have LQ's greater than 1. The ten most important import-potential sectors are, in order, air transportation (481), lessors of non-financial intangible assets (533), telecommunications (517), broadcasting, except Internet (518, this is the home of CNN), electronic markets and agents and brokers (425), couriers and messengers (492), merchant wholesalers for durable goods (423), publishing industries, except Internet (511), and textile product mills (314). Thus, in terms of clusters defined as horizontally similar industrial groups, the Atlanta metropolitan region could be characterized in terms of Transport and Communications, except Internet.

The Dallas region (formally the Dallas-Fort Worth-Arlington MSA) comprises a population of about 5.82M in 2005 and total employment (non-government) of 2,357,064. The major industrial sectors are administrative and support services (NAICS 561, 198,613), professional and technical services (NAICS 541, 163,002), ambulatory health care services (NAICS 621, 108,625) – all urbanization economy sectors. Below these are two others sectors with employment over 75,000: specialty trade contractors (NAICS 238-utilities, 97,823), and credit intermediation and related activities (86,094). Below these five are four other sectors with employment over 50,000: general merchandise stores (68,691), hospitals (62,587), insurance carriers and related activities (55,690), and computer and electronic product manufacture (NAICS 334, 51,849). In terms of location quotients, twenty sectors have LQ's greater than 1. The four most important sectors are air transportation (481, LQ=3.23), ISPs, search portals, and data processing (518, 2.36), postal service (491, 2.02), and computer and electronic product manufacturing (334, 1.86). Thus, in terms of clusters defined horizontally, the Dallas metropolitan region could be characterized in terms of Specialty Trade, Finance, and Computer Infrastructure and Computer and Electronic Product Manufacture

The Memphis region (formally the Memphis MSA) has a population of about 1.26M in 2005 and total employment (non-government) of 516,328 in 2004 – about one quarter the size of the Atlanta and about one fifth the size of the Dallas regional economies. The major industrial sectors are administrative and support services (NAICS 561, 50,259), hospitals (NAICS 622, 24,666), ambulatory health care services (NAICS 621, 22,808), merchant wholesalers for durable goods (NAICS 423, 19,487), and professional and technical services (NAICS 541, 19,487). Here, durable goods wholesalers are in the top group of industrial sectors. In terms of location quotients, twenty sectors have LQ's greater than 1. The five most important sectors are paper manufacturing (322, LQ=3.06), warehousing and storage (493, 2.83), beverage and tobacco product manufacturing (312, 1.97), support activities for transportation (488, 1.92), air transportation (481, 1.73), petroleum and coal products manufacturing (324, 1.51), and electrical equipment and appliance manufacturing (335, 1.50). Furthermore, the location quotient for water transportation (NAICS 483) is 1.46. The portrait of Memphis is as a transport center located in an urban manufacturing center.

Several similarities and differences emerge among the three regions. Clearly, the major similarities include the dominance of urbanization functions such as administrative and support services, health care, and professional services. The location quotient analysis provides a somewhat different picture (perhaps removing these urbanization functions) showing that Atlanta has perhaps the most diverse economy, that Dallas is a higher tech place, but that applications appear to be in the financial sector, and that Memphis is still primarily a manufacturing and service center. In all places, location quotients for transportation support (NAICS 488) and at least one other transportation related industrial sector are significantly above 1.

4.2 The Case Studies

4.2.1 Atlanta (Hartsfield-Jackson) International Airport and Economic Activity Around It

Hartsfield-Jackson Atlanta International Airport (ATL) is located south of downtown Atlanta. Measured in terms of passenger traffic and landings and take-offs (a somewhat spurious conjunction), it is the world's busiest airport since 2005. It is both within the southern city limits of Atlanta and the adjacent city of College Park in both Fulton and Clayton counties. The relative location of the airport to the major features of the Atlanta region and the zip codes that comprise the activity center are shown in Figures 1 and 2.



Figure 1. Location of ATL within Atlanta Region



Figure 2. ATL Activity Node

Overall, the economic activity node at or near the Atlanta airport employs about 70,000 non-government employees or roughly 4.1% of the entire MSA non-government workforce. The economic activity is distributed among four different zip codes.

The largest sub-concentration of employees is located in Zip Code 30349 (employment > 23,000), located south and southwest from the airport. Here, there are eleven firms of significant size (employment > 250). There is one very large (employment > 1000) commercial bank and one large (employment > 500) lessor of non-financial intangible assets as well as two document preparation service firms. Two large transportation firms (air transport and support for rail transport) are located here. In addition, there are two manufacturing firms and two wholesale firms all involved in the food business. Finally, there is a religious organization. The second largest sub-concentration is located in Zip Code 30354 (employment > 20000), located to the northwest of the airport. Here, there are eighteen firms of significant size. Eight of them are directly involved in either direct transportation services (six of the eight) or courier services. Four others are presumably airport related – temporary agencies, travel agencies, and security services. Aside from these twelve, there are three manufacturing firms, two of which are involved in automobile manufacture, a real estate credit firm, and a very large computer systems design firm. Finally, there are two hotels.

The remaining two zip codes have fewer employees and fewer significant firms. There are nine sizable firms and 14,073 employees overall in Zip Code 30297, located southeast from the airport. The two large firms are a general freight trucking firm and an electrical utility. The remaining firms include three in the transportation (NAICS=48) sector and four are in the manufacture/wholesaling sectors. The firms in the transportation sector include general warehousing, a courier, and another general freight trucking firms. The two manufacturing firms include a bakery and manufacturer of polish. The wholesaling firms include groceries and automobile and other vehicle wholesaling. Zip code 30337, which includes the airport proper, has seven sizable large firms and an overall non-government employment of 8,000. The three large firms include a grocery warehouse, a professional distribution and logistics firm, and a school. The remaining sizable firms include soft drink manufacturer, an appliance repair shop, and two hotels.

Cluster or concentration? It appears that the economic activity at Atlanta is a concentration, but with possible cluster characteristics. There are clearly airport-sensitive or intensive industries. But there are also a number of firms involved in manufacture, warehousing, and wholesaling, particularly of food and food products. The co-location of food and food products at various stages on the supply chain to air transport is an area of future study. Moreover, the positive influence of the highway system makes inter-modal transfer efficient. The inter-modality of transport is a feature that all airports must develop, and is evident here in the preponderance of general freight trucking firms.

4.2.2 Dallas Airport and Economic Activity Around It

The Dallas-Fort Worth International Airport (DFW) is located between the cities of Dallas and Fort Worth, at the center of a triangle if one includes the Denton area. The airport is heavily marketed as a business location. In terms of land area, at nearly 18,000 acres, it is the largest airport in Texas, the second largest in the US, and fourth largest in the world. The airport crosses county boundaries and parts of it are located in four other cities.



Figure 3. Location of DFW within Dallas Region

Figure 4. Dallas Airport

Overall, the economic activity node at or near the DFW airport employs about 105,184 in 2004 distributed among 3740 firms. This accounts for .04% of the entire metropolitan area employment. Economic activity is distributed over three zip codes, each of which is fairly sizable and each of which extends some distance from the airport, suggesting that the economic impact is “near” but not necessarily “at” the airport.

Zip Code 75038 – located to the southeast and including the northern edge of the City of Irving, has thirty six sizable firms with a total non-government employment of 33,078. There appear to be several industrial groupings in this location. First, there is a financial and information center composed of fifteen firms, including a large estate credit firm and a large wired telecommunication firm. Within this cluster are also a commercial bank, sales financing firm, title insurance, two property and casualty firms, a residential property management firm as well as two professional computer firms, one of which does custom programming. There is also four additional wired telecommunications firms and a directory/ mailing list enterprise. Second, there are three manufacturing firms, including a very large manufacturer of analytical laboratory instruments and two others, one involved in semi-conductors and related devices and one involved in surgical appliances and supplies. Third, there is a jewelry node consisting of a jewelry wholesaler and a large retailing operation. Beyond these, there are six (two large) temporary help agencies, a large doctor’s office, and one other service firm focusing on computer and office machine repair.

Zip code 75063 – to the northeast of DFW, has thirty two sizable firms and overall non-government employment of 46,082 in 1107 firms. The largest concentration of firms, nine, is in the finance sector, revolving around a very large real estate credit establishments in addition to three (one large) sales financing firms, a consumer lending firm, two loan brokers, a large property and casualty insurance, and a large third party administrator of insurance. There are three information firms, one each in wired telecommunications and in paging, and a large cable and other programming distribution firm. The four professional firms include a very large accounting firm, two custom computer programming and design firms, and a management general counsel firm. The zip code is home to two corporate, subsidiary, or regional headquarters. There is also a large drug and druggists’ sundries warehousing firm. At the retail level, there is a large computer and software store and a big box warehouse club and super center. The lone large transportation firm is airport operations. The administrative support area is populated by a very large temporary employment agency, a large telemarketing firm, and two (one large) security firms. There are two educational institutions, one of which is a very large trade school. Finally, there is also a very large medical laboratory, a sports team, a single large hotel, and a very large firm engaged in other personal and household goods repair and manufacture.

Zip code 76051 is located in Tarrant County (on the Fort Worth side of the airport). Overall non-government employment in this zip code in 2004 was 26,024 in 1521 firms, twelve of which are sizable.. The economic activity here seems almost unrelated to airport operations. The very large firms include a wireless

communication company and a hospital. The only other large firm is a corporate, subsidiary or regional headquarter. The remaining firms include two manufacturers (concrete blocks and bricks, air conditioning for automobiles), three wholesale and retail firms of the big box variety (automobile dealerships, boat dealerships, and a furniture store). The real estate sector is represented by a car rental facility. Finally, there is another corporate, subsidiary, or regional headquarters, hotels, and a religious organization.

Cluster or Concentration? The economic activity around DFW (including portions of the city of Irving) appears to be a cluster based on finance, information, and associated computer programming and design. Other than this focus, the general pattern of employment is rather ordinary for an urban place. It is also clear that the economic activity has distinct spatial vectors to it, with the Dallas County area being more “creative” and “information technology” driven and the Tarrant County side being more service oriented. It is also clear that the economic activity is concentrated “near” the airport, but not necessarily “at” the airport.

4.2.3 Memphis Airport and Its Economic Activity

The airport(s) at Memphis are a special, but interesting, case. MEM is a public airport located south of the city of Memphis in Shelby County, Tennessee. It is Northwest Airlines’ third-largest passenger hub, with many US routes and a daily nonstop flight to Amsterdam. However, its major fame is that it is home to Federal Express’ “super-hub.” So much so, that combined with the United Parcel Services’ third-largest sorting facility, MEM is the largest cargo airport in the world. This is clearly not explained by city size nor signature hub for a major carrier, but to weather conditions conducive (ideal?) for uninterrupted air service.



Figure 5. Location of MEM within Memphis Region

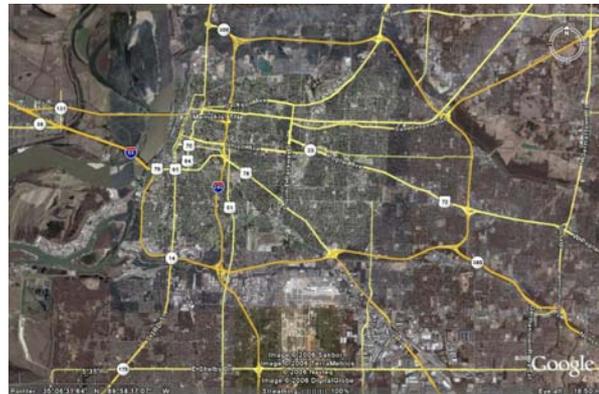


Figure 6. MEM Activity Node

Overall, the economic activity node at or near MEM employs over 105K and accounts for an astounding 20% of the entire non-government workforce in the metropolitan region. This number alone is worthy of signification. There are five zip codes in and around the Memphis airport complex.

Zip code 38118, located east of the airport, has thirty four sizable firms. Overall non-government employment in 2004 was 66,802 distributed over 1690 firms. Ten of these are in the transportation and warehousing sector. Two very large and three other courier firms are the backbone of this concentration, in addition to the three general freight firms and another that specializes in “arranging” freight. However, there is also a large commercial bank and a large accounting firm, located near large to very large six corporate, subsidiary, or regional headquarters. Not surprisingly, there are seven administrative support firms including four (one very large) temporary services firm, a solid waste collection company, a janitorial service company, and a facilities support firm. Beyond these transportation and office functions, there are two health care firms and two firms involved in computer and office machine repair and maintenance. Manufacturing is represented in the area by a brewery and a large coated paper manufacturer. Aside from a very large footwear wholesaler, there is a group of two grocery related firms – a large wholesaler and a large retailer. Zip code 38141 is located just southeast of 38118 and is part of the same economic node. It has overall non-government of 7,976 in 225 firms, seven of which are sizable. There is a large temporary services agency, two medical laboratories, three general warehousing facilities, and a soybean processing firm.

To the west of the airport, Zip Code 38116 is home to nine sizable firms. Overall non-government employment in this zip code in 2004 was 24,557 in 976 firms. Visually, this looks like an area that developed prior to large scale expansion of the airport and the Federal Express arrival – it is focused on a major north-

south highway leading out of Memphis. Four of the sizable firms are in the transportation sector, with two very large firms (scheduled passenger service, general freight trucking), a large courier firm, and another general freight firm. In addition, there are two manufacturing firms, a very large one involved in surgical appliance and supply and another in commercial gravure. Aside from the almost ubiquitous temporary services agencies, there is a large hospital and a museum facility associated with a rock and roll star.

The third node of economic activity consists of two small (geographically) zip codes immediately northwest of the airport – 38131 and 38132 – that together have a non-government employment of 8,491 in 1,297 firms. There are no sizable firms in 38131 and four in 38132. These include a very large general freight firm and a large wholesaler of medical, dental and hospital equipment. The remaining sizable establishments are administrative support firms – a temporary services agency and a security firm.

Cluster or Concentration? In the two largest subareas, transportation and transportation related companies dominate the distribution of industrial types. But, the area also has six headquarters and a small focus on medical and medical related firms. All in all, probably a transportation cluster, with potential for increasing specialization in medically-related activities.

4.3 Some Comparative Findings

There are obvious similarities and differences. Among the similarities is the collection of airport or transport related firms – everything from the ugly (general freight) to the necessary (couriers and temporary service firms). These are most dominant in Memphis and least dominant in Dallas. There is also obvious differences, the most profound being the proportion of the regional workforce that is employed at or near the airport – from the 20% near Memphis to .04% in Dallas. In the remainder of this section, comments are focused along three lines of analysis: (a) locational characteristics viz. metropolitan area; (b) the character, sometimes surprising, of the economic activity; (c) some resolution about the cluster v. concentration issue.

In the case of the two larger cities, both sites are relatively interesting. Both cross jurisdictional boundaries and, at least from reading non-researched reports, are plagued by jurisdictional squabble. But, it is regional form attributes that are intriguing. From the air, the Dallas-Fort Worth region looks either like a triangle (if one includes Denton) or a dumbbell with a very strong bar (the transport spine) holding up two large masses (Dallas and Fort Worth). Along the bar of the dumbbell are several sizable cities, one (Las Colinas) built over the past twenty years. Including Denton in the image, DFW is the very center of the region. On the other hand, ATL is located at almost the southernmost point of the circular interstate system around the city of Atlanta. It is physically at the point of entry from the south – both southeast and southwest. From space, the spatial structure of the Atlanta region looks like a “-Y”. The top of the Y are the northern points of the region and represent intersections of two major north south highways with the circular highway around the city, the v of the Y is downtown, and the bottom is ATL. The ‘-’ to the west is an industrial zone through which a major highway runs and which contains another smaller airport.

The correlation of metropolitan region size and age of development also appears related to the types of activities found at or near the airport. DFW is the largest and the location of the airport newer; the opportunity to “start fresh” is apparent. ATL is partially dependent on its relation to the Interstate highway system. MEM is the result of good luck and good planning. It has turned into a specific economic development strategy and the principal employment site in the region.

However, it is the “character” of the economic activity nodes that is the major concern of this paper. Aside from the transport related activity, the analysis demonstrates several interesting features. Each has what appears to be a signature collection – communications in Atlanta, finance and computers in Dallas, and corporate headquarters in Memphis. But, there is also a very large food and food processing presence in both Atlanta and Memphis.

Finally, are these clusters or concentrations? Aside from the transport related activities – which seem more like a wealth creating cluster in Memphis and a service cluster in the other two – the only airport area that seems “cluster-like” as opposed to “concentration-like” is the finance and computer related activity in Dallas.

5 CONCLUSIONS AND SPECULATIONS

5.1 Conclusions

Many of the specific conclusions have been stated above. Here, key findings are reiterated in terms of a larger picture. First, it is clear that the economic activity around this collection of airports is not identical. The set of economic activities represent a blend of historic land use and economic features (the older highway corridor in Memphis, the Interstate System in Atlanta) and opportunities to start on fresh land (Dallas). Second, each airport is symbolically important in different ways. MEM is clearly the “heart and soul” of Memphis; the new sports arena is called the “Fed Ex” arena. And, third, while not related specifically to the data or analysis, there seem to be parallels and lessons from these airports to others throughout the world. The Dallas and Atlanta airports are major transfer points in passenger traffic – they serve a similar function as the several European hubs – Schiphol and Frankfurt being the major examples. On the other hand, the case of Memphis is similar to smaller cities that are seeking to capitalize on the fifth wave of transport by developing basically freight operations, similar to Verona and Bratislava.

5.2 Unintended “Findings” and Speculations

One unintended outcome of this exercise is that I stumbled on secondary, for lack of a better term, airports – and there were lots of them. Their size characteristics and spatial patterns intrigued me in light of the twin theoretical (polycentric metropolitan morphology and economic cluster theory) considerations used. The case of Dallas is most illustrative. DFW is centered on a pattern of smaller airports that, from space, form almost a perfect hexagon around it. Two of these (Love Field in Dallas and Alliance in Fort Worth) are major freight centers (one is now – the former major airfield in the region, one is planned to become) and they are on opposite sides of the metropolitan region. The remaining are general purpose smaller airports. Even below this level are a series of smaller municipal airfields. In Atlanta, there a fewer airports, but the one that caught my attention was the one in the ‘-’ industrial district southwest of downtown. The spine of this area is the Fulton Industrial Highway, located interestingly where Fulton, Cobb and Douglas counties converge. The area is contained mostly within zip code 30336, which has non-governmental employment of over 25,000 and fourteen sizable firms among its 629. The makeup of this area is very similar to that found around ATL -- the largest firms are transportation and wholesaling firms. On the other hand, smaller markets, such as Memphis, do not appear to have as many minor airports. So, the question to be asked and evaluated further goes something like this: is there a hierarchy of airports within a region and does this hierarchy manifest itself in spatially regular ways? Is there a rank-size rule between the size of a metropolitan region and the number of airports?

Second, although jurisdictional and land use issues are clearly beyond the scope of this analysis, I do find it interesting that both Atlanta and Dallas are built on lands of more than one place. This aspect of airport development clearly begs further work.

Finally, the aerotropolis literature is almost as annoying as other normative literatures in their reliance on the notion that the metaphor will yield positive economic benefits. A quick read of this literature suggests that aerotropolis will save Detroit and transform Bela Horizonte the transportation hub of South America. More realistic accounts of the importance and impact of airport centered economic engines are found in Rondinelli (2004) and Hanley (2004). Simply put, branding needs to be accompanied by realistic economic assessments. Yet, it is apparent that the economic activity in and around airports are serious economic engines. The case of Memphis is illustrative. While certain elements of the Memphis intelligentsia are marketing it – via the Memphis Manifesto – as a creative city, it is clear that the real Memphis is encapsulated by activities at the airport. Other cities face similar quandaries. The lovely city of Verona, Italy is known for Romeo and Juliet and its first century Coliseum, yet I suspect that the economic engine of Verona is the Quadrante Europa “freight village” at the airport focused on agricultural and food products. Aerotropolis help, but the region will always be more than just it!

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