Emergence and Impact of Secondary Airports in the United States

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Motivation

- **Capacity of the National Airport System**
  - Airports (runways) are key constraints in the U.S. Air Transportation System
  - Potential capacity increase is limited at major airports
    - Mismatch between needs and capacity adjustments at major airports in the OEP
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- Demand for Air Transportation
  - Pressure from a growing demand for air transportation
  - Greater number of operations are expected in the NAS in the upcoming years
  - Factors amplifying the problem
    - Decreasing size of aircraft: Influence of Regional Jets
    - Potential entry of small aircraft in the NAS in the upcoming years: VLJs, UAVs
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- **System Capacity Inadequacy**
  - Indicators of capacity inadequacy
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- **System Capacity Inadequacy**
  - Indicators of capacity inadequacy
  - Increasing pressure on key airports

- **Alternatives & Solutions**
  - The use of secondary airports has been and is expected to be one of the key mechanisms by which demand is met in congested metropolitan areas

- **Need**
  - Understand the dynamics of the system at both the regional and the national level
  - Understand the factors influencing the emergence of secondary airports
Methodology

- **Identification of Airports**
  - Case study approach
  - Selection of case studies based on the 30 busiest airports in the United States
  - Regional airport system defined as all airports within 50 miles of a major airport
  - Criteria and threshold for identifying secondary airports:
    - 1% traffic share based on passenger enplanements within the regional airport system

- **Airport Classification**:
  - Core airports (Original)
  - Core airports (Emerged)
  - Secondary airports
  - Secondary airports (Re-emerged from an original core airport)
  - Other airports (traffic share below 1%)
Core and Secondary Airports in the U.S.
Factors Influencing the Emergence of Secondary Airports
Factor #1: Congestion of the Core Airport

- Correspondence between the congestion of the core airport and the existence of secondary airports in the regional airport system.

- Reasons:
  - Degraded level of service at the core airport
    - Decreased attractiveness of the core airport to both airlines and passengers.
  - Increase of the attractiveness of closely located and underutilized airport that do not exhibit the same congestion problems.

<table>
<thead>
<tr>
<th>Airport Code</th>
<th>Airport Name</th>
<th>Operations delayed</th>
<th>Existence of secondary airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGA</td>
<td>LaGuardia</td>
<td>15.6%</td>
<td>Yes</td>
</tr>
<tr>
<td>EWR</td>
<td>Newark</td>
<td>8.1%</td>
<td>Yes</td>
</tr>
<tr>
<td>ORD</td>
<td>Chicago</td>
<td>6.3%</td>
<td>Yes</td>
</tr>
<tr>
<td>SFO</td>
<td>San Francisco</td>
<td>5.7%</td>
<td>Yes</td>
</tr>
<tr>
<td>BOS</td>
<td>Boston</td>
<td>4.8%</td>
<td>Yes</td>
</tr>
<tr>
<td>PHL</td>
<td>Philadelphia</td>
<td>4.5%</td>
<td>Yes</td>
</tr>
<tr>
<td>JFK</td>
<td>Kennedy</td>
<td>3.9%</td>
<td></td>
</tr>
<tr>
<td>ATL</td>
<td>Atlanta</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>IAH</td>
<td>Houston</td>
<td>2.8%</td>
<td>Yes</td>
</tr>
<tr>
<td>DFW</td>
<td>Dallas/Ft.Worth</td>
<td>2.4%</td>
<td>Yes</td>
</tr>
<tr>
<td>PHX</td>
<td>Phoenix</td>
<td>2.2%</td>
<td></td>
</tr>
<tr>
<td>LAX</td>
<td>Los Angeles</td>
<td>2.2%</td>
<td>Yes</td>
</tr>
<tr>
<td>IAD</td>
<td>Dulles</td>
<td>2.0%</td>
<td>Yes</td>
</tr>
<tr>
<td>STL</td>
<td>St. Louis</td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td>DTW</td>
<td>Detroit</td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td>CVG</td>
<td>Cincinnati</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>MSP</td>
<td>Minn./St. Paul</td>
<td>1.3%</td>
<td></td>
</tr>
<tr>
<td>MIA</td>
<td>Miami</td>
<td>1.1%</td>
<td>Yes</td>
</tr>
<tr>
<td>SEA</td>
<td>Seattle</td>
<td>1.0%</td>
<td></td>
</tr>
<tr>
<td>LAS</td>
<td>Las Vegas</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>DCA</td>
<td>Reagan National</td>
<td>0.8%</td>
<td>Yes</td>
</tr>
<tr>
<td>BWI</td>
<td>Baltimore.- Wash.</td>
<td>0.7%</td>
<td>Yes</td>
</tr>
<tr>
<td>MCO</td>
<td>Orlando</td>
<td>0.6%</td>
<td>Yes</td>
</tr>
<tr>
<td>CLT</td>
<td>Charlotte</td>
<td>0.6%</td>
<td></td>
</tr>
<tr>
<td>PIT</td>
<td>Pittsburgh</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>SAN</td>
<td>San Diego</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>DEN</td>
<td>Denver</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>SLC</td>
<td>Salt Lake City</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>TPA</td>
<td>Tampa</td>
<td>0.2%</td>
<td>Yes</td>
</tr>
<tr>
<td>MEM</td>
<td>Memphis</td>
<td>0.0%</td>
<td></td>
</tr>
</tbody>
</table>
Factor #2: Low-Cost Carrier Entries at Secondary Airports

- The entry of a specific carrier – generally a low-cost carrier – was correlated with the emergence of secondary airports.
  - e.g. Case of Manchester (in the Boston region)
    - year to year growth in passenger enplanements: 6% from 1990 to 1997
    - after the entry of Southwest: 45% from 1998 to 2000.

<table>
<thead>
<tr>
<th>Secondary airport</th>
<th>Low-cost carrier</th>
<th>Year of entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago Midway (MDW)</td>
<td>Midway</td>
<td>1979</td>
</tr>
<tr>
<td></td>
<td>Southwest</td>
<td>1985</td>
</tr>
<tr>
<td>Fort Lauderdale (FLL)</td>
<td>Southwest</td>
<td>1996</td>
</tr>
<tr>
<td>Providence (PVD)</td>
<td>Southwest</td>
<td>1996</td>
</tr>
<tr>
<td>Manchester (MHT)</td>
<td>Southwest</td>
<td>1998</td>
</tr>
<tr>
<td>Orlando Sanford (SFB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melbourne (MLB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>St Petersburg (PIE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sarasota (SRQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oakland (OAK)</td>
<td>Southwest</td>
<td>1989</td>
</tr>
<tr>
<td>Burbank (BUR)</td>
<td>Southwest</td>
<td>1990</td>
</tr>
<tr>
<td>Ontario (ONT)</td>
<td>Southwest</td>
<td>1985</td>
</tr>
<tr>
<td>Orange county (SNA)</td>
<td>Southwest</td>
<td>1994</td>
</tr>
<tr>
<td>Long Beach (LGB)</td>
<td>jetBlue</td>
<td>2002</td>
</tr>
<tr>
<td>Islip (ISP)</td>
<td>Southwest</td>
<td>1999</td>
</tr>
<tr>
<td>Baltimore (BWI)</td>
<td>Southwest</td>
<td>1993</td>
</tr>
<tr>
<td>Newark (EWR)</td>
<td>People Express</td>
<td>1980</td>
</tr>
<tr>
<td>Dallas (DAL)</td>
<td>Southwest</td>
<td>1971</td>
</tr>
<tr>
<td>Houston (HOU)</td>
<td>Southwest</td>
<td>1972</td>
</tr>
</tbody>
</table>
Factor #2: Mechanisms of Emergence of Secondary Airports

- Change in the dynamics at the airport level following the entry of a low-cost carrier
- Market Stimulation: Fares and Destinations
  - Prior to the entry:
    - High fares, limited destinations
  - After the entry:
    - Drop in average fare
      (e.g. at MHT average aggregate yield dropped by 27% between 1997 and 1999)
    - Stimulation of traffic
      (e.g. at MHT: enplanements increased by 154% between 1997 and 1999)
- Increased competition at the airport level
  - Entries of low-cost carriers and legacy carriers
  - Loss of monopolistic power of incumbent airlines
Factor #3: Distribution of Population

- **Influence of Local Basins of Population:**
  - Secondary airports generally emerged close to medium to large local basins of population

- **Single core (Centralized):**
  - Original core: Large local basin
  - Secondary airport: Smaller basin
  (e.g. Boston, San Francisco, Miami, Tampa)

- **Multi-Core airport system:**
  - Original core: Large local basin
  - Emerged core airports: Smaller basin
  (e.g. New York, Washington)

- **Single core (De-centralized):**
  - Emerged core airport: Small local basin
  - Secondary airport re-emerged from a core: Large local basin
  (e.g. Dallas, Chicago, Houston)

- **It was observed that secondary airports tend to emerge further away from the core local basin of population**
Factor #4: Airport Infrastructure

- Runways are the most constraining element in an airport system.

- Generally, the core airport can accommodate: Wide Bodies, Narrow Bodies, Regional Jets, Turbo Props.

- Secondary airports can accommodate: Narrow Bodies, Regional Jets, Turbo Props. (in some cases Wide Bodies)

- The current set of airports, which possess one or more runway with length greater than 5,500 ft constitute the potential secondary airports of the future.

- Currently, there are 74 airports with at least one runway longer than 5500 ft that are located within 50 miles of 16 key metropolitan areas.
Factor #5: Connecting Passengers at the Core Airport

- The emergence of a new secondary airport is more likely to happen at an airport where connecting passengers are not predominant (below 25%).

- Exceptions: Secondary airports that re-emerged from an original core airport: Secondary airports located inland close to a major hub airport:
  - MDW / ORD
  - HOU / IAH
  - DAL / DFW

- These airports were able to reemerge because they had an advantage in terms of location compared to the emerged core airport.
Models of the Dynamics of Secondary Airport Emergence
## Two Major Mechanisms of Emergence of Secondary Airports

- **Core airport congestion**
  - Congestion at the core airport and the degraded level of service increase the attractiveness of underutilized regional airports

- **Local market**
  - Based on the distribution of demand for air transportation at the regional level, airlines may choose to exploit market opportunities and enter service at a specific regional airport.

- **Combination of both models**

### Chart:

<table>
<thead>
<tr>
<th>Core airport congestion based emergence</th>
<th>Local market based emergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion predominant</td>
<td>Combined factors</td>
</tr>
<tr>
<td>DFW, IAD, JFK, EWR, IAH</td>
<td>PVD, MHT, MDW, FLL, OAK, SJC, BWI, BUR, ONT, SNA, LGB</td>
</tr>
<tr>
<td>Local market predominant</td>
<td>PIE, SRQ, SFB, MLB, DAL, HOU</td>
</tr>
</tbody>
</table>
Implications of the Emergence of Secondary Airports
Impacts of the Emergence of Secondary Airports

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**Implications at the Regional Level**
- **Advantages:**
  - Relieve core airports
  - Better access to air transportation for suburbs and neighborhood towns’ residents
  - Stimulate a local market
- **Disadvantages:**
  - **Environmental:** increase population exposure to noise.
  - Dilution of operations for airlines. Limits the opportunity for economies of scale.
  - Force G.A. activity to move to small regional airports

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**Impact on the Regional Airspace System**
- **Interactions between airports** appear and airport operations become dependent.
  (e.g. New York airport system face operational constraints due to airport interactions)
- **Consolidation of TRACONs** (Terminal Radar Approach Control).
  - e.g. In 2003, the Potomac TRACON in Washington was the result of the merger of 4 single airport TRACONs that became inefficient because of the greater interactions between Washington National, Washington Dulles, Baltimore and the Andrews Air Force base airports
  - e.g. Boston region (February 2004) with the merger of Boston and Manchester TRACONs.
Impacts of the Emergence of Secondary Airports

- **Implications on the National Infrastructure**
  - Decreasing concentration of activity at major airports
  - **Reliance on a larger set of airports.**
  - **Reliability:**
    - Effects of the disruption of activity at an airport are lower than what they would have been if all activities were located at the same airport.
    - e.g. use of Ontario airport during intense fog conditions at Los Angeles (LAX)
  - **Greater dilution of funds and a more difficult fund allocation process** from an infrastructure investment standpoint.

- **Implications of Multi-Airport Systems at the National Level**
  - Secondary airport emergence implies new connections to the rest of the airport network.
    - e.g. Emergence of Providence led to the creation of OD pairs such as:
      - PVD-ORD (a secondary to core airport market)
      - PVD-MDW (a secondary to secondary airport market)
  - At the national level, OD pairs (or inverse) between:
    - Secondary to core airports: +13% between 1990 and 2003
    - Secondary to secondary airports:+49% during the same time period
  - Creation and growth of parallel air transportation networks
Conclusion

- Secondary airport emergence is the expression of the adaptation and transformation of the national air transportation system to capacity constraints and market opportunities.

- In the past, secondary airports have proven to be effective mechanisms for increasing the capacity of regional airport systems.

- Increasing demand for air transportation in the future

- Need to consider existing underutilized resources as an opportunity to exploit through the emergence of secondary airports.

- Factors influencing the emergence of secondary airports:
  - Congestion of the core airport
  - Distribution of population at the regional level
  - Airport infrastructure (airports with runway length as low as 5500 ft)
  - Connecting passengers
  - Entry of a specific carrier - generally a low-cost carrier -
  - Political factors, etc.

- The transition from single core airport to region wide multi-airport systems impose new constraints that need to be taken into account in the management and modernization of the National Airspace System.
Questions & Comments