The Model of Network Carriers' Strategic Decision Making With Low-Cost Carrier Entry

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Curtis, T., & Rhoades, D. L. (2015). The Model of Network Carriers’ Strategic Decision Making With Low-Cost Carrier Entry. . (). Retrieved from [https://commons.erau.edu/publication/118](https://commons.erau.edu/publication/118)

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THE MODEL OF NETWORK CARRIERS’ STRATEGIC DECISION-MAKING WITH LOW-COST CARRIER ENTRY

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Overview

- 1978: The U.S. Airline Deregulation Act
- 1970s: Southwest Airlines LCC model
- 1991: Ryanair, Ireland

“U.S. passenger traffic has averaged 2% annual growth since 2009.”

*Boeing Market Outlook, 2014*
## U.S.-based LCCs

<table>
<thead>
<tr>
<th>IATA Code</th>
<th>Airline</th>
<th>Principal Hub</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FL AirTran Airways, TX</td>
<td>Hartsfield-Jackson Atlanta Intl</td>
</tr>
<tr>
<td>2</td>
<td>G4 Allegiant Air, NV</td>
<td>Las Vegas McCarran Intl</td>
</tr>
<tr>
<td>3</td>
<td>F9 Frontier Airlines, CO</td>
<td>Denver Intl</td>
</tr>
<tr>
<td>4</td>
<td>B6 JetBlue Airways, NY</td>
<td>New York John F. Kennedy Intl</td>
</tr>
<tr>
<td>5</td>
<td>WN Southwest Airlines, TX</td>
<td>Chicago Midway Intl</td>
</tr>
<tr>
<td>6</td>
<td>NK Spirit Airlines, FL</td>
<td>Fort Lauderdale-Hollywood Intl</td>
</tr>
<tr>
<td>7</td>
<td>VX Virgin America, CA</td>
<td>San Francisco Intl</td>
</tr>
</tbody>
</table>

*Source: CAPA database*
1. To investigate major carriers’ competitive reaction (AA, DL, UA, US) when they face an LCC entrant in the less congested, small-sized U.S. regional airports.

- To select number of U.S.-based airports with 3-4 airlines in operation.
- To investigate airline behavior to deter or to accommodate the LCC entrant.

Axelrod’s “Tit for Tat” strategy (1992)

Pricing behavior and capacity
2. To investigate 5 indicators and their effect on the fares in the market with LCC entry.

- **Stage length:**
  Longer routes result in higher costs and higher fares

- **Number of economy class passengers:**
  Less passengers result in higher fares

- **Number of competitors:**
  Less competitors result in higher fares

- **Number of stops:**
  Fewer stops result in higher fares

- **The price of oil:**
  Higher oil price result in higher fares
Methodology

• Stage 1: The effect of LCC entry on airlines at the selected small-sized U.S. domestic airports.
  • Quarterly air fares were collected for the airlines operating in the market one year prior to LCC entry and two years after.

• Stage 2: The influence of selected indicators on airfares with LCC entry.
  • Dependent variable: The average economy class one-way fares of airlines flying in the same market as LCC entrant.
  • Predictor variables: Stage length, # economy pax, # competitors in the same market, # of stops, and the price of oil (one year prior LCC entry and two years after).
## LCCs and Secondary U.S. Airports

<table>
<thead>
<tr>
<th>Airport</th>
<th>LCC</th>
<th>Entry</th>
<th>LCC</th>
<th>Entry</th>
<th>LCC</th>
<th>Majors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. McGhee Tyson Airport, TN</td>
<td>AirTran</td>
<td>Q2 2009</td>
<td>Frontier</td>
<td>Q3 2007</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2. Newport News/Williamsburg Intern Airport, VA</td>
<td>Frontier</td>
<td>Q3 2010</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>3. Palm Spring International Airport, CA</td>
<td>Frontier</td>
<td>Q3 2010</td>
<td>Virgin America</td>
<td>Q4 2011</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4. Portland International Airport, OR</td>
<td>JetBlue</td>
<td>Q2 2006</td>
<td>Southwest</td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. Richmond International Airport, VA</td>
<td>AirTran</td>
<td>Q2 2005</td>
<td>JetBlue</td>
<td>Q1 2006</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>6. Sarasota Bradenton International Airport, FL</td>
<td>JetBlue</td>
<td>Q4 2006</td>
<td></td>
<td></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>7. Westchester County Airport, NY</td>
<td>AirTran</td>
<td>Q2 2006</td>
<td>JetBlue</td>
<td>Q1 2007</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>8. Atlantic City International Airport, NJ</td>
<td>AirTran</td>
<td>Q2 2009</td>
<td>Spirit</td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9. Capital Region International Airport, MI</td>
<td>Frontier</td>
<td>Q4 2013</td>
<td>Sun Country</td>
<td>Q4 2010</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10. McAllen Miller International Airport, TX</td>
<td>Allegiant</td>
<td>Q3 2005</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Research Method

• Data collection:
  • *masFLIGHT*, the subscription database
  • WTI Cushing Oklahoma oil, the U.S. Department of Energy

• Which specific independent variables make meaningful contributions to the overall prediction of the model (airfares)?
  • Stepwise multiple regression with backward elimination
Stage 1 Results

- There were no specific patterns discovered in airline behavior in a market with LCC entry.
- While some airlines decreased their fares in the first year following the LCC entrant, other airlines demonstrated fare increases.
- No pattern was discovered in the second year of operation as well.
- Additionally, the LCC itself demonstrated either fare increases or decreases in the second year of operation.
Limitations

• The average market airfares will not correctly reflect airline behavior because airlines are competing on the individual routes.
  • Seasonality, day of the week and time of the flight also play a large role in airline revenue management.
• *masFlight* provided a 10% sample of quarterly airfares
  • The Bureau of Transportation Statistics' Passenger Origin and Destination survey
Stage 2 Results

1. An increase in the stage length (the longer the route, the higher the costs and the higher the fare). SUPPORTED

2. A decrease in the number of passengers in economy class (less passengers result in higher fares). SUPPORTED

3. A decrease in the number of competitors in the market (less competitors results in higher fares). SUPPORTED
4. A decrease in the number of stops (the fewer the stops, the higher the fare).  SUPPORTED

5. An increase in oil price (the higher the oil price, the higher the fare).  MIXED RESULTS

The surprising results of negative relations came from analysis of oil price and airline fares out of two airports: McGhee Tyson Airport with AirTran Airways entry, and Westchester County Airport with AirTran Airways and JetBlue Airways entries.
Conclusion

• The first stage of research demonstrated mixed results and did not discover any patterns in airline behavior with LCC entry due to a large number of other variables influencing airline revenue management.

• The second stage confirmed that the stage length, # pax, # of competitors, and # of stops (with the exception of the oil price) had an impact on airfares for airlines operating out of small regional airports.
Target Deliverables

• Presentation: The Air Transport Research Society World Conference 2016

• Publications: transportation research peer-reviewed journals

• External grants: The U.S Department of Transportation

“...the grants to universities across the United States to advance the state-of-the-art in transportation research and develop the next generation of transportation professionals.” (DOT, 2014)
THANK YOU!

QUESTIONS?