Price Competition in the Top US Domestic Markets: Revenues and Yield Premium

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Objectives

Perform an analysis of US Domestic markets from years 2000 to 2006 in order to:

- Realize the yield differential between Legacy Airlines and Low Cost Carriers.
  - *Yield is the revenue generated by one passenger carried one mile.*
- Identify trends in traffic, revenues, average fare.
- Get an overview of the competition each legacy carrier faces and how this has changed from 2000 to 2006.
- Identify differences in yield premium, revenues, traffic and market share for each Legacy Carrier in its Hub Markets
Data Sample

10% sample of tickets of all US airlines which operate a/c with capacity greater than 60 seats

Data source: O&D Plus
- Summary of all domestic O-D markets by carrier by quarter
- Top 1000 US domestic markets extracted from O&D Plus for the period 2000-06
- Database: 856 OD markets that appeared every year in the Top 1000 markets
  - Traffic, Revenues, Yield, Market Share, Average Haul
  - Within each market airlines with market share below 5% are excluded from the database
Changes in Overall Traffic and Revenue

Total PDEW Traffic and Revenue in Top 856 Markets

Thousands

2000 2001 2002 2003 2004 2005 2006

Millions

$0 $10 $20 $30 $40 $50 $60 $70

Traffic
Revenues
Legacy Carriers vs LCCs

Two distinct groups of airlines:

- LCCs were selected according to their traffic during 2005 in the Top 856 Markets; i.e. the six with the highest traffic (and revenues) in 2006.

<table>
<thead>
<tr>
<th>Legacy Group</th>
<th>LCC Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Airlines</td>
<td>Airtran/Frontier</td>
</tr>
<tr>
<td>Continental Airlines</td>
<td>America West Airlines</td>
</tr>
<tr>
<td>Delta Air Lines</td>
<td>Frontier Airlines</td>
</tr>
<tr>
<td>Northwest Airlines</td>
<td>Jet Blue</td>
</tr>
<tr>
<td>United Airlines</td>
<td>Southwest Airlines</td>
</tr>
<tr>
<td>US Airways</td>
<td>Spirit Air Lines</td>
</tr>
</tbody>
</table>
Legacy Group vs LCC Group

PDEW Traffic in Top 856 Markets

PDEW Revenues in Top 856 Markets

Average Fare in Top 856 Markets

- $90.44
- $54.67
Effective Competitors in the Top 856 Markets in 2000 and 2006:
- Average Number of Competitors per market
- Excluding airlines with Market Share below 5%

**Change in Competition from 2000 to 2006**

- Effective Competitors drop from 3.18 in 2000 to 2.95 in 2006
- More Monopoly and Duopoly markets in 2006 than in 2000
- Fewer markets with more than 3 competitors in 2006
Effective Competitors 2

- Effective Competition by Legacy Carriers Drops from 2000 to 2006
- Competition by LCCs increases
- Largest drop for CO by 2006
- US faces the fewest competitors in 2000, but together with DL is the only airline which faces higher competition in 2006
- By 2006 DL and NW are the carriers most exposed to LCC competitors

![Bar chart showing competition by Legacy, LCC, and others for 2000 and 2006]
Yield Premium Approach

A new variable was introduced on the data set:

Yield Index \( Y_{Iij} = \frac{\text{Airline i Yield in a market j}}{\text{Avg Yield in market j}} \)

The avg yield index of every airline across all markets in one year was calculated by weighting in respect to pax on each market:

\[
\text{Avg Weighted Yield Index } AX_i = \frac{\sum (Y_{Iij} \times \text{Pax of airline i on market j})}{\sum \text{Pax of airline i}}
\]

\( AX_i \) from 2000 to 2006 was plotted for the major Legacy Airlines and LCCs.
The legacy carriers that maintain a yield premium are grouped together.

These airlines operate constantly above the average yield.
Delta Air Lines and US Airways are the only legacy carriers that show a yield below average for most years during the period 2000-06. US improves since 2002. America West, although it is considered an LCC, produces yields above average.
Results: LCC 1

Major LCCs have a yield lower than the average from 2000 to 2006
Results: LCC 2

Other LCC carriers are below average yield, except Alaska Airlines

Average Weighted Yield Index (LCC 2)
Hub analysis: Yield Premium

- The yield index at the Hub Markets of each Legacy Carrier was evaluated and compared to the overall yield index of the carrier.
- The hubs considered were:
  - Atlanta (Delta)
  - Chicago O’Hare (American, United)
  - Charlotte (US)
  - Cincinnati (Delta)
  - Cleveland (Continental)
  - Dallas Fort Worth (American)
  - Denver (United)
  - Detroit (Northwest)
  - Houston (Continental)
  - Memphis (Northwest)
  - Minneapolis St Paul (Northwest)
  - New York (Continental)
  - Philadelphia (US)
  - Pittsburgh (US)
  - Salt Lake City (Delta)
Hub Analysis: Overall Trends

Legacy Carriers Overall Traffic From Hub and Non-hub Markets

Legacy Carriers Overall Revenues From Hub and Non-hub Markets

Legacy Carriers Average Fare At Hub and Non-hub Markets
### American Hub Premium

<table>
<thead>
<tr>
<th>AMERICAN</th>
<th>Number of Markets in 2006</th>
<th>% of Total Revenues in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas/ Fort Worth</td>
<td>61</td>
<td>33%</td>
</tr>
<tr>
<td>Chicago O'Hare</td>
<td>62</td>
<td>21%</td>
</tr>
<tr>
<td>Non-hub Markets</td>
<td>255</td>
<td>48%</td>
</tr>
<tr>
<td>Overall</td>
<td>377</td>
<td>100%</td>
</tr>
</tbody>
</table>

**American Hub Premium**

- **Dallas/ Fort Worth**: 61 markets, 33% of total revenues in 2006
- **Chicago O'Hare**: 62 markets, 21% of total revenues in 2006
- **Non-hub Markets**: 255 markets, 48% of total revenues in 2006
- **Overall**: 377 markets, 100% of total revenues in 2006

Graph showing the American Hub Premium from 2000 to 2006 for different markets and overall.
Continental Hub Premium

<table>
<thead>
<tr>
<th>CONTINENTAL</th>
<th>Number of Markets in 2006</th>
<th>% of Total Revenues in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>65</td>
<td>58%</td>
</tr>
<tr>
<td>Cleveland</td>
<td>21</td>
<td>11%</td>
</tr>
<tr>
<td>Houston</td>
<td>51</td>
<td>35%</td>
</tr>
<tr>
<td>Non-hub Markets</td>
<td>56</td>
<td>3%</td>
</tr>
<tr>
<td>Overall</td>
<td>190</td>
<td>100%</td>
</tr>
</tbody>
</table>

Continent Hub Premium

- 2000 2001 2002 2003 2004 2005 2006

- Y1

- Cleveland
- Houston
- New York
- Overall
- Non-hub Markets
Delta Hub Premium

<table>
<thead>
<tr>
<th>DELTA</th>
<th>Number of Markets in 2006</th>
<th>% of Total Revenues in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cincinatti</td>
<td>14</td>
<td>7%</td>
</tr>
<tr>
<td>Atlanta</td>
<td>56</td>
<td>47%</td>
</tr>
<tr>
<td>Salt Lake City</td>
<td>27</td>
<td>10%</td>
</tr>
<tr>
<td>Non-hub Markets</td>
<td>223</td>
<td>37%</td>
</tr>
<tr>
<td>Overall</td>
<td>318</td>
<td>100%</td>
</tr>
</tbody>
</table>

Delta Hub Premium

Graph showing Delta Hub Premium from 2000 to 2006 for various markets including Atlanta, Cincinatti, Salt Lake City, Overall, and Non-hub Markets.
Northwest Hub Premium

<table>
<thead>
<tr>
<th>NORTHWEST</th>
<th>Number of Markets in 2006</th>
<th>% of Total Revenues in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memphis</td>
<td>7</td>
<td>4%</td>
</tr>
<tr>
<td>Detroit</td>
<td>32</td>
<td>37%</td>
</tr>
<tr>
<td>Minneapolis/ St. Paul</td>
<td>36</td>
<td>48%</td>
</tr>
<tr>
<td>Non-hub Markets</td>
<td>74</td>
<td>12%</td>
</tr>
<tr>
<td>Overall</td>
<td>148</td>
<td>100%</td>
</tr>
</tbody>
</table>

Northwest Hub Premium

- Detroit
- Memphis
- Minneapolis/ St. Paul
- Overall
- Non-hub Markets
## United Hub Premium

<table>
<thead>
<tr>
<th>UNITED</th>
<th>Number of Markets in 2006</th>
<th>% of Total Revenues in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington DC</td>
<td>43</td>
<td>18%</td>
</tr>
<tr>
<td>Chicago O'Hare</td>
<td>64</td>
<td>30%</td>
</tr>
<tr>
<td>Denver</td>
<td>46</td>
<td>21%</td>
</tr>
<tr>
<td>Non-hub Markets</td>
<td>186</td>
<td>36%</td>
</tr>
<tr>
<td>Overall</td>
<td>336</td>
<td>100%</td>
</tr>
</tbody>
</table>

### United Hub Premium

- **Chicago O'Hare**: Represents the premium for flights originating from Chicago O'Hare.
- **Denver**: Represents the premium for flights originating from Denver.
- **Washington DC**: Represents the premium for flights originating from Washington DC.
- **Overall**: Represents the total premium across all hubs.
- **Non-hub Markets**: Represents the premium for flights from non-hub markets.

The graph shows the United Hub Premium from 2000 to 2006, with data points for each hub and market type.
### US Hub Premium

<table>
<thead>
<tr>
<th>US</th>
<th>Number of Markets in 2006</th>
<th>% of Total Revenues in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlotte</td>
<td>18</td>
<td>18%</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>17</td>
<td>10%</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>33</td>
<td>35%</td>
</tr>
<tr>
<td>Non-hub Markets</td>
<td>116</td>
<td>40%</td>
</tr>
<tr>
<td>Overall</td>
<td>183</td>
<td>100%</td>
</tr>
</tbody>
</table>

#### US Hub Premium Chart

- **Charlotte**: Pink line
- **Philadelphia**: Green line
- **Pittsburgh**: Orange line
- **Overall**: Brown line
- **Non-hub Markets**: Blue line
Summary

Legacy carriers have a yield premium in the Top US markets.

- LCCs yield index is always below 1 with a very stable pattern

All six legacy carriers generate higher yields than their competitors in their own hub markets but lower than average in the non-hub markets.

- AA’s yield premium is constantly decreasing since 2000 both in hub and non-hub markets.
- CO is very strong in its EWR hub while the yield index in its non-hub markets is rising. Losing pricing power in IAH hub.
- NW’s yield index is very low in non-hub markets but is improving since 2002.
- US’s yield index has been improving since 2003 in all of its hub and non-hub markets.
Deleted Slides
Perform a disaggregate analysis of US Domestic markets from years 2000 to 2005 in order to:

Identify differences in yield premium, revenues, traffic and market share for each carrier for different market segmentations:

- Markets with and without significant LCC presence.
- Short, medium, long haul markets.
- Hub vs non-hub markets.
856 markets out of the Top 1000 Markets appeared every year from 2000 to 2005. These 856 markets constitute the market sample analyzed.

RPMs in Sample markets for major airlines range from 39 to 71% of the total domestic.

Revenues’ range is higher.
Initial Analysis Per Carrier: Traffic

Change in Major Carriers PDEW Traffic in the Sample Markets

Thousands:

- AA: 29%
- CO: 18%
- DL: -25%
- NW: 1%
- UA: -7%
- US: -37%
- B6: 1417%
- FL: 167%
- WN: 27%

2000 vs. 2006
Initial Analysis Per Carrier: Revenues

Change in Major Carriers PDEW Revenues in the Sample Markets

Million:

<table>
<thead>
<tr>
<th>Carrier</th>
<th>2000 Change</th>
<th>2006 Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>-2%</td>
<td>1%</td>
</tr>
<tr>
<td>CO</td>
<td>-25%</td>
<td>-2%</td>
</tr>
<tr>
<td>DL</td>
<td>-8%</td>
<td>-24%</td>
</tr>
<tr>
<td>NW</td>
<td>-38%</td>
<td>1885%</td>
</tr>
<tr>
<td>UA</td>
<td>-38%</td>
<td>175%</td>
</tr>
<tr>
<td>US</td>
<td>-24%</td>
<td>50%</td>
</tr>
<tr>
<td>B6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WN</td>
<td></td>
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</tbody>
</table>
Initial Analysis Per Carrier: Average Fare

Change in Major Carriers Average Fare in the Sample Markets

<table>
<thead>
<tr>
<th>Carrier</th>
<th>2000</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>-22%</td>
<td>-18%</td>
</tr>
<tr>
<td>CO</td>
<td>-17%</td>
<td>-9%</td>
</tr>
<tr>
<td>DL</td>
<td>0%</td>
<td>-1%</td>
</tr>
<tr>
<td>NW</td>
<td>-9%</td>
<td>-1%</td>
</tr>
<tr>
<td>UA</td>
<td>-18%</td>
<td>-1%</td>
</tr>
<tr>
<td>US</td>
<td>31%</td>
<td>3%</td>
</tr>
<tr>
<td>B6</td>
<td>3%</td>
<td>18%</td>
</tr>
<tr>
<td>FL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Per Carrier Initial Analysis: Market Participation

Change in Major Carriers Market Participation in the Sample Markets

- AA: 5%
- CO: -16%
- DL: -34%
- NW: -8%
- UA: -22%
- US: -3%
- B6: 567%
- FL: 182%
- WN: 16%

Legend:
- 2000
- 2006
Effective Competition per Carrier

- With how many carriers (LCC and Legacy) on average does each of the legacy carriers compete across the Top 856 Markets.
- Mean competition decreased during the period 2000-06.

<table>
<thead>
<tr>
<th>Year</th>
<th>AA Mean</th>
<th>Std. Dev.</th>
<th>CO Mean</th>
<th>Std. Dev.</th>
<th>DL Mean</th>
<th>Std. Dev.</th>
<th>NW Mean</th>
<th>Std. Dev.</th>
<th>UA Mean</th>
<th>Std. Dev.</th>
<th>US Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>2.874</td>
<td>1.351</td>
<td>2.951</td>
<td>1.507</td>
<td>2.733</td>
<td>1.426</td>
<td>3.271</td>
<td>1.714</td>
<td>3.039</td>
<td>1.359</td>
<td>2.618</td>
<td>1.446</td>
</tr>
<tr>
<td>2003</td>
<td>2.778</td>
<td>1.344</td>
<td>2.862</td>
<td>1.508</td>
<td>2.702</td>
<td>1.389</td>
<td>3.126</td>
<td>1.546</td>
<td>2.900</td>
<td>1.327</td>
<td>2.603</td>
<td>1.400</td>
</tr>
<tr>
<td>2004</td>
<td>2.764</td>
<td>1.387</td>
<td>2.802</td>
<td>1.491</td>
<td>2.648</td>
<td>1.446</td>
<td>3.027</td>
<td>1.592</td>
<td>2.856</td>
<td>1.325</td>
<td>2.663</td>
<td>1.334</td>
</tr>
<tr>
<td>2005</td>
<td>2.578</td>
<td>1.412</td>
<td>2.753</td>
<td>1.542</td>
<td>2.673</td>
<td>1.490</td>
<td>2.709</td>
<td>1.659</td>
<td>2.756</td>
<td>1.332</td>
<td>2.454</td>
<td>1.329</td>
</tr>
<tr>
<td>2006</td>
<td>2.568</td>
<td>1.383</td>
<td>2.594</td>
<td>1.429</td>
<td>2.787</td>
<td>1.421</td>
<td>2.872</td>
<td>1.463</td>
<td>2.682</td>
<td>1.303</td>
<td>2.705</td>
<td>1.325</td>
</tr>
</tbody>
</table>
Competition per Carrier

- Average Competition Drops from 2000 to 2006
- Competition more concentrated around the average for 2006 (smaller error bars)
- Largest drop for CO by 2006
- US faces the smallest competition in 2000 but is the only airline which faces higher competition in 2006

Mean Competition By Airline in 2000 and 2006

<table>
<thead>
<tr>
<th>Airline</th>
<th>2000</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Yield Index for all carriers was determined for the following segments of the top 856 O-D markets:

**Avg Haul Segmentation**
- Avg market haul < 500 miles
- 500 miles < Avg market haul < 1500 miles
- Avg market haul > 1500 miles.

**LCC presence**
- Markets with LCC market share above 10%
- Markets with LCC market share below 10%

**Hub Analysis**
- Yield Index of legacy carriers at markets originating from their hubs
Markets segmented in terms of the market share of low fare carriers in two categories:
- LCC market share above 10%
- LCC market share below 10%
Avg Haul segmentation for CO, UA, AA, NW

Avg Haul > 1500 miles: Legacy Carriers 1

Avg Haul < 500 miles: Legacy Carriers 1

500 < Avg Haul < 1500 miles: Legacy Carriers 1
Average Haul Segmentation 2

Avg haul segmentation for US, DL, HP
Average Haul Segmentation 3

Avg Haul segmentation
WN, B6, FL

Avg Haul > 1500 miles: Major LCCs

Avg Haul < 500 miles: Major LCCs

500 < Avg Haul < 1500 miles: Major LCCs