Operating Costs and Productivity Measures

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February 15, 2006
• Form 41 contains traffic, financial, and operating cost data reported to the DOT by US Major airlines
  – Data is reported and published quarterly for most tables
  – Detail of reporting differs for different expense categories
    • Aircraft operating expenses by aircraft type and region of operation
    • Other expenses more difficult to allocate by aircraft type

• DOT Form 41 includes the following schedules:
  – P12 : Profit and Loss statement
  – P52 : Aircraft Operating Expenses
  – P6 : Operating Expenses by Objective Groupings
  – P7 : Operating Expenses by Functional Groupings
  – P10 : Employment Statistics
  – B1 : Balance Sheet
Objective Cost Category Breakdown (3Q2005)

UNIT COST BY CATEGORY
Cents per ASM

- Labor
- Fuel
- Ownership
- Professional Services
- Landing Fees
- Food & Beverage
- Maintenance
- Material
- Passenger Commissions
- Insurance
- Communication
- Ad & Promotion
- Utils & Office Supplies
- Other

Source: ATA data
Form 41 Functional Cost Categories

- Aircraft operating costs
  - Expenses associated with flying aircraft, also referred to as “Direct Operating Costs” (DOC)

- Aircraft servicing costs
  - Handling aircraft on the ground, includes landing fees

- Traffic service costs
  - Processing passengers, baggage and cargo at airports

- Passenger service costs
  - Meals, flight attendants, in-flight services

- Reservation and Sales costs
  - Airline reservations and ticket offices, travel agency commissions

- Other costs, including:
  - Advertising and publicity expense
  - General and administrative expense
Activity Drivers by Functional Category

• Aircraft Operating Costs
  – Per Block Hour (for example, $3415 for 185-seat B757-200 in 2003)

• Aircraft Servicing Costs
  – Per Aircraft Departure (average $1135 in 2003)

• Traffic Servicing Costs
  – Per Enplaned Passenger (average $18)

• Passenger Servicing Costs
  – Per RPM (average $0.015)

• Reservations and Sales Costs
  – % of Total Revenue (average 10%)

• Other Indirect and System Overhead Costs
  – % of Total Operating Expense (average 12%)
2004 Functional Cost Breakdown

- Depreciation & Amortization, 5.3%
- Transport Related, 13.0%
- General & Administrative, 5.7%
- Promotion & Sales, 8.3%
- Aircraft & Traffic Servicing, 16.3%
- Passenger Service, 9.1%
- Maintenance, 9.6%
- Flying Operations, 32.7%
Airline Operating Cost Breakdown

• Adapted from Form 41, used by Boeing, MIT (and Aviation Daily) for more detailed comparisons

  FLIGHT (DIRECT) OPERATING COSTS (DOC) = 50%
  • All costs related to aircraft flying operations
  • Include pilots, fuel, maintenance, and aircraft ownership

  GROUND OPERATING COSTS = 30%
  • Servicing of passengers and aircraft at airport stations
  • Includes aircraft landing fees and reservations/sales charges

  SYSTEM OPERATING COSTS = 20%
  • Marketing, administrative and general overhead items
  • Includes in-flight services and ground equipment ownership

• Percentages shown reflect historical “rules of thumb”.

Flight Operating Costs

• Flight operating costs (FOC) by aircraft type:
  – Reflect an average allocation of system-wide costs per block hour, as reported by airlines for each aircraft type
  – Can be affected by specific airline network or operational patterns
  – Collected by US DOT as Form 41 operating data from airlines

• Typical breakdown of FOC for US carrier:
  CREW: Pilot wages and benefits
  FUEL: Easiest to allocate and most clearly variable cost
  MAINTENANCE: Direct airframe and engine maintenance cost, plus “burden” or overhead (hangars and spare parts inventory)
  OWNERSHIP: Depreciation, leasing costs and insurance
Example: B757-200 FOC (2003 US data)

- Costs per block-hour of operations (avg. 181 seats):
  - CREW $ 869
  - FUEL $ 904
  - MAINTENANCE $ 875
  - OWNERSHIP $ 767
  - TOTAL FOC $3415 per block-hr

- Based on 1267 mile average stage length and 9.7 block-hr daily utilization (weighted averages):
  - Different stage lengths and utilization by different airlines result in substantial variations in block-hour costs for same aircraft type
  - Also, differences in crew costs (union contracts, seniority), maintenance costs (wage rates), and ownership costs (age of a/c)
## Table 9 - Hourly flight and Seats Costs for the B757-200

<table>
<thead>
<tr>
<th>Airline</th>
<th>Number of Aircraft</th>
<th>Number of Seats (seats)</th>
<th>HFC ($/hr)</th>
<th>HSC ($/seat-hr)</th>
<th>Utilization (hrs/day)</th>
<th>SL (Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>142</td>
<td>175</td>
<td>3370.1</td>
<td>19.26</td>
<td>10.2</td>
<td>1430.8</td>
</tr>
<tr>
<td>Delta</td>
<td>106</td>
<td>185</td>
<td>3382.8</td>
<td>18.29</td>
<td>11.0</td>
<td>1084.8</td>
</tr>
<tr>
<td>United</td>
<td>96</td>
<td>182</td>
<td>3516.8</td>
<td>19.32</td>
<td>9.1</td>
<td>1361.5</td>
</tr>
<tr>
<td>Northwest</td>
<td>54</td>
<td>182</td>
<td>2923.7</td>
<td>16.06</td>
<td>9.2</td>
<td>1157.7</td>
</tr>
<tr>
<td>Continental</td>
<td>41</td>
<td>178</td>
<td>3445.7</td>
<td>19.36</td>
<td>10.7</td>
<td>1506.1</td>
</tr>
<tr>
<td>US Airways</td>
<td>30</td>
<td>182</td>
<td>4308.0</td>
<td>23.67</td>
<td>9.9</td>
<td>1015.2</td>
</tr>
<tr>
<td>ATA</td>
<td>16</td>
<td>214</td>
<td>4284.3</td>
<td>20.02</td>
<td>8.9</td>
<td>1390.4</td>
</tr>
<tr>
<td>America West</td>
<td>13</td>
<td>190</td>
<td>3808.4</td>
<td>20.04</td>
<td>8.3</td>
<td>1073.5</td>
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<tr>
<td><strong>average</strong></td>
<td><strong>498</strong></td>
<td><strong>186</strong></td>
<td><strong>3630.0</strong></td>
<td><strong>19.50</strong></td>
<td><strong>9.7</strong></td>
<td><strong>1252.5</strong></td>
</tr>
</tbody>
</table>

Source: DOT Form41 Schedule P-5.2
Unit Cost by Airline Group
Unit Costs by Functional Category 2004
Lowfare carriers have lowest CASM across all average stage lengths
Ex-transport related CASM 2000-2004
Yield and Stage Length 2000-2004
Aircraft Productivity

- Measured in ASMs generated per aircraft per day:
  \[= \text{# departures} \times \text{average stage length} \times \text{# seats}\]

- Aircraft “utilization” measured in block-hours/day:
  - Block hours begin at door close (blocks away from wheels) to door open (blocks under wheels)
  - Gate-to-gate time, including ground taxi times

- Increased aircraft productivity achieved with:
  - More flight departures per day, either through shorter turnaround (ground) times or off-peak departure times
  - Longer stage lengths (average stage length is positively correlated with increased aircraft utilization = block hours per day)
  - More seats in same aircraft type (no first class seating and/or tighter “seat pitch”)
Components of Aircraft Productivity

Average Aircraft Capacity

Departures per Day

Average Stage Length

2000 2001 2002 2003 2004
US Major Airlines Aircraft Productivity

Aircraft Productivity (ASMs per day)

AIRCRAFT UTILIZATION 1999-2003

Block Hours per Day

TOP 6 NETW
NON-NETW
### Example: Boeing 737-500 Productivity

<table>
<thead>
<tr>
<th>Airline</th>
<th>Flights per Day</th>
<th>Block Hours</th>
<th>Stage Length</th>
<th>Seats</th>
<th>ASMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continental</td>
<td>3.9</td>
<td>8.3</td>
<td>719</td>
<td>104</td>
<td>291,246</td>
</tr>
<tr>
<td>United</td>
<td>4.3</td>
<td>7.5</td>
<td>564</td>
<td>109</td>
<td>264,284</td>
</tr>
<tr>
<td>Southwest</td>
<td>8.2</td>
<td>10.2</td>
<td>400</td>
<td>122</td>
<td>399,746</td>
</tr>
</tbody>
</table>
Example: B737-500 FOC per Block Hour

<table>
<thead>
<tr>
<th>Airline</th>
<th>Crew</th>
<th>Fuel</th>
<th>Maintenance</th>
<th>Ownership</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continental</td>
<td>$510</td>
<td>$430</td>
<td>$651</td>
<td>$698</td>
<td>$2,291</td>
</tr>
<tr>
<td>United</td>
<td>$927</td>
<td>$487</td>
<td>$1048</td>
<td>$510</td>
<td>$2,974</td>
</tr>
<tr>
<td>Southwest</td>
<td>$388</td>
<td>$537</td>
<td>$251</td>
<td>$350</td>
<td>$1,526</td>
</tr>
</tbody>
</table>
Lowfare carriers lead in aircraft utilization at all average stage lengths.
Employee Productivity

- Measured in ASMs per employee per period

- As with aircraft, employee productivity should be higher with:
  - Longer stage lengths (amount of aircraft and traffic servicing for each flight departure not proportional to stage length)
  - Larger aircraft sizes (economies of scale in labor required per seat for each flight departure)
  - Increased aircraft productivity due to shorter turnaround times (more ASMs generated by aircraft contribute to positive employee productivity measures)

- Yet, network airlines with long stage lengths and large aircraft have lower employee productivity rates
Legacy carrier employment down by 25% since 2000, a loss of over 100,000 jobs
US Major Airline Labor Cost per Employee

Average Salary+Benefits per Employee

$60,000
$65,000
$70,000
$75,000
$80,000
$85,000
$90,000

2000 2001 2002 2003 2004
Lowfare carrier salaries/benefits per employee 25% lower than legacy carriers
ASMs/employee and Average A/C Size

![Graph showing the relationship between ASMs/employee (in thousands) and Average Seats per Departure. The graph has a downward trend line with data points scattered around it.](image-url)
Employee Productivity Up 30% From 2002

Source: ATA data
ASM per Employee 2000-2004

Annual ASM per Employee
Revenue per Employee

Annual Operating Revenue per Employee

Revenue per Employee Chart:
- X-axis: Years (2000 to 2004)
- Y-axis: Revenue per Employee ($0,000 to $300,000)
- Data points show an increase in revenue per employee from 2000 to 2004.
ASM per Dollar of Salaries+Benefits

Annual ASM per Dollar Salaries & Benefits

2000 2001 2002 2003 2004
Revenue per Dollar of Labor Expense

Operating Revenue per Salary/Benefit Dollar

2000 2001 2002 2003 2004
Summary: Airline Productivity Measures

• Aircraft Productivity
  – Aircraft Utilization (block-hours per day)
  – ASMs per Aircraft per Day
    • Average Stage Length
    • Number of Departures per Day
    • Aircraft Capacity (seats per aircraft)

• Employee Productivity
  – ASMs per Employee
  – ASMs per Labor Dollar
  – Revenue per Employee,
  – Revenue per Labor Dollar