Revenue Management for Airline Alliances

H. Jain
MIT, Cambridge, MA
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Global Alliance Market Shares

Available Seat Kilometres 2010

<table>
<thead>
<tr>
<th>Alliance</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star Alliance</td>
<td>26.2%</td>
</tr>
<tr>
<td>SkyTeam</td>
<td>16.1%</td>
</tr>
<tr>
<td>oneWorld</td>
<td>15.8%</td>
</tr>
<tr>
<td>Others</td>
<td>41.9%</td>
</tr>
</tbody>
</table>

Revenue Pass. Kilometres 2010

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<tr>
<th>Alliance</th>
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<tbody>
<tr>
<td>Star Alliance</td>
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ASK (Bn)

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<tr>
<th>Alliance</th>
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</thead>
<tbody>
<tr>
<td>Star</td>
<td>1569.1</td>
</tr>
<tr>
<td>SkyTeam</td>
<td>963.9</td>
</tr>
<tr>
<td>oneWorld</td>
<td>944.6</td>
</tr>
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</table>

RPK (Bn)

<table>
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<tr>
<th>Alliance</th>
<th>RPK (Bn)</th>
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<tbody>
<tr>
<td>Star</td>
<td>1205.1</td>
</tr>
<tr>
<td>SkyTeam</td>
<td>755.1</td>
</tr>
<tr>
<td>oneWorld</td>
<td>725.1</td>
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</tbody>
</table>

Source: Airline Consolidation, Dr. Olaf Backofen, Deutsche Lufthansa AG, MIT, June 12, 2010
Alliances formed with a goal of increasing revenues for the member airlines
   - Alliance partners expand their network coverage by use of codeshare on each other’s flights

Sub-optimal benefits or potentially negative effects can arise from:
   - Lack of joint network optimization solution
   - Partners using arbitrary codeshare valuation in their Revenue Management (RM) systems
   - Different RM capabilities of each partner, technical distribution system constraints
Operated Flights: UA101 LH202

LAX  BOS  FRA

Codeshare: LH*2101 UA*1202

Seats must be made available by RM systems of both operating carriers to accept the codeshare booking: LAX-FRA
Code Share Paths via ORD Hub
Examples of Double Connect CS Paths
1. Different Levels of Information

- **Itinerary information (AVS and Cascading)**
  - BASELINE: Under standard AVS practices, operating airline does not know complete itinerary.
  - “Cascading” gives both partners complete itinerary information for making availability decisions.

- Each alliance partner performs optimization for own network separately:
  - Separate network optimization assuming local fare valuation of code-share connecting passengers.
<table>
<thead>
<tr>
<th></th>
<th>CASCADING</th>
<th>AVS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARTNER 1</td>
<td>1.20%</td>
<td>1.40%</td>
</tr>
<tr>
<td>PARTNER 2</td>
<td>0.80%</td>
<td>1.00%</td>
</tr>
<tr>
<td>ALLIANCE</td>
<td>0.40%</td>
<td>0.60%</td>
</tr>
<tr>
<td>COMPETITOR</td>
<td></td>
<td>1.20%</td>
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The control is sub-optimal for the alliance because of the arbitrary local fare valuation on codeshare paths.

Cascading leads to slightly higher revenues than AVS (red stacks).
2. Codeshare Valuation

Valuation of CS bookings in RM systems affects:
- Own network because of potential displacement of own local and connecting traffic
- Partner’s network due to interaction with their RM system and availability calculations for CS bookings

Two codeshare (CS) valuation schemes are compared:
- **Local Fare Valuation**: CS paths are valued at the local fares by each partner regardless of the total fare
- **Y-Prorate Valuation**: Total fare is divided exactly into two parts, in the ratio of the Y-Prorates (highest fares)
## Valuation Schemes

### booking (O-D) marketing airline OD fare

<table>
<thead>
<tr>
<th>Booking (O-D)</th>
<th>Marketing Airline</th>
<th>OD Fare</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAX-BOS</td>
<td>UA</td>
<td>$200</td>
</tr>
<tr>
<td>BOS-FRA</td>
<td>LH</td>
<td>$500</td>
</tr>
<tr>
<td>LAX-FRA</td>
<td>Codeshare (UA/ LH )</td>
<td>$600</td>
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### valuation of LAX-FRA

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<th>Airline</th>
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Y-Prorate leads to slightly higher gains for the alliance.

Though the difference in gains in small, the revenue components are quite different in the two schemes.
Revenue Components
Y-Prorate vs. Local Valuation

Y-Prorate Valuation compared to Local

*Codeshare (CS) revenues are pre-resolution

Y-Prorate values the codeshare bookings at a lower value and hence take fewer codeshare bookings
3. Bid Price Sharing

Bid price = marginal network revenue value of available seat on each leg

Partner 1:

Bid Price Computation → Bid Prices → Inventory Control

Separate Optimization

Partner 2:

Bid Price Computation → Bid Prices → Inventory Control

Bid Price Sharing

At the end of each time frame

Booking Request → Decision

Decision
Bid Price Sharing Results

Revenues Compared to Baseline: Leg RM

Incremental gain of 0.3% using Bid price sharing is equivalent to $200M for an alliance like United-Lufthansa.

Bid Price sharing yields higher gains for both Local and Y-Prorate Valuation.

PARTNER 1  PARTNER 2  ALLIANCE
Until now, only own airline bid prices are used for the network optimization by each partner. Incorporating estimates of the value of a partner’s seat into own optimization gets closer to the joint network revenue solution.

**Next Step: Dynamic Codeshare Valuation**

- Use the Partner’s Bid Prices in valuation:
  - Total Fare - Partner’s Bid Price

**Partner 1:**
- Bid Price Comp.
- Bid Prices
- Inventory Control
- Decision
- Booking Request
- "At the end of each time frame"
- "Separate Optimization"

**Partner 2:**
- Bid Price Comp.
- Bid Prices
- Inventory Control
- Decision
- Booking Request
- "Bid Price Sharing"

**Next Time Frame**
- Bid Price Comp.
- Bid Prices
Airline revenue gains can be affected by alliances:
- Valuation scheme of code share passengers affects seat availability decisions on both partner networks
- With separate and uncoordinated RM, one partner can benefit more than the other

Information sharing improves revenues:
- Cascading yields higher revenues than AVS
- Bid price sharing yields substantially higher revenues, of the order of $100M (each) for big alliance carriers

Dynamic codeshare valuation using bid prices can lead to even greater revenues