Exploring the rationale and potential of LCCs’ self-interlining

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LCCs’ business evolution

- LCCs first emerged in the USA, followed by the EU and the rest of the world, after industry deregulation (Francis et al., 2006), including a breakthrough strategy in managing airlines.

- Core features: short-haul point-to-point service, operational effectiveness through the simplification of services and processes, and revenue management through dynamic pricing strategies (Gillen and Lall, 2004; Malighetti et al., 2009).

- No head-head competition with FSCs: Opening of new markets.

- Most recently, the ability of LCCs to stimulate demand is running out, and many markets seem to be at or near the saturation point (Binggeli and Pomepo, 2005).

- Increase of «within» LCC-markets competition (Malighetti et al. 2013).

- Network carriers have tried to emulate LCCs’ business model cutting costs, while chartered flights started to enter LCC routes.

Increasing market pressure -> New strategies
LCC hybridization - Connecting flights

- Low-cost carriers have started to address the need of connecting passengers along with their **hybridization process** (Klophaus et al., 2012; Morandi et al., 2015).
  - Shifting to primary airports, starting hubbing activities, providing meals and other inflight services, and entering alliances (de Wit and Zuidberg, 2012)
- Nowadays, new network strategies are going to be experimented by LCCs in the European framework, such as self-interlining, i.e. the connection of already operated flights by a single airline.
  - Interlining has been mostly addressed at intercontinental level and within alliances’ agreements, whereas knowledge is however scarce about the effect strategic choices on single legs (e.g., price formation (Lijesen et al. 2002).

**Goal of our project:**

- First systematic attempt to explore self-interlining into the LCC framework, highlighting its effects on passengers and airlines’ profits.
Ryanair interlining

Objective: From Barcelona to Catania

**I LEG**

<table>
<thead>
<tr>
<th>Time</th>
<th>Flight</th>
<th>Departure</th>
<th>Arrival</th>
</tr>
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<tbody>
<tr>
<td>06:15</td>
<td>FR 6353</td>
<td>Barcelona</td>
<td>Milan Bergamo</td>
</tr>
<tr>
<td>08:00</td>
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**II LEG**

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**I LEG + II LEG**

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<td>Milan Bergamo</td>
</tr>
<tr>
<td>12:50</td>
<td>Catania</td>
</tr>
</tbody>
</table>

Total journey: 6 hr 35 mins

*Interlining*
Network (A-B-C)

From Lanzarote to Athens

Departure: 17/07/2018

No direct flights

A (Lanzarote)

B (Milan)

C (Athens)

FR: 112 € - T: 17:30
U2: 172 € - T: 13:20
AZ: 157 € - T: 13:20
A3: 209 € - T: 13:30
FR: 112 € - T: 14:55
A3: 177 € - T: 19:35
FR: 112€ - T: 19:55

FR: 76 € - T: 12:35
U2: 88 € - T: 14:55

(FR: 141 €)
I(12:35) – II(20:55)
Network (A-B-C) & competitors

From Barcelona to Bari

Departure: 18/07/2018

VY: 76 € - T: 22:00
IB: 82 € - T: 22:00

To Milan (BGY)
FR: 24 € - T: 8:00
VY: 41 € - T: 9:05
U2: 56 € - T: 10:20

From Milan (BGY)
FR: 44 € - T: 12:45
AZ: 332 € - T: 14:05
AZ: 99 € - T: 16:30

A further alternative for B:
FCO (FR interlining: 91 €)

Barcelona to Bari Wednesday 18 Jul 2018

13:20 Barcelona
FR 6973 1 hr 50 mins
15:10 Rome Fiumicino
5 hr 55 mins connection in airport

FR 7075 1 hr 5 mins
21:05 Rome Fiumicino
22:10 Bari
Total journey 8 hr 59 mins
Data and sample

- **Ryanair interlining hub**: Milan-Bergamo airport
- **Unit of analysis**: European city-pairs
  - City pair: airports within a radius of **100 km** from the city centre (43 European cities)
Interlining

- 320 interconnected destinations considering Milan (BGO) as the destination of the first leg
Interling pricing

LS Regression Results

<table>
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<tr>
<th>Dep. Variable: connect_airfare</th>
<th>R-squared: 0.933</th>
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<tbody>
<tr>
<td>Model: OLS</td>
<td>Adj. R-squared: 0.933</td>
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<tr>
<td>Method: Least Squares</td>
<td>F-statistic: 3.738e+05</td>
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<td>Date: Thu, 28 Jun 2018</td>
<td>Prob (F-statistic): 0.00</td>
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<tr>
<td>Time: 16:02:57</td>
<td>Log-Likelihood: -91101.1</td>
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<td>No. Observations: 26897</td>
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<tr>
<td>DF Residuals: 26895</td>
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<tr>
<td>DF Model: 1</td>
<td>Covariance Type: nonrobust</td>
</tr>
</tbody>
</table>

| coef | std err | t | P>|t| |
|------|---------|---|------|
| const | 15.6840 | 0.087 | 180.264 | 0.000 | 15.513 | 15.855 |
| sumleg_airfare | 0.9333 | 0.002 | 611.421 | 0.000 | 0.930 | 0.936 |
Descriptive statistics

- Weekly-statistics (from 16 July 2018) on the integrated trip A-C
# Descriptive statistics

- Weekly-statistics (from 16 July 2018) on the integrated trip A-C

<table>
<thead>
<tr>
<th>Top 5 – Price(FR)/Price(Others)</th>
<th>Origin city</th>
<th>Destination city</th>
<th>mean</th>
<th>min</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
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<th>min</th>
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<th>50%</th>
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Simulation modelling

Discrete simulation modelling to investigate the multi-market scenario with shared capacity and interactions between single-legs and integrated itineraries

The arriving stream of leg-1 pax is a Poisson process with rate $\lambda_l$

$MNL$ choice model $U = \alpha (\text{Fare} + \text{VOTT} \cdot (\text{FlightT} + \text{ConnT}))$ (Lieshout et al., 2016)

Cumulative bookings
Cumulative revenues

\[ \begin{align*}
\text{direct leg: } P &= \text{entry}P + \Delta P \cdot Q \\
\text{indirect leg: } P &= P_1 + P_2 \\
\text{where} \\
P &= \text{entry}P \\
\Delta P &= (\max P - \text{entry}P)/\text{Cap}
\end{align*} \]
Simulation features
Conclusion & further developments

- LCCs’ interlining is a recent and quickly evolving phenomenon

- The set of Ryanair’s interconnections are not homogeneous in terms of time/price performance, relative to its competitors

- It is unlikely Ryanair’s interlining strategy will be limited to charge

- A better understanding of the reasons why LCCs are implementing interlining strategies is required by deeply simulating the behavior of Ryanair and competition across different market scenarios
  - Testing a potential increase of Ryanair’s frequencies on specific routes
  - An attempt to evaluate the possibility to hit competitors on specific markets

- Further developments to explore the impact of:
  - Increasing arrival rate using non-homogeneous Poisson process
  - Intertemporal pricing dynamics
  - The willingness to pay of different categories of passengers (business/leisure)
  - Different type of competition
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