Network carriers versus charters versus low cost carriers: battling it out in the Spanish skies

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Outline

Introduction

Before liberalization, the airline market in Europe was split. On the one hand, the scheduled Network Carriers (NCs) with approximately 75 % intra-European market share and, on the other, the Charter Carriers (CC) with 25 % market share. The low-cost phenomenon undermines the previous airline industry structure.

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Low-Cost Carriers (LCCs) have resulted in significant changes to the business model of the NCs and CCs, e.g.:

- In airline-airport relations
- In airport charges
- In the role that hubs play
- In the appearance of low-cost subsidiaries in both NCs and in CCs

Introduction

In the tourism market, LCCs have influenced the way that tourists travel. e.g.:

- With an increase in short break holidays and a declining average stay
- In many cases they have dictated the online purchase of airline tickets to the detriment of travel agencies
- They have sparked the launch of new destinations and the consolidation of existing ones

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- The disintermediation process has led to tourists preferring to create their own holiday packages, including transport, transfers and accommodation, without delegating the task to tour operators
- The ever more widespread short breaks holidays favored by the LCCs could be affecting the demand for traditional one- and two-week packages offered by charter operators

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The present paper seeks to offer empirical evidence as to the size of the effects that the development of LCCs has had on NCs and, in a wholly original way, CCs. This is done using a case study that is extremely relevant: the Spanish tourism market.

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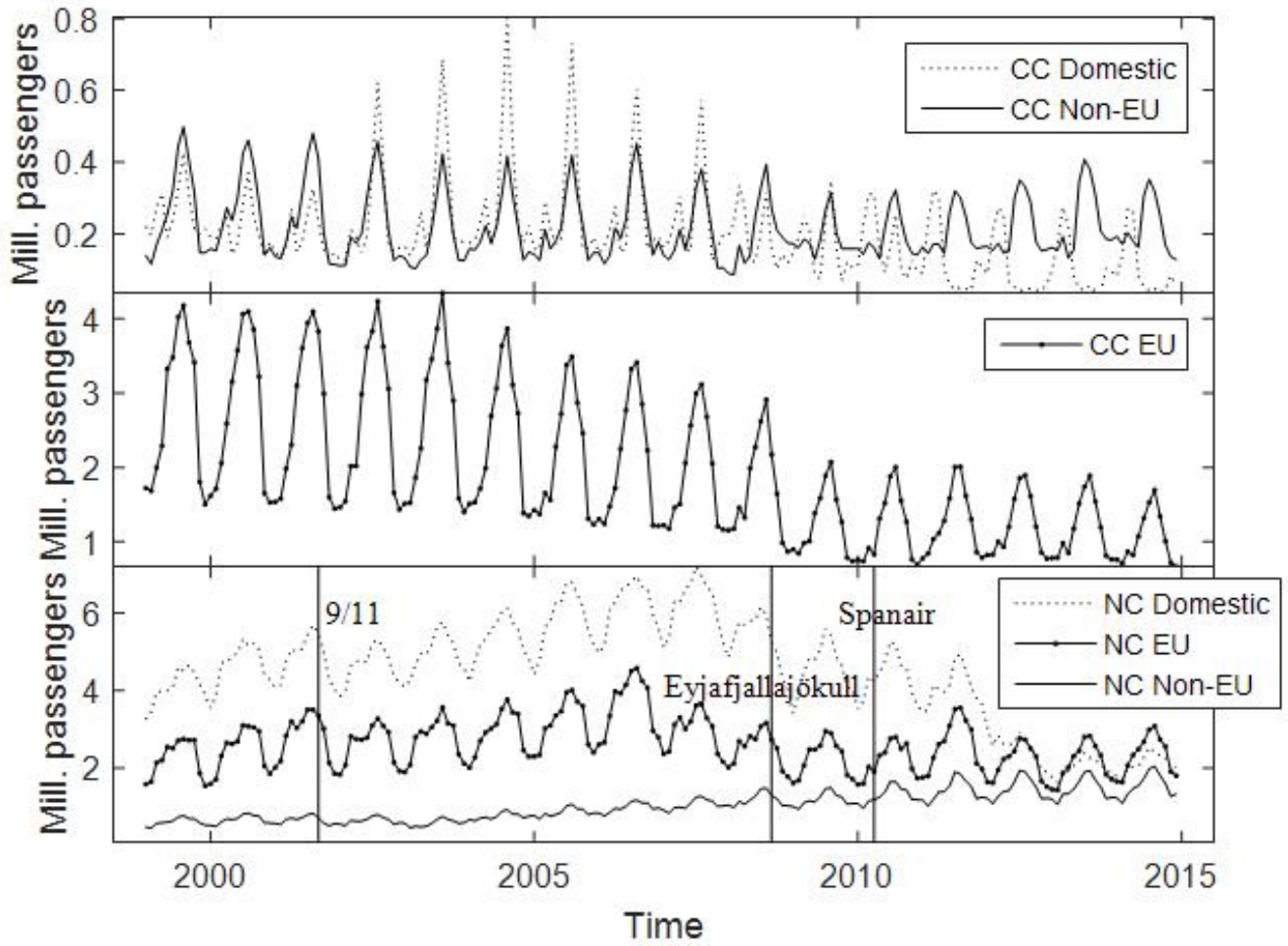
A separate model is built for each geographical area destination area and each type of company (6 models in total).

Endogenous variables



Exogenous variables

- The Low Cost Carriers effect (LCC) to measure the impact of the introduction of LCCs on charter operators in each geographical area. This variable is monthly LCC air traffic from January 1999 to December 2014 in three geographical areas.

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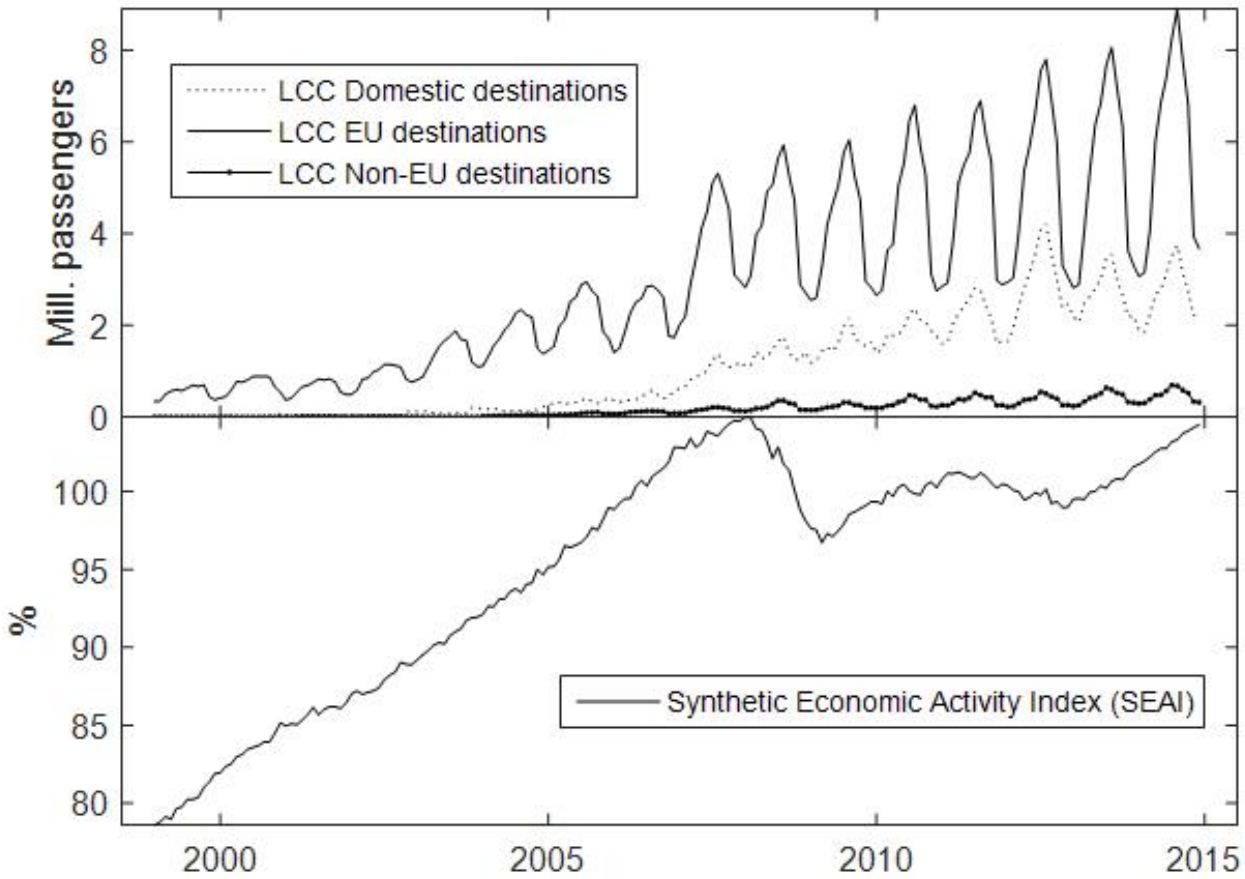
- Business Cycle: represented using the monthly Spanish Ministry of the Economy and Treasury Synthetic Economic Activity Index (SEAI)

Exogenous variables



Exogenous variables

- Dummy variables:
  - Easter effect
  - Trading day effect
  - Eyjafjallajökull effect in April 2010
  - 9/11 terrorist attacks (9/11/2001)
  - Spanair accident of 20th August 2008
  - Other variables that turned out not to be significant: i) other terrorist attacks: 11th March 2004 in Madrid, 7th July 2005 in London, ii) public works in Spain at hub airports, terminals T4 at Adolfo Suárez Madrid-Barajas (February 2006) and terminal T2 at Barcelona-El Prat (20th February 2008), and the High Speed Train AVE connecting Madrid and Barcelona (February 2008)

Methodology

The methodology is based on Transfer Function analysis. The general model is:

$$\Delta^d \Delta_{12}^D y_t = \alpha + \sum_{i=1}^{k} \frac{b_i}{1 + a_i B} \Delta^d \Delta_{12}^D x_{it} + \sum_{j=1}^{m} w_j(B) \Delta^d \Delta_{12}^D z_{jt} + \frac{\theta_q(B)\Theta_Q(B^{12})}{\phi_p(B)\Phi_P(B^{12})} e_t$$

- B is the backshift operator, e.g. $B^l y_t = y_{t-l}$
- Δ and Δ_{12} are the difference and seasonal difference operators
- y_t, x_{it} and z_{jt} are any of the six endogenous, dummy or plain exogenous, respectively
- e_t is white noise
- a_i, b_i, are a set of parameters
- $w_j(B)$, $\theta_q(B)$, $\Theta_Q(B^{12})$, $\phi_p(B)$ and $\Phi_P(B^{12})$ are polynomials on the B operator of appropriate orders identified using information criteria

Methodology

All Transfer Functions of dummy variables are assumed to be of order 1. This parameterization is convenient because it allows for several possibilities when x_{it} is an impulse variable, namely, additive outliers ($a_i = 0$), level shift ($a_i = -1$), and transitory change ($0 < a_i < 1$). When x_{it} is a more general dummy variable, such as EASTER, a_i is set to zero.

Estimation is performed by Exact Maximum Likelihood using the ECOTOOL Matlab toolbox with an algorithm for automatic detection of outliers

Results: Charter Carriers

	CCs Domestic	CCs EU destinations	CCs All other destinations		CCs Domestic	CCs EU destinations	CCs All other destinations
LCCt	-0.044**	-0.041**	0.045	Q(1)	2.021	0.337	1.619
LCCt-1		-0.034**	0.019	Q(12)	11.986	13.335	15.445
Easter	0.049***	0.112***	0.036***	Q(24)	20.824	32.750	19.488
Trading		-0.014***	-0.002***	KSL	0.057	0.036	0.033
Eyjafjallajökull		-0.121**			(0.164)	(0.621)	(0.657)
9/11t				H	0.906	0.869	0.888
9/11t-1					(0.712)	(0.604)	(0.658)
9/11 a_i							
Spanair							
Spanair a_i							
SEAI		0.043***					
Differencing	Δ_{12}	$\Delta\Delta_{12}$	Δ_{12}				
$\phi_p(B)$	1-0.545B		1-0.765B				
$\theta_q(B)$		1-0.252B					
$\Theta_Q(B^{12})$			1-0.264B^{12}				

Estimation results. One, two and three asterisks indicate statistical significance at 10 %, 5 % and 1 % levels, respectively. Only significant parameters included, with the only exception of the LCC effect in the fourth column. All the ARIMA parameters were significant at the 1 % level. Q(p) is the Lung-Box autocorrelation portmanteau test for p lags under the null hypothesis of Independence. KSL is the Kolmogorov-Smirnov-Lilliefors gaussianity test under the null of gaussianity (p-value in brackets). H is a variance ratio test between the first third of the samples with respect to the final third under the null of homoscedasticity (p-value in brackets)

Results: Network Carriers

	NCs Domestic	NCs EU destinations	NCs All other destinations
LCCt	-0.262**	-0.098***	0.951***
LCCt-1	-0.397***		
Easter		0.157***	0.047***
Trading	0.004**	-0.009***	-0.002***
Eyjafjallajökull		-0.287***	
9/11t	-0.277**	-0.168*	-0.053**
9/11t-1			-0.113***
9/11 a_i	-1 (fixed)	-1 (fixed)	-0.516**
Spanair	-0.332***		
Spanair a_i	-0.734***		
SEAI	0.123***	0.049***	
Differencing	$\Delta\Delta_{12}$	$\Delta\Delta_{12}$	$\Delta\Delta_{12}$
$\phi_p(B)$			
$\theta_q(B)$	1-0.180B		
$\Theta_Q(B^{12})$	1-0.384B^{12}	1-0.592B^{12}	1-0.455B^{12}

	NCs Domestic	NCs EU destinations	NCs All other destinations
Q(1)	0.001	1.433	0.164
Q(12)	8.401	15.330	10.862
Q(24)	29.283	26.301	27.265
KSL	0.034	0.059	0.054
	(0.648)	(0.155)	(0.222)
H	0.925	0.764	0.832
	(0.769)	(0.310)	(0.486)

Discussion: LCC effects

The most important results are:

	CCs Domestic	CCs EU destinations	CCs All other destinations
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- The emergence of LCCs has different effects depending on the endogenous variable considered:negative effects on domestic and EU destinations both for CCs and NCs and a powerful positive effect on all other destinations for NCs.

Discussion: LCC effects

- For the domestic flight market, approximately 70 % of LCC traffic comes from the other two types of airline, whilst the remaining 30 % is new demand generated by the LCCs. For the EU market, only over 17 % of LCC traffic comes from the other types of airline and, as a result, the remaining 83 % is new demand.

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- There is a clear substitution relationship of CCs for LCCs in LCC niche markets, i.e. short-distance flights.
- The substitution relationship to NCs is different:
  - The value is significantly lower, especially with regard to domestic flights.
  - There appears to exist a positive effect in the NCs in international destinations outside the EU, i.e., generally transatlantic routes on which the LCCs do not operate, but this reaction cannot be found in the CCs.

Discussion: Other effects

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- A positive Easter effect was found for most of the series.
- Trading effects were negative for EU and non-EU destinations, meaning that these flights are more related to weekends, while it is positive for NC domestic flights and non-existent for charter flights. This latter point means that domestic NC flights are used more intensely for business purposes.

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- The effect of the Eyjafjallajökull volcano eruptions was clearly felt by both CCs and NCs during a single month and only for EU destinations.
- The 9/11 terrorist attack did not affect any of the CC destinations, but doubtlessly had an effect on NC passengers to all destinations.

Discussion: Other effects

	CCs Domestic	CCs EU destinations	CCs All other destinations
Cycle		0.043***	
	NCs	**NCs**	**NCs**
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- The Spanair accident only affected NC flights to domestic destinations. It had a rapid decay that lasted for only one year.
- Economic activity appears to have a positive effect on the number of passengers on NC flights to EU destinations and domestic flights. All other cases seem to be unaffected by the economic cycle.

Discussion: Model diagnostics

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- All models were estimated with a constant α that was not significant. All are statistically correct, as no autocorrelation remains in the residuals and they are Gaussian and homoscedastic.

Thank you for your attention!

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