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A retrospective analysis of the competitive effects of the Southwest and Airtran merger in overlapping markets

Huubinh B. Le
University of South Alabama

Abstract

Since the implementation of the Southwest and Airtran merger in 2011, the competitive effects on routes most affected by the merger—overlapping routes—have not been evaluated. This paper attempts to empirically investigate the price and traffic effects on these routes. In addition, we test whether their effects depend on the extent of preexisting competition prior to the merger. The results suggest that prices increase but traffic remains unchanged. Preexisting competition has a decreasing effect on both price and traffic.

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Contact: Huubinh B. Le - hble@southalabama.edu.
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1. Introduction

The merger between two low-cost carriers Southwest and Airtran was cleared by the U.S. Department of Justice (DOJ) in 2011. Even though the DOJ expressed concerns due to a number of overlapping routes—routes where both Southwest and Airtran are direct competitors— it did not challenge the merger. Moreover, it suggested that since much of the overlapping routes do not have entry restrictions, the adverse effects on these routes, if any, are unlikely to be serious.

There has been a significant amount of research including Werden et al. (1991); Borenstein (1990); Kim and Singal (1993); Peters (2006) and Luo (2014) that have assessed the potential and actual effects of mergers between legacy carriers. There is very little research however when the merger involves two major low-cost carriers such as Southwest and Airtran even though various dimensions of the Southwest effect on the U.S. airline industry have been investigated such as Dresner et al. (1996); Richards (1996); Vowles (2001); Morrison (2001) and Goolsbee and Syverson (2008). Moreover, previous research have primarily focused on assessing the overall price or traffic effects of a merger rather than on specific routes directly affected by a merger such as overlapping routes where a direct competitor is eliminated.

There are two reasons why evaluating specifically at the overlapping routes can be important. (i) These routes are of primary concern to the U.S. antitrust regulators because consumers are most likely to be harmed in the form of higher prices and lower traffic. A retrospective analysis can provide some evidence on the extent of consumer harm, if any. (ii) The effects on price and traffic because of increased market concentration due to the merger may depend on the extent of preexisting competition on those routes. Therefore, an empirical analysis can provide evidence on whether preexisting competition makes a difference in terms of affecting price and traffic. The objective of this paper is therefore (i) to assess the actual effects on price and traffic on routes where Southwest and Airtran are direct competitors prior to their merger and (ii) determine whether they depend on the extent of existing competition as measured by the Herfindahl market concentration index.

The results suggest that in city-pairs where Southwest and Airtran are direct competitors, prices on average increased but traffic remains unchanged. In addition, existing market competition prior to their merger does have an effect on price and traffic. A highly concentrated market has a negative effect on traffic but interestingly, it increases price competition. These latter findings are consistent with varying the merger time period.

The rest of the paper is organized as follows. The next section presents the empirical model and explains how the effects on the overlapping routes are identified. Section 3 briefly describes the data. Section 4 discusses the results and section 5 concludes.

2. Empirical Model

To isolate the effects on price and traffic, the average price and total traffic of city-pairs where Southwest and Airtran previously competed are compared to a set of benchmark city-pairs that were not affected by the merger—city pairs that neither airline competed in prior to their merger. This method follows Bamberger et al. (2004) and Gayle (2008) where a city-pair is defined as a pair of origin airport (traveling from) and destination airport (traveling to) city combination. An airline may provide several products that belong to the same city-pair. For example, Delta offers a non-stop product from Kansas City (MCI) to Atlanta (ATL) and a one-stop product from MCI to ATL with the stop in Philadelphia (PHL). Both products belong to the

same city-pair even though their routes are different. Products that differ in their routes but have the same origin and destination airports are considered belonging to the same city-pair. The following price and traffic equations detail how average city-pair price and traffic are computed.

$$ln\left(\frac{Price_{post,i}}{Price_{pre,i}}\right) = \beta_0 + \beta_1 AirTran_i + \beta_2 Southwest_i + \beta_3 Overlap_i + \beta_4 HHI_{pre,i} + \beta_5 Other\_LCC_i + \beta_6 Overlap_i \times HHI_{pre,i} + \varepsilon_i \quad (1)$$

$$ln\left(\frac{Traffic_{post,i}}{Traffic_{pre,i}}\right) = \alpha_0 + \alpha_1 AirTran_i + \alpha_2 Southwest_i + \alpha_3 Overlap_i + \alpha_4 HHI_{pre,i} + \alpha_5 Other\_LCC_i + \alpha_6 Overlap_i \times HHI_{pre,i} + \mu_i \quad (2)$$

The dependent variable in equation (1) measures the percentage change in average city-pair price. This variable is computed as average price of all products in city-pair i in each of the pre-and post-merger periods and then taking the log of their ratio. Similarly, the dependent variable in equation (2) is computed as the log ratio of the total number of passengers of all products that belong to city-pair i in the pre and post-merger periods. Since these two dependent variables are in first-differences, time-invariant specific effects on city-pair i are implicitly accounted for.

$AirTran_i$ is a dummy variable that equals one if Airtran serves city-pair i but Southwest does not. In other words, only AirTran and other airlines compete against each other in city-pair i but Southwest is not one of those competitors. Similarly, $Southwest_i$ is a dummy variable that equals one if Southwest serves city-pair i without the presence of Airtran. These two variables capture the city-pairs that their services do not overlap. $Overlap_i$ is a dummy variable that equals one if both Airtran and Southwest are present in city-pair i. The remaining set of city-pairs are therefore unaffected by the merger— those that neither Southwest nor Airtran serves prior to their merger.

The premerger Herfindahl-Hirschman index $HHI_{pre,i}$ is a passenger-based measure of city-pair concentration in the pre-merger period. It is computed as the sum of the squared market shares of each airline in a city-pair. This index ranges between zero (perfectly competitive) and one (monopoly). It is meant to capture the degree of existing competition in a city-pair prior to the merger. The interaction variable $Overlap_i \times HHI_{pre,i}$ therefore, identifies whether the price and traffic effects on the overlap city-pairs are affected by preexisting competition.

Finally, $Other\_LCC_i$ is a dummy variable that captures the presence of other low-cost carriers[1]—low-cost carriers that are not Southwest or Airtran—in city-pair i in the premerger period. The presence of other low-cost carriers in an overlap city-pair may exert different competitive pressure on Southwest and Airtran than in the benchmark city-pairs where neither Southwest nor Airtran is present. This variable is used to control for any differences in the effects on price and traffic that could arise between them.

The coefficients of interest are β_3, α_3, β_6 and α_6. In the absence of any offsetting effects, the merger between Southwest and Airtran is expected to raise price ($\beta_3 > 0$) and reduce traffic ($\alpha_3 < 0$) in city-pairs where they offer overlapping service prior to the merger. In addition, the effects on the overlapping city-pairs may depend on the level of preexisting concentration on

[1] Other low-cost carriers include: JetBlue, Allegiant, Spirit, Frontier, Virgin America and Sun Country Airlines.

those routes. Therefore, it is expected that when the preexisting concentration is high, the adverse effects on price ($\beta_6 > 0$) and traffic ($\alpha_6 < 0$) will be greater.

3. Data

The dataset "Airline Origin and Destination Survey (DB1B)" comes from the Office of Airline Information of the Bureau of Transportation Statistics (BTS)[2]. This quarterly survey contains a 10 percent sample of domestic airline tickets[3]. Each observation contains information such as: airfare, number of passengers that purchase the ticket, the carrier(s) that issues the ticket, and the series of airports that the passengers go through traveling from the origin to the destination city. The DB1B does not contain passenger-specific information. The time periods of analysis are the third quarters of 2011 (premerger) and 2013 (postmerger).

A few adjustments and filters are made to arrive at the final sample. First, airports are grouped if they are in the same metropolitan areas. Second, all tickets with the following characteristics are dropped: (i) outside the 48 mainland U.S. states; (ii) one-way tickets; (iii) tickets with more than two stops. Third, all tickets with fares equal to zero, missing, or unreliable are discarded. Finally, only city-pair tickets that appear in both merger time periods are kept.

Descriptive statistics of the variables in the regression disaggregated for overlap, non-overlap and the benchmark city-pairs are presented in Table I.

Table I
Descriptive Statistics

	Overlap				Non-Overlap				Benchmark			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Log ratio of price	.124	.132	-.277	.717	.114	.171	-1.37	1.32	.088	.668	-5.53	5.58
Log ratio of traffic	-.039	.194	-1.99	.758	-.019	.164	-1.71	1.52	-.009	.159	-2.08	2.47
Airtran	0	0	0	0	.083	.275	0	1	0	0	0	0
Southwest	0	0	0	0	.917	.275	0	1	0	0	0	0
Overlap	1	0	1	1	0	0	0	0	0	0	0	0
Premerger HHI	.321	.104	.155	.882	.446	.188	.173	1	.802	.239	.209	1
Other LLC	.627	.484	0	1	.290	.454	0	1	.064	.244	0	1

Note: Sample size 40,795 city-pairs where 561 are overlap and 3,812 are non-overlap city-pairs.

4. Results

Table II presents the results of the model. The coefficients on the overlap variable in columns one and three suggest that prices have increased by about 7.68[4] percent on average but there is no evidence that traffic in these city-pairs have decreased after preexisting concentration and the presence of other low-cost carriers have been controlled for. These results suggest that consumers are worse-off with respect to these routes. Columns two and four allow for changes in price and traffic to vary depending on preexisting concentration.

The sign patterns of the estimates suggest that higher preexisting concentration has on average a decreasing effect on price and traffic. While the effect on traffic is expected, the

[2] The BTS's webpage: http://www.transtats.bts.gov/
[3] Each quarter in the raw data contains millions of tickets.
[4] 7.68 is computed as $100\left((e^{.074}) - 1\right)$.

effect on price suggest that greater concentration in a city-pair, perhaps dominated by a few large airlines, are more competitive than in city-pairs that have many smaller airlines. This result has an interesting implication that price competition in an overlap city-pair can increase if the merged airline becomes more equal in size relative to its competitors. Nonetheless, when evaluated at the mean premerger concentration, changes in price remain positive at 7.79 percent, the effects on traffic while positive is economically insignificant at .37 percent.

Table II
Regression Results

	Change in Price		**Change in Traffic**	
	(1)	(2)	(3)	(4)
Intercept	.072*	.071*	.029*	.028*
	(.007)	(.007)	(.002)	(.003)
Airtran	-.010	-.010	-.066*	-.065*
	(.010)	(.010)	(.015)	(.015)
Southwest	.048*	.048*	.001	.002
	(.004)	(.004)	(.003)	(.003)
$\mathrm{HHI}_{\mathrm{pre}}$	.024^{+}	.024^{+}	-.040*	-.039*
	(.012)	(.012)	(.004)	(.004)
Other_LCC	-.045*	-.045*	-.090*	-.091*
	(.007)	(.007)	(.006)	(.006)
Overlap	.074*	.110*	.002	.247*
	(.007)	(.019)	(.009)	(.055)
Overlap × $\mathrm{HHI}_{\mathrm{pre}}$	--	-.109^{+}	--	-.758*
		(.051)		(.184)
R^2	.0007	.0007	.027	.030

Note: Ordinary least squares estimation. White-adjusted standard errors are in parenthesis.
* and + denote statistical significance at 1 and 5 percent, respectively.

4.1 Varying merger time period

As a check on the consistency of the result that higher pre-merger concentration decreases both price and traffic, the empirical models are re-estimated using the first and second quarters of 2011 and 2014 as the pre-and-post merger time periods. Table III shows the results of this variation. Consistent with prior results, the coefficients on the variable overlap and its interaction with pre-merger concentration maintain the same sign pattern and statistical significance in the price regression. In the traffic regression however, pre-merger concentration does have a decreasing effect on traffic as expected but the statistical significance is mixed in this case. The coefficient on the interaction variable is statistically significant at the 1 percent level in the second quarter of 2011 and 2014 but it is only significant at the 11 percent level in the first quarter. These results suggest that the effect of pre-merger concentration on traffic may be sensitive to the merger window but the effect on price is not.

Table III
Regression Results

	Change in Price		Change in Traffic	
	Pre-2011Q1 Post-2014Q1	Pre-2011Q2 Post-2014Q2	Pre-2011Q1 Post-2014Q1	Pre-2011Q2 Post-2014Q2
Intercept	.057*	.060*	.018*	.002
	(.008)	(.007)	(.003)	(.003)
Airtran	.053*	.063*	.041*	-.015
	(.009)	(.009)	(.014)	(.014)
Southwest	.034*	.049*	.032*	.035*
	(.005)	(.004)	(.003)	(.004)
HHI_{pre}	.062*	.077*	-.023*	-.020*
	(.013)	(.012)	(.003)	(.004)
Other_LCC	-.021*	-.002	-.073*	-.106*
	(.006)	(.007)	(.006)	(.007)
Overlap	.135*	.112*	.165*	.224*
	(.022)	(.018)	(.046)	(.050)
Overlap × HHI_{pre}	-.188*	-.158*	-.238	-.465*
	(.060)	(.047)	(.146)	(.160)

Note: Ordinary least squares estimation. Robust standard errors are in parenthesis.
* denotes statistical significance at 1 percent.

5. Conclusion

This paper investigates the competitive effects of the merger between Southwest and Airtran in overlapping markets and determines whether preexisting competition— measured by the Herfindahl concentration index—has any effect on changes in price and traffic. The results suggest that prices increase in these markets and that preexisting competition has a decreasing effect on both price and traffic. These results are consistent with varying the merger time periods. In addition, these findings seem suggest that greater preexisting concentration on routes that overlap does not necessarily imply less price competition following a merger. If a merger creates an airline that becomes more equal in size relative to its competitors, price competition may be enhanced even though market concentration has also increased. One limitation of this study is that changes in product quality by the merged airlines were not taken into account. Even though the data does not contain such information, future research should incorporate a quality dimension in the analysis.

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