

Reputation, Search Cost, and Airfares

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Abstract

We compare fares offered by Southwest Airlines to those found through Orbitz on-line travel agency. We find that lowest last-minute fares, offered by Southwest, are on average 8.5% higher than the lowest fares one can find on Orbitz. We determine that Southwest offers higher fares as compared to other airlines for longer journeys; where the carrier offers higher frequency of service; and on markets with lower income customers. The hypothesis that Southwest offers higher last-minute fares because of different yield management practice is not supported. We suggest that the observed result is consistent with exploitation of Southwest Airlines' reputation coupled with the high opportunity cost of shopping around faced by the last minute travelers.

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1. Introduction

When selecting way(s) to retail its product or service to consumers, a firm faces important trade-offs. If consumers at the retail outlet can observe both your and your competitors' products; your attempt to charge prices higher than those offered by your competitors (for the product of the same quality) will likely fail. However, potential customers will be more likely to notice your product. On the other hand, if you choose to retail your product or service through your own outlet, you can exploit customers' unawareness of other alternatives (or high search cost) to charge higher prices – on condition that consumers are aware of your outlet and can access it.

Airlines have traditionally retailed majority of their tickets through the computer reservation systems (CRS). Originally developed by airlines themselves, they are now independent companies. The largest of such reservation systems (also referred to as the global distribution systems) are Sabre, Amadeus, Worldspan, and Galileo. The airlines choose their level of participation in each of the CRS (i.e., what fares to post); and the tickets are sold via the extensive network of (on-line or brick-and-mortar) travel agents. While many airlines have also been selling an increasing share of their tickets through their own web sites, none of the US carriers has abandoned its CRS participation. Recently, JetBlue Airways (the youngest low cost carrier on the US market) abandoned its strategy of selling its tickets solely through its web-site, and started actively participating in Sabre CRS.

Southwest Airlines (carrier code WN) has become widely known both in the United States and across the world as perhaps the most successful low-cost and low-fare airline on the US airline market. One feature of this carrier's business model (along with reliance on point-to-point services; higher aircraft utilization rates; and limited in-flight services) is distribution of majority of its tickets through its own web-site. Indeed, the airline only participates in Sabre CRS to very limited degree: Travelocity, a major on-line travel agent linked to Sabre CRS, will not offer Southwest Airlines' fares to its customers. In light of the above-stated, one can wonder if Southwest could try to combine its reputation with its ticket sales strategy to take advantage of its (potential) customers. This is the issue addressed by this paper.

We compare fares offered by Southwest Airlines through its web-site with those other airlines post with a major computer reservation system (Worldspan²), accessed via a leading on-line travel agent (Orbitz). The fares for comparison were collected for 238 directional markets; for each market, fare quotes from www.southwest.com and www.orbitz.com were obtained nearly simultaneously. Orbitz was chosen not only for being a major on-line travel agent (along with Travelocity and Expedia); a recent study by Bilotkach and Pejcinovska (2007) compared fares offered by the above-named three major players over a hundred US airport-pair markets, and showed Orbitz was least likely to produce the lowest available fare. Thus, the design of our study is such that if results are biased, they will most likely be biased against us. To model a situation with high search cost for the potential customer, the focus of this study is on fares offered one-two days before the departure date, for the short last minute trip.

Overall, fares offered by Southwest Airlines for last minute purchase were \$34.46 (8.5 per cent) higher than comparable lowest fares found on Orbitz. Yet, one was about as likely to encounter WN offering the lowest last minute fare as finding a better deal on Orbitz (other things almost equal). Further analysis revealed the following. First, comparison of last minute fares offered by Southwest with same by individual airlines showed WN on average charged similar fares to those offered by most major carriers, and offered higher fares as compared to smaller and other lower cost airlines. Second, WN is more likely to charge higher last minute fares as compared to its direct competition on long-haul routes; where it offers more frequent service; on markets with lower per capita income; on North-South routes, and where WN's origin airport is the same as that of its direct competitor. Third, higher average last minute fares offered by Southwest cannot be attributed to realization of uncertain demand coupled with yield management (or, we can alternatively interpret our result as suggesting Southwest offers fewer discounted seats than do other carriers). Thus, we can suggest that our results (coupled with the well-known fact that Southwest Airlines does enjoy lower cost per available seat mile as

² According to the US Department of Transportation, with 20% market share Worldspan is the second largest player on the US airline ticket distribution market.

compared to its competitors³) imply that WN attempts to use its ticket sales strategy to earn higher mark-ups from consumers with high search cost.

Southwest Airlines' consistent success in the rather turbulent airline business has attracted researchers' attention. The papers specifically devoted to this airline include Morrison (2001) and Bogulaski et al. (2004). Morrison showed that Southwest Airlines lowers competitors' fares not only at the airport it enters, but also at the surrounding airports. Bogulaski et al. documented the pattern of the airline's network development and evaluated the extent to which major network carriers are vulnerable to further Southwest Airlines expansion.

Development of on-line travel agents led to several studies based on samples of offered fares. Bilotkach (2006) concludes that dispersion of offered fares across airlines on the same route is higher for last minute fares than for advance purchase ones. Bilotkach et al. (2006) document across-airline differences in dynamics of price setting on London-New York city pair market. Piga and Bachis (2006) collected an extensive sample of fares offered by both low cost and full service carriers on a number of UK-EU markets. They detect instances where low cost carriers do not always offer the lowest fares⁴, and more so as the departure date nears (yet, full service carriers appear to offer higher fares on average). Piga and Bachis did not, however, explore the factors behind the observed differences between fare quotes across airlines; nor did they document the magnitude of across-airline differences in quoted fares. Escobari (2006) links the dynamics of offered fares to capacity constraints faced by the airlines. Hazledine (2007) uses offered fares to examine airline conduct on the Australasian airline market.

Recent research (e.g., Ellison and Ellison, 2005) documented that even on the on-line markets consumers tend to choose options that are listed first. Intuitively, therefore, a firm should be willing to invest resources into ensuring potential customer receives its offer before everybody else's. In fact, regulations governing the computer reservation systems explicitly prohibit 'display bias' to ensure no airline obtains the 'first viewer' advantage over its rivals. For an airline distributing its tickets by itself, a way to ensure a potential customer visits its web-site before going to a place where all competing airlines'

³ The only major US airline boasting lower cost per available seat mile in 2005-2006 is JetBlue Airways.

⁴ Indeed, different low cost carriers offered the highest fares with different frequency. However, those LCCs, which tried overpricing their competitors more often, were eventually acquired by other carriers.

fares are observable (unless the customer exhibits brand loyalty) is to establish reputation for being the place to get the best deals. By looking at the advance purchase fare quotes, we find that Southwest Airlines' best offers on markets where it faces other non-stop competitors are 4.5% lower than the best comparable fares one could observe on Orbitz. While we in this paper are unable to quantify the reputation effects for Southwest Airlines directly, what we observe seems consistent with the strategy outlined above.

The rest of the paper is organized as follows. Section 2 explains hypotheses and the data collection procedure in detail. Section 3 presents results of the data analysis. Section 4 concludes.

2. Data

2.1 General

The idea behind our analysis is testing the suggestion that a firm (Southwest Airlines) choosing to retail its product solely via its own outlet (web site) can use its reputation to charge higher fares when a potential customer faces high search cost, as compared to a carrier selling its tickets through an outlet where competitors' offers can be observed (Orbitz). Clearly, the opportunity cost of search is the highest when you book you travel shortly before departure; hence, we will focus on last minute fare quotes (one-two days before the trip). If we fail to observe the alleged conduct while comparing last minute fare quotes: this means there is no need to look any further. If a firm does not try taking advantage of a consumer when the opportunity cost of search is the highest for him/her; there is no reason to believe it will try to do it with lower search cost.

The simplest way to analyze our contention would be by comparing the lowest fares offered by Southwest to the lowest comparable fares found on Orbitz. Yet, even if the average last minute fare offered by Southwest happens to be higher than the lowest comparable fare found on Orbitz; we will not be able to immediately declare our investigation successfully concluded. Indeed, the airlines may be exercising their yield management differently, so that by the time the flight is about to depart one carrier may have more empty seats left than the other; and will therefore charge lower fare. While we will not be able to observe how many seats each carrier has available at the time price search is performed; we will use differences in frequency of the airlines' services to

address this issue. Second, comparison of Southwest Airlines' fare with the lowest comparable price available should be complemented by comparison with fares offered by individual airlines. Indeed, if different airlines offer the lowest fare on different markets, then Southwest may look like a higher fares airline as compared to Orbitz; while carrier-by-carrier comparison may reveal that WN does not offer higher fares than, for example, United or American.

2.2 *Data Collection*

We centered our data collection exercise on the notion of a hypothetical customer, contemplating a round-trip journey. Our customer prefers non-stop flights but is willing to trade between airports within both the origin and the destination metropolitan areas. Thus, a traveler living in Chicago and going to Houston will be willing to depart from either O'Hare or Midway airport, arriving to either Intercontinental or Hobby, as long as he/she can get an airline offering a non-stop flight between the two airports.

For collecting our sample of offered fares, we used Southwest Airlines' schedule to identify nine origin airports, from which the airline operates services to many destinations. Our other concern was to include origin airports in areas, where Southwest is exposed to large-scale competition from other major carrier(s) (i.e., airports which are hubs to major airlines, or airports located in the same metropolitan area as major airlines' hubs); as well as those origin airports, where Southwest should not expect substantial competition from major carriers. The following airports were selected: Nashville (BNA), Chicago Midway (MDW), Portland, OR (PDX), Seattle (SEA), St. Louis (STL), Baltimore (BWI), Houston Hobby (HOU), Kansas City (MCI), and Phoenix (PHX). MDW is located in the same metropolitan area as Chicago O'Hare airport, which serves as a hub for United Airlines and American Airlines; SEA is the hub for Alaska Airlines; BWI is in the same area as Washington Dulles (United Airlines' hub) and Ronald Reagan National (a 'semi-hub' for US Airways); HOU is in the same metropolitan area as Houston Intercontinental (hub for Continental Airlines); and PHX is one of US Airways' hub airports⁵. Thus, we should be able to observe direct interaction of Southwest

⁵ Technically, PHX was a hub for America West, which acquired US Airways over a year before the data collection took place; and adopted US Airways name for the bigger airline.

Airlines (to the extent offered fares enable us to do so) with a number of the main players on the US airline market (except for Delta Air Lines and Northwest Airlines).

We collected offered fares for travel to each destination, serviced by Southwest Airlines with at least one daily non-stop flight from each of the nine above-listed origin airports, with the exception of flights to Long Island Islip airport (this one is technically located in the New York City area, but appears an inferior choice as compared to other area airports). As for options offered by other airlines, we collected those through Orbitz, one of the leading on-line travel agents, linked to Worldspan – a major computer reservation system (CRS). Unlike most other major players⁶, Southwest Airlines does not participate in this CRS, so one cannot find fares offered by this carrier on Orbitz. For travel to/from a multi-airport metropolitan area, we searched for competing airlines' flights to/from all major airports in the area. For instance, to search for alternatives to Southwest Airlines' departures from BWI, we searched for available options departing from Washington Dulles (IAD) and Ronald Reagan National (DCA) airports, in addition to BWI departures.

We ended up with fare quotes for 238 directional⁷ city-pair markets. Of those, on 194 markets Southwest faced at least one competitor providing a non-stop service (in fact, on 114 markets the carriers faced one other non-stop competitor; on 66 routes there were two other airlines providing non-stop service; and in fourteen other instances three airlines competed with Southwest with non-stop services). Quotes for both last-minute and advance purchase trips were collected. The following table contains information on the dates of collection and proposed dates of travel, as well as on the number of city-pair markets for which the quotes were obtained, by the origin airport. It should be noted here that Southwest and Orbitz fare quotes were obtained at nearly the same time; with search for the same city-pair markets and travel dates conducted in parallel on both web sites.

⁶ JetBlue Airways was another airline, which until recently did not participate in a major CRS, selling its tickets through its own web site. This changed in late 2006, however, as JetBlue started participating in Sabre CRS, making its fares available on-line through Travelocity.com.

⁷ That is, Chicago to Phoenix market was considered different from Phoenix to Chicago route.

Table 1 Dates of Data Collection

Origin airport	Number of markets		Last minute quotes			Advance purchase quotes		
	Total ⁸	With non-stop rival(s)	Date of collection	Travel date	Return date	Date of collection	Travel date	Return date
BNA	26	10	01/08/07	01/10/07	01/12/07	12/12/06	01/11/07	01/14/07
BWI	35	33	11/27/06	11/29/06	12/01/06	12/12/06	01/11/07	01/14/07
HOU	26	26	11/27/06	11/29/06	12/01/06	12/12/06	01/11/07	01/14/07
MCI	20	10	11/27/06	11/29/06	12/01/06	12/12/06	01/11/07	01/14/07
MDW	45	45	12/12/06	12/13/06	12/15/06	12/12/06	01/11/07	01/14/07
PDX	12	9	01/08/07	01/10/07	01/12/07	12/12/06	01/11/07	01/14/07
PHX	41	35	11/27/06	11/29/06	12/01/06	12/12/06	01/11/07	01/14/07
SEA	12	10	01/08/07	01/10/07	01/12/07	12/12/06	01/11/07	01/14/07
STL	21	5	12/12/06	12/13/06	12/15/06	12/12/06	01/11/07	01/14/07

In each instance, we recorded the lowest fare offered by Southwest for a journey, involving non-stop flights in both directions. For routes where other non-stop competitors were present, we recorded the lowest fare for a non-stop journey, offered by each such competitor. For the markets where no non-stop flights were offered by other airlines, we only recorded the lowest fares quoted on Orbitz.

3. Data Analysis

Let us start with the raw facts. The lowest last minute fares offered by Southwest Airlines through its web site (averaged across all routes) were 8.5 per cent (\$34.37) higher than the same average for fares offered on Orbitz. The difference was 7.8 per cent (\$30.85) for routes where other non-stop competitors existed; and 11.5 per cent (\$49.89) for markets where Southwest was the only carrier offering non-stop service. For advance purchase fares, the differences were less dramatic. Overall, the lowest advance purchase fare offered by Southwest, again averaged across the routes, was 2.7 per cent (\$5.42) below that one would get on Orbitz. For markets where Southwest faced other non-stop competitors, the airline posted advance purchase fares which were 4.5 per cent (\$8.80) lower than its competitors'; whereas if Southwest Airlines was the only carrier with a non-stop service on the route, its lowest offered advance purchase fares were on average 4.4 per cent (\$9.50) higher than the best deal offered by the competing carriers. All percentages are relative to the respective average lowest fare offered by Southwest Airlines.

⁸ Excluding flights to ISP airport

However, the lowest last minute fare offered by Southwest was not lower than the one found on Orbitz on 121 routes out of 238 (50.8 per cent). The share is slightly higher for routes where other non-stop carriers are present (104 routes out of 194, or 53.6 per cent). For the eighty routes where Southwest faced non-stop competition from two or three other carriers, the airline's last minute offered fare for the roundtrip journey involving non-stop flights was the highest in 31 instances (38.8 per cent of routes); neither the highest nor the lowest on 13 routes, and the lowest on the remaining 36 markets.

We thus see that as far as last minute purchases are concerned, Southwest appears to be a 'normal' airline – you are as likely to pay more flying on it as you are to pay less, other things approximately equal. If you end up paying more, however, the difference between Southwest fare and the lowest one available will be higher than if you pay less. The following table provides more detailed information about the sample.

Table 2 – Differences in Offered Fares, by Origin Airport

Origin airport	Advance purchase fares		Last minute fares	
	WN – Orbitz Difference	Difference as per cent of WN fare	WN – Orbitz Difference	Difference as per cent of WN fare
BNA	16.11 (62.80)	7.8%	34.00* (99.61)	8.7%
BWI	-20.40 (83.77)	6.6%	-29.97 (149.88)	5.8%
HOU	6.08 (40.32)	3.1%	43.07** (90.38)	10.0%
MCI	-30.25 (84.39)	16.8%	25.40 (166.31)	6.3%
MDW	3.64 (38.87)	1.9%	73.60** (98.12)	21.7%
PDX	-11.83* (24.44)	6.8%	-18.50 (84.28)	4.9%
PHX	-7.15 (74.67)	3.3%	68.93** (81.76)	14.0%
SEA	-14.42** (16.01)	7.8%	6.75 (95.32)	1.6%
STL	-4.95 (45.55)	2.7%	25.90 (140.30)	11.6%
All routes	-5.42 (61.09)	2.7%	34.36** (117.95)	8.5%
Routes with non-stop competitors	-8.80 (58.91)	4.5%	30.85** (116.98)	7.8%
Routes w/o non-stop competitors	9.50 (68.70)	4.4%	49.89** (122.29)	11.5%

Notes:

1. Values in parentheses are standard deviations.
2. Reported differences are between the lowest non-stop Southwest fare quote and the lowest non-stop (where available) or one-stop fare quote for single-airline travel, found on Orbitz.
3. Differences are averaged across corresponding routes.
4. All percentages are relative to average WN fare quotes.

* - statistically significant at 10% level

** - statistically significant at 5% level

From the table above, one can observe substantial heterogeneity in differences in offered fares across the origin airports, especially for the last minute fares. Notably, there is not a single origin airport for which differences in last minute fares are statistically significantly lower than zero; yet, those differences are significantly positive for only three (or four, depending on significance level one considers appropriate) out of nine origin airports.

Next, let us turn to comparison of Southwest with specific carriers, concentrating on last minute offered fares. Table 3 below includes comparison of last-minute fares offered by Southwest as opposed to those offered by specific airlines. For markets where Southwest faced non-stop competition from at least one other carrier, we recorded lowest

non-stop fares posted by each airline providing such service. As one can notice from the following table, in our sample Southwest's last minute offered fares are significantly higher than those offered by Continental Airlines and other carriers (Air Tran, Frontier, and Midwest Airlines).

Table 3 – Difference in non-stop last-minute offered fares, by airline

Airline	Number of markets	Difference in average offered fares
American Airlines	64	-16.63 (160.90)
United Airlines	78	21.60 (130.50)
Continental Airlines	36	25.94** (76.36)
Delta Air Lines	8	-6.62 (113.70)
US Airways	61	8.03 (123.10)
Alaska Airlines	22	-3.73 (57.16)
Northwest Airlines	6	-14.33 (118.84)
Other carriers (Frontier, AirTran, Midwest)	13	130.20** (160.00)

Notes:

1. Reported difference is between fares offered by Southwest and those offered by a specific airline, averaged across corresponding markets.
2. Fares are averaged across those markets, where Southwest and the respective airline(s) offer non-stop service.
3. Values in parentheses are standard deviations.
4. Only lowest fares for non-stop roundtrip journeys have been included into calculations.
5. US Airways includes America West Airlines; and excludes fares offered by US Airways for flights operated by United Airlines.
6. American Airlines excludes fares offered by the carrier for flights operated by Alaska Airlines.

* - statistically significant at 10% level

** - statistically significant at 5% level

In addition, Table 4 shows (for markets where WN faces non-stop competition from other carriers) comparison of each airline's last minute offered fare quotes to the lowest ones found on Orbitz, conditional on an airline offering higher than the lowest fare for the non-stop service.

Table 4 Airlines' versus lowest Orbitz fares, last minute quotes

Airline	Number of markets where airline offers higher non-stop fare than the lowest Orbitz fare	Number of markets on which airline offers non-stop service	Airline's fare minus Orbitz lowest fare, averaged across routes where airline's fare is higher than lowest Orbitz fare
Southwest Airlines	104	194	109.00 (77.25)
American Airlines	33	64	84.85 (131.29)
United Airlines	21	78	42.28** (72.03)
Continental Airlines	7	36	38.29** (38.06)
Delta Air Lines	2	8	42.00** (22.63)
US Airways	6	61	87.83 (110.10)
Alaska Airlines	3	22	23.33** (23.09)
Northwest Airlines	1	6	247.00
Other carriers (Frontier, AirTran, Midwest)	0	13	0.00

Notes:

1. Reported differences represent the difference between airline's and lowest Orbitz fare, averaged across markets, where the airline provides non-stop service *and* offers higher fare than the lowest one found on Orbitz.
 2. Fares are averaged across those markets, where Southwest and the respective airline(s) offer non-stop service.
 3. Values in parentheses are standard deviations.
 4. US Airways includes America West Airlines; and excludes fares offered by US Airways for flights operated by United Airlines.
 5. American Airlines excludes fares offered by the carrier for flights operated by Alaska Airlines.
- ** - Indicates the difference for a specific airline is statistically significantly different from the same difference for Southwest airlines at 5% level.

Table 3 suggests that Southwest Airlines' pricing policy, as far as last minute offered fares are concerned, looks like that of most other airlines. Table 4, however, shows that, when compared to the lowest fare found on Orbitz, Southwest does (attempt to) charge higher last minute fares than do other carriers (except for US Airways and American Airlines).

Next, we use simple regression analysis to study impact of market characteristics or other factors on the differences in fare quotes. As a dependent variable in all regressions, we will use the difference of natural logarithms of lowest Southwest and Orbitz fare quotes. The independent variables we use are as follows:

- Geometric averages of endpoints' population and per capita income;
- The logarithm of non-stop flight time⁹ (lowest of that for flights in either direction¹⁰);
- Origin airport dummies;
- Airline¹¹ dummies (equal to one if an airline provides non-stop service, and used for sub-sample of markets where Southwest faces other non-stop competitor(s))
- Dummy for routes where Southwest is the only non-stop competitor;
- Dummy for cases, where an airline offering the lowest fare through Orbitz operated its flight from a different origin airport than Southwest¹².
- Sunbelt dummy (following Ito and Lee (2007)) to single out destinations in California, Nevada, Arizona, Louisiana, New Mexico, Texas, Alabama, Florida, and Mississippi.
- North-South dummy for the routes with origin outside of and destination within the Sunbelt – to account for collection of our sample during the winter;
- Southwest Airlines' non-stop frequency (highest if different on departure and arrival days);
- Frequency of service for the airline offering the lowest quote for non-stop flight on Orbitz (only used for sub-sample of markets where Southwest faces other non-stop competitor(s));

Restricting our analysis to 194 directional markets, where Southwest faces non-stop competition, we can examine the role of yield management as a factor behind the observed differences in fare quotes. One may suspect that Southwest can charge higher last minute fares on those markets, where it operates fewer departures than the airline offering lower fare through Orbitz. Yield management implies, other things equal, that fares will be lower the more seats remain unfilled prior to the departure date. While we do not know how many seats actually remained empty one-two days prior to the

⁹ All values for non-stop flight time are as reported on Southwest Airlines' web-site, to ensure consistency.

¹⁰ For example, due to wind patterns, East Coast to West Coast flights are about one hour longer than West Coast to East Coast journeys, other things equal. All values for non-stop flight time are as reported on Southwest Airlines' web-site, to ensure consistency.

¹¹ As defined in Tables 3 and 4.

¹² This variable is not perfectly collinear with the origin airport dummies thanks to Washington, D.C. area. Some of the lowest fares were for departures from BWI; while in other cases the departure airport was IAD or DCA

departure date¹³; we can use difference in frequency of service between Southwest and the airline offering the lowest non-stop fare on Orbitz as a proxy for this¹⁴. Then, if observed differences in fare quotes are the result of yield management practices, we should see negative coefficient the frequency difference variable.

The proxy we use is an imperfect one, as Southwest's competitors may (and often do) use different aircraft than WN does¹⁵. However, as long as Southwest Airlines' competitors use aircraft with equal or less capacity as compared to that used by WN; any potential bias resulting from use of frequency instead of capacity will be against us. This does seem to be the case: the only aircraft (of those actively used by US carriers on the domestic market) with substantially larger capacity than Boeing-737 used by WN is Boeing-757¹⁶; WN configures its aircraft in economy class only, meaning more seats for the same aircraft size; also, 'traditional' airlines tend to use smaller regional jets on shorter routes, where Southwest flies B-737s.

Regression results are presented in the tables below. Table 5 presents results for the sample of advance purchase fares. Results for the last minute fare quotes are presented in Table 6.

¹³ It is true, however, that Southwest Airlines has one of the lowest load factors in the industry.

¹⁴ If two or more airlines offered the same fare; we recorded frequency of the airline, offering the fewest flights.

¹⁵ Southwest Airlines' fleet consists entirely of Boeing-737 aircraft.

¹⁶ Use of wide-body aircraft (such as Boeign-767 or Boeing-777) is not frequent on the US domestic routes.

Table 5 Regression Results – Advance Purchase Fares

Independent variable	All markets		Markets with non-stop competition	
	Regression 1	Regression 2	Regression 1	Regression 2
Constant	-0.6279** (0.2792)	-0.6125** (0.2843)	-0.4707 (0.3556)	-0.3931 (0.3505)
Population average	-1.38E-05 (1.50E-05)	-1.09E-05 (1.50E-05)	-1.43E-05 (1.72E-05)	-1.07E-05 (1.68E-05)
Per capita income average	1.55E-06 (6.19E-06)	3.94E-06 (6.23E-06)	9.89E-07 (6.86E-06)	4.60E-06 (6.58E-06)
Log of flight time	0.1171** (0.0435)	0.0915* (0.0485)	0.0741 (0.0544)	0.0171 (0.0598)
WN frequency	-0.0003 (0.0068)	-0.0044 (0.0069)	-0.0019 (0.0084)	-0.0096 (0.0084)
Frequency difference	---	---	0.0036 (0.0084)	0.0044 (0.0081)
Different Airport	-0.1829** (0.0799)	-0.1808** (0.0654)	-0.1901** (0.0858)	-0.1772** (0.0834)
WN is the only non-stop carrier	0.0463 (0.0494)	0.0565 (0.0496)	---	---
Sunbelt destination	---	0.1171* (0.0641)	---	0.1654** (0.0652)
North-South market	---	-0.0616 (0.0783)	---	-0.0562 (0.0839)
Adjusted R-squared	0.1116	0.1247	0.0649	0.1161

Notes:

1. Dependent variable is difference in natural logarithms of lowest offered fares
 2. Values in parentheses are standard errors
 3. Number of observations: all markets – 238; markets with non-stop competition – 194
 4. Corrected for heteroscedasticity using White-robust variance-covariance matrix
 5. Origin airport dummies are included in all regressions, but not reported
 6. Airline dummies are included in regressions for markets with non-stop competition, but not reported
- * - significant at 10% level
 ** - significant at 5% level

Table 6 Regression Results – Last Minute Fares

Independent variable	All markets		Markets with non-stop competition	
	Regression 1	Regression 2	Regression 1	Regression 2
Constant	-1.1244** (0.3018)	-0.9480** (0.3043)	-0.7658** (0.3781)	-0.5250 (0.3833)
Population average	-1.35E-05 (1.62E-05)	-6.72E-06 (1.60E-05)	2.72E-06 (1.86E-05)	7.51E-06 (1.84E-05)
Per capita income average	-6.35E-06 (6.69E-06)	-3.56E-06 (6.67E-06)	-1.41E-05* (7.22E-06)	-1.21E-05* (7.20E-06)
Log of flight time	0.2978** (0.0471)	0.2241** (0.0519)	0.2692** (0.0588)	0.1835** (0.0654)
WN frequency	0.0158** (0.0073)	0.0112 (0.0074)	0.0170* (0.0091)	0.0128 (0.0092)
Frequency difference	---	---	-0.0052 (0.0090)	-0.0061 (0.0089)
Different Airport	-0.3502** (0.0711)	-0.3345** (0.0700)	-0.2505** (0.0927)	-0.2405** (0.0913)
WN is the only non-stop carrier	0.0285 (0.0536)	0.0485 (0.0530)	---	---
Sunbelt destination	---	0.0081 (0.0686)	---	-0.0302 (0.0713)
North-South market	---	0.1329 (0.0838)	---	0.1804** (0.0912)
Adjusted R-squared	0.3024	0.3264	0.3667	0.3874

Notes:

1. Dependent variable is the difference in natural logarithms of lowest offered fares
 2. Values in parentheses are standard errors
 3. Number of observations: all markets – 238; markets with non-stop competition – 194
 4. Corrected for heteroscedasticity using White-robust variance-covariance matrix
 5. Origin airport dummies are included in all regressions, but not reported
 6. Airline dummies are included in regressions for markets with non-stop competition, but not reported
- * - significant at 10% level
 ** - significant at 5% level

Table 5 shows that for the advance purchase fares the difference between the fare offered by Southwest and the lowest comparable alternative found on Orbitz will be smaller if Southwest flies from a different airport; and, the same difference will be larger for Sunbelt destinations. There is some evidence (which is not very robust) of larger Southwest-Orbitz difference for long-haul flights. Generally, there is no discernible pattern for the differences in advance purchase fare quotes, which is consistent with the above reported average raw difference being statistically close to zero; observe also that the fit of regression to the data is not impressive.

Results for last minute fare quotes are more interesting. The differences in fare quotes are clearly larger for long-haul flights. The positive and sometimes significant

coefficient on Southwest frequency variable suggests the airline tries to extract premium for higher frequency (hence, better quality) service. The coefficient on the frequency difference variable is never significant, even though it is negative. That is, we can rather confidently assert that potential differences in yield management practices by Southwest and other airlines do not contribute to the observed differences in offered fares in the way we previously suspected they might. While one can claim that Southwest appears to offer fewer discounted seats than do other airlines, this apparent difference in yield management practices is observationally equivalent to attempting to extract higher premiums from customers unaware of the available alternatives.

The Southwest-Orbitz difference is higher for North-South routes; and lower if Southwest flies from a different airport than the competitor offering the lowest fare through Orbitz. The negative and significant coefficient on (geometric) average per capita income is rather puzzling. One would think customers with higher income have higher search cost: hence, one would expect this coefficient to be positive if Southwest tried taking advantage of higher cost search of travelers making last minute bookings. On the other hand, customers living in higher income communities are more likely to be frequent travelers; thus, they are more likely to be aware of the available alternatives when booking their flight. So, we may suggest that if Southwest tries to take advantage of potential customers booking flights close to the departure date, the airline seems to target customers unaware of the available alternatives rather than those with high search cost. This statement should be viewed, however, as a speculation based on a single regression coefficient rather than a conclusion of this study.

Conclusions

Let us summarize what we have learned from the data analysis. First, Southwest Airlines' advance purchase offered fares are lower than the best comparable deal one can find through a source effectively combining offers from the competing carriers. Second, while WN is neither more nor less likely to offer the best deal for the last minute purchase; the average lowest last minute fare offered by Southwest is higher than the comparable offer posted by its competitors through a leading computer reservation system. Third, there is no evidence the observed difference is due to Southwest Airlines'

flights getting filled faster than those of its competitors (moreover, WN has one of the lowest load factors in the industry). Finally, the difference between the Southwest and the lowest comparable Orbitz fare is higher for long-haul flights; North-South markets; and lower income markets. Yet, where Southwest flies from a different airport than its competitor on the same city-pair market; the difference between WN and Orbitz offered fares tends to be lower.

Our initial goal was to find out if Southwest Airlines, by not participating in computer reservation systems at any level noticeable to regular customers, can utilize customers' unawareness of available alternatives (backed by the belief that Southwest tends to charge the lowest fares), coupled with high opportunity cost of search, to attempt charging higher last minute fares. The differences in last minute offered fares were consistent with our suspicion; we also found no support for the most obvious alternative explanation, related to the airlines' use of yield management. If airlines do use yield management differently, Southwest appears to be offering fewer discounted seats, which is consistent with trying to take advantage of the unsuspecting customers.

While all airlines sometimes charge higher fares than the lowest ones available; we found that the average difference between the airline's fare and the lowest Orbitz fare, conditional on airline's quote being higher than the lowest available comparable one, was higher for Southwest than for most other carriers¹⁷. We were unable to claim, however, that Southwest (when offering higher fares) acts clearly differently than some of the airlines when doing the same. Thus, while we are rather confident yield management is not behind the observed phenomenon; we are unable to completely reject the hypothesis that Southwest's price-setting strategy is similar to that implemented by, for example, American Airlines. However, given the difference in costs between WN and other airlines covered in our study¹⁸, we can reasonably suspect that immediately prior to flight's departure Southwest appears to be able to attempt selling its seats at higher mark-up as compared to other carriers.

The obvious caveat of our analysis is that we are looking at offered fares, not actual purchases. However, the question we asked is about airlines' strategies; and is

¹⁷ See Table 4. The corresponding difference for Northwest Airlines is based on a single observation.

¹⁸ As noted above, of major carriers only JetBlue Airways (whose fare quotes we do not observe here) has lower cost per available seat mile than Southwest Airlines.

therefore one that can be best answered analyzing what airlines offer. We must also add that our analysis could actually underestimate the differences between the offered fares, since quotes obtained on Orbitz have not been adjusted for the booking fee charged by this on-line travel agent; therefore, similar trips booked directly through individual airlines' could be \$5-10 cheaper for the customer.

Our study may have implications for further development of the airline ticket distribution business in the internet age. The airlines attempt to sell more and more of their tickets through their own web-sites; citing cost savings as the primary reason for doing so. Our analysis, however, suggests a different reason for such a practice. When a potential customer is unable to immediately observe competitors' offers and search cost is high, an airline can take advantage of this situation. Thus, behind the current movement in the airline industry to restructure ticket sales, we can see and document a force which could push fares upwards.

To avoid misinterpretation of our results, we need to state that our research does not indicate that Southwest Airlines charges higher average fare as compared to its competitors. Nor do we question prior findings that Southwest Airlines' entry substantially decreases fares charged by incumbent airlines. We however suggest that the airline's strategy of not distributing tickets where a potential customer can immediately compare WN's offers to those of its direct competitors, can give the carrier some advantages, which we have been able to document through our data collection and analysis exercise.

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