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“Fare Game”: Exploring the Impact of Discount Airlines in Philadelphia

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ABSTRACT

Low-cost carriers are becoming increasingly popular with the flying public. In this paper, we develop a model to explore the airfare impact of discount airlines when they compete with their non-discount counterparts in serving particular destinations. As a case study, we examine fares charged from Philadelphia since two low-cost carriers recently began operations at its airport. Our results show that a “Southwest effect” has occurred at Philadelphia, although an even stronger “America West” effect may exist at this airport. These timely and relevant findings ought to be important for airport authority officials, airline company management and passengers.

INTRODUCTION

Airline passengers may find Philadelphia’s “friendly skies” becoming even friendlier as additional low-cost carriers launch service from Pennsylvania’s largest city. Arguably the most significant such carrier to enter this market is Southwest Airlines. This notable discount flyer, the first airline to launch its own website (in 1995), currently carries over 65 million passengers annually on about 2,800 flights each day with a fleet of roughly 400 Boeing 737’s (see www.southwest.com).

On May 9th, 2004, Southwest Airlines commenced its Philadelphia service. Initially, it provided 14 daily flights to 6 destinations (Chicago, Las Vegas, Orlando, Phoenix, Providence and Tampa). Just under two months later, Southwest service was augmented with 14 new daily nonstop flights to 7 additional destinations (Fort Lauderdale, Houston, Los Angeles, Manchester (NH), New Orleans, Raleigh/Durham and West Palm Beach). Southwest’s aggressive entry into Philadelphia is not yet complete. By the end of October (2004), the airline added direct flights to Hartford, Jacksonville (FL), and Oakland.

According to Southwest officials, Philadelphia represents the best new market the carrier has ever entered (Belden 2004). In its first month of service – despite operating for only 23 days - the airline carried over 60,000 passengers. It is likely that Southwest Airlines will become Philadelphia’s 2nd largest carrier (in terms of passengers), trailing only US Airways, the traditionally dominant airline in this market.

Indeed, Southwest’s arrival at Philadelphia may jeopardize US Airways’ operations in other airports. In terms of operating costs, Pittsburgh is the most expensive of US Airways’ three hubs (Sheehan 2003). Should US Airways be forced to enter a price war with low-cost carriers to maintain its Philadelphia presence, it may be obliged to pull out of Pittsburgh (to thus trim costs so it can afford to make the fare concessions required to compete in Philadelphia). Clearly, the implications of a low-cost or discount carrier operating in a particular market are far-reaching.

Another low-cost carrier has made a recent foray into Philadelphia, albeit on a much smaller scale. On May 23rd, 2004 (a mere two weeks after Southwest’s entry), Frontier began Philadelphia service (Lott 2004). The carrier provides two daily non-stop flights to Denver, as well as one daily direct flight to Los Angeles.

Apparently, customers have enthusiastically responded to these discount airlines. Figure 1 illustrates monthly scheduled domestic enplanements. Although the post-entry time series is not yet extensive (owing to the fact that these discount airlines have only recently entered this market), we do observe an upswing in traffic subsequent to the two low-cost carrier entries. For example, in June, 2004, domestic enplanements totaled 928,579, an increase of over 11% from the previous month.

===== insert Figure 1 about here =====

A total of 13 domestic airlines provide regularly scheduled service from the Philadelphia International Airport (see Table 1 for a listing of these airlines). Frontier and Southwest are not the only airlines that could be classified as a discount or low-cost carrier. Admittedly, we recognize that the term “discount airline” may be difficult to define since it frequently depends on the performance measures used to assess particular airlines; indeed, Dresner, Lin and Windle (1996, p. 322) claim that “the definition of what constitutes a low-cost carrier is subject to debate”. Nonetheless, based on discussions with the U.S. Department of Transportation’s Office of Aviation Analysis (Bryan 2004), we assert that three additional domestic airlines operating out of Philadelphia (besides Southwest and Frontier) could be categorized as low-cost carriers; namely, AirTran, ATA and America West. Further, we note that these 5 discount carriers correspond to the specific ones outlined in Belden (2004). For lack of a better term, we shall refer to the 8 remaining airlines as “non-discount” carriers.

===== insert Table 1 about here =====

Historically, AirTran was the first discount carrier to enter Philadelphia. It began its service in 1993 under the company name ValuJet. America West was the second of the discounters to arrive in Philadelphia, making its initial flights in 1994. ATA commenced its Philadelphia service in 1999.

In this paper, we present a linear regression model to explore the impact that discount airlines have on fares when they compete with non-discount carriers in serving identical destinations. Does the presence of a low-cost carrier lead to downward pressure on fares? If so, which of the discount carriers exhibits the strongest influence on these

fares? For purposes of this study, we shall examine flights departing from Philadelphia. Since two discount airlines recently entered this market, the findings from our study ought to be both timely and relevant.

Our paper proceeds as follows. The next section provides a literature review. We then describe our quantitative model and discuss important results. We conclude our paper with a summary and some remarks.

LITERATURE REVIEW

Analyzing fare changes and airline competitiveness subsequent to the arrival of a discount carrier into a particular market has been the focus of other pieces of academic research. A study commissioned by the U.S. Department of Transportation (1999) compared airfares in 1979 (prior to deregulation of the U.S. airline industry) with those charged in 1997 (many years subsequent to its deregulation). Low-fare competition has had a significant effect on fares, especially in short-distance markets (defined as less than 750 miles). Since deregulation, inflation-adjusted average fares increased by 26% in those short-distance markets that featured no low-fare carriers. On the other hand, inflation-adjusted fares fell by 36% in markets that included discount competition. This study asserted that in short-haul markets, it is not the number of competitors, but rather the type of airline (low-cost or non-discount) that moves fares in a downward fashion.

Bennett and Craun (1993) originally coined the term “Southwest Effect”. This phenomenon is realized when fares drop due to a low-cost carrier entering a specific market. Non-discount airlines reduce their fares to maintain competitiveness. These authors observed that Southwest quickly gains a presence in what may be termed “dense”

markets (those markets with 500 or more passengers daily). To demonstrate this effect, the authors reviewed Southwest's experience in the "California Corridor", the largest U.S. domestic market in terms of passenger traffic. This corridor is bounded by San Francisco and Oakland on the north end, with Los Angeles, Burbank, Ontario and Long Beach on the south. When Southwest entered the Oakland-Ontario route in the 3rd quarter of 1989, prices declined by 60% and traffic tripled. When the low-cost carrier began serving the Oakland-Burbank city-pair, prices dropped by 55% and traffic increased six-fold. Clearly, Southwest's entry affected its competitors.

Windle and Dresner (1995) explored the effects of Southwest's 1993 entry into Baltimore-Washington International (BWI). They determined that after Southwest arrived at BWI, fares were as much as 86% cheaper than fares prior to entry. In an effort to understand the longer-run entry effects of low-cost carriers, the two authors collected data on the top 200 U.S. domestic origin and destination pairs (in terms of total traffic) over a 3-year period from 1991 to 1994. They observed that subsequent to a non-discount carrier entering a route, prices dropped to 88% of the pre-entry level by the 2nd quarter after entry. Prices climbed slightly after that, peaking at 95% of the pre-entry price by the 4th quarter after entry. For Southwest Airlines' entry to a specific route, a different story emerged. Prices dropped to 52% of pre-entry levels, then remained relatively stable at that level during the full year after entry. Traffic, meanwhile, increased by 200%. These authors also used regression analysis to show that the presence of Southwest Airlines on a particular route had the most significant downward pressure on airline fares.

Dresner, Lin, Windle (1996) quantified the “spill-over” effects that may occur upon the arrival of a low-cost carrier into a specific market. They sought to establish if other carriers at the airport of entry lowered their prices on “non-competing” routes. Again basing their analysis on the Southwest impact at BWI, they determined that significant price and traffic effects resulted on other routes flown from this airport. Moreover, these authors explored the impact of discount airline entry on other airports in close proximity to the airport where entry originally occurred. In other words, would carriers at nearby airports concomitantly lower their prices to compete with the low-cost carrier, so as to avoid traffic diversion? Analyzing the nearby airports of Washington National and Dulles, the authors discovered that even though some passenger and price effects occurred at the other two competing airports (i.e. traffic rose and prices fell), the overall impact was much smaller and less uniform than that which occurred at the original airport, BWI.

Brady and Cunningham (2001) provided evidence involving Southwest’s entry into Providence, RI. Upon the arrival of this low-cost carrier, average fares in this market dropped by 71%, while passenger traffic experienced an almost nine-fold increase.

In an effort to establish the manner in which “incumbent” airlines (those providing service at a particular airport prior to the entry of a discount carrier) respond to low-cost airline arrival, Lin, Dresner and Windle (2001) analyzed almost 900 incumbent reactions from 1991 to 1997. A regression model was used to ascertain the significant variables in predicting the incumbent carriers’ price cuts following discount competitor entry. The authors discovered that the extent of the entrant’s price cut, the number of passengers carried by the entrant on the route, as well as the entrant’s number of

customer complaints all affected the incumbent airlines' fare reactions. In a similar vein, Whinston and Collins (1992) examined the reactions of incumbent airlines' stock prices to the announcements of entry by discount airline People Express (this carrier ceased operations in 1986 due to competitive pressures from larger airlines). They examined 24 specific entry events during 1984-1985, mainly involving destinations served from the Newark International Airport. As one may expect, the incumbents' stock prices suffered significant value reductions upon the announcement of People Express entry.

Competitive analysis of low-cost carrier operations has been conducted for other country's airlines, besides those in the U.S. Mentzer (2000) determined whether the presence of particular low-fare carriers on a domestic Canadian route served to suppress the fares charged by major, "non-discount" airlines (namely, Air Canada and Canadian Airlines). His regression model analyzed fare data involving 163 Canadian city-pairs. In the end, a certain low-cost airline, WestJet, was the only of the discount carriers whose presence on a route led to lower fares charged by its non-discount competitors. The other low-cost airlines appeared to have no significant effect on the major airlines' fares. Mentzer (2003) re-examined this issue after the much-publicized 1999 merger between Air Canada and Canadian Airlines. Using data from 150 city-pairs, his regression analysis again showed that WestJet was the prime low-cost airline in affecting the fares charged by the nation's lone major carrier.

QUANTITATIVE MODEL

Our objective is to develop a quantitative model to explore those significant variables in determining the fares charged for flights from Philadelphia to a number of domestic destinations. We are desirous to understand the effects that each discount airline has on Philadelphia fares. Do all low-cost carriers exert the same level of downward pressure on fares, or is there a difference between these respective competitors? If so, which of the discount airlines provides the greatest price pressure?

We shall develop a linear regression model of the form:

$$Y = \beta_0 + \beta_1 \text{ Mileage} + \beta_2 \text{ PopDest} + \beta_3 \text{ Stop} + \beta_4 \text{ AirTran} + \beta_5 \text{ America West} \\ + \beta_6 \text{ ATA} + \beta_7 \text{ Frontier} + \beta_8 \text{ Southwest} + \beta_9 \text{ Non-discount carriers}$$

Mileage represents the air mileage between Philadelphia and a specific destination. We were able to obtain these values using a “Distance calculator” found on the website, www.indo.com/distance/.

As our destination data set, we chose any community with a population greater than 100,000 (according to the 2000 U.S. census). Table 2 lists the destinations used in our regression model. We note that several municipalities had populations above 100,000 but were not included in our study. These cities were located in the suburbs of a metropolitan area served by a larger city’s airport (e.g. Mesa, AZ is served by the Phoenix airport, while Glendale, CA is close to the Los Angeles International airport). In the end, our list involved 130 destinations. We are confident that such a wide sample of destinations ought to provide sufficient validity for our study. The explanatory variable

PopDest refers, obviously, to the population of a particular destination. For purposes of our regression analysis, we measured population in thousands.

===== insert Table 2 about here =====

Stop is a dummy variable used to differentiate between non-stop flights and those that feature layovers. It has the following representation:

Stop = 1 if a particular flight involved a layover
 0 otherwise (a non-stop flight served Philadelphia and the given destination)

The next five explanatory variables refer to specific low-cost carriers. They are dummy variables representing:

AirTran = 1 if AirTran serves the particular destination
 0 otherwise

America West = 1 if America West serves the particular destination
 0 otherwise

ATA = 1 if ATA serves the particular destination
 0 otherwise

Frontier = 1 if Frontier serves the particular destination
 0 otherwise

Southwest = 1 if Southwest serves the particular destination
 0 otherwise

Finally, the explanatory variable “Non-discount carriers” corresponds to the number of these airlines that operate flights from Philadelphia to a specific destination. Recall from our earlier discussion that 8 such carriers service Philadelphia.

Initially, we were concerned that our results may be skewed if a particular low-cost carrier served a substantial number of the 130 destinations in our regression model, while another discount competitor operated flights between Philadelphia and but few of these destinations. However, these concerns were unfounded. Table 3 shows that the

number of destinations in our 130-city data set served by each low-cost carrier (via either direct or connecting flights) is rather consistent. Southwest serves the greatest number of destinations (36), while Frontier serves the fewest (25).

===== insert Table 3 about here =====

We indicate at least three important hypotheses that we wish to test with our quantitative model. These are briefly described as follows:

1: The explanatory variables for each of the five low-cost carriers should have a negative coefficient. In other words, $\beta_4, \beta_5, \beta_6, \beta_7$ and $\beta_8 < 0$. This would indicate that, as described in previous studies, the presence of low-cost carriers serving a particular destination exerts downward pressure on airline fares.

2: The coefficient for the Southwest explanatory variable (β_8) should be the most negative of the five discount airlines. Said another way, $\beta_8 = \min \{ \beta_4, \beta_5, \beta_6, \beta_7, \beta_8 \}$. Such a finding shows that Southwest's presence evokes the greatest impact on fares.

3: As the number of non-discount airlines serving a particular destination increases, fares ought to drop. Fundamental rules of competitiveness (as well as supply and demand) should suggest that additional carriers serving a destination will, *ceteris paribus*, lead to downward movements in fares. We should observe that $\beta_9 < 0$.

MODEL RESULTS

We obtained round-trip airfares between Philadelphia and each of our 130 destinations from the Orbitz website, www.orbitz.com. Even though airfares are constantly subject to change, we nevertheless had to arbitrarily choose dates on which to retrieve airline fare data from this website. Gathering our airfare data on August 27th and 28th (2004), we chose a hypothetical Philadelphia-destination trip length of 3-5 days for travel sometime between November 1st and November 30th (2004). Orbitz provided us with the fares for travel on all possible dates in that time interval; we simply scanned the list to observe the lowest indicated fare (for an E-ticket, including all taxes and fees). Upon observing the lowest possible fare, we also noted the specific low-cost airlines, as

well as the number of non-discount competitors, that operated flights to the particular destination. For Southwest (whose fares are not listed on the Orbitz website), we accessed the airline's own website to determine the specific destinations served from Philadelphia.

Understandably, one could have obtained varying results depending on the particular dates chosen for air travel. Nonetheless, we are confident in our data-gathering approach since we collected fares for 130 different trips, thus permitting us to observe any discount carrier price effects for a wide range of destinations from Philadelphia. We also provided Orbitz with a month's worth of potential travel dates, a more preferable approach than limiting ourselves to a specific date for the departure and return flights. This ought to provide an accurate indication of the lowest fare for all flights in our data set.

We used StatPro, a spreadsheet-based statistical package, to perform the regression analysis. Table 4 provides the results of our linear regression modeling. Our original model results are illustrated in the 2nd column from the left. For each variable, we list its unstandardized coefficient along with its standard error in parentheses. Many of the explanatory variables are highly significant. The R^2 value of 0.5739 indicates a reasonable degree of explanatory power in the model; we note that this value for the coefficient of determination is in line with the corresponding values obtained in other studies of low-cost carrier impact (such as Dresner, Lin and Windle 1996 and Lin, Dresner and Windle 2001).

==== insert Table 4 about here =====

Let us now turn our attention to the three hypotheses. Our first proposition - namely, that low-cost carriers serving a particular destination apply downward pressure on airline fares – appears to be nearly supported by our regression results. With the exception of Frontier Airlines, we note that the explanatory variables for each of the discount carriers have a negative coefficient. Moreover, these variables possess a rather high degree of significance. Both America West and Southwest are significant at the 1% level, while AirTran and ATA have p-values less than 0.05. On the other hand, the explanatory variable for Frontier Airlines, besides being positive, holds limited statistical significance. Most likely, Frontier exhibits little impact on airline fares for the destinations it serves from Philadelphia.

Our second hypothesis conjectured that Southwest Airlines would be the leader among its low-cost carrier competitors. Based on our results gathered from several flights operated from Philadelphia, this does not appear to be the case. Although Southwest exerts considerable pressure on fares (note that its coefficient is very negative), America West possesses an even stronger effect on airline fares. Its presence on a route leads to a greater drop in prices than any of its competitors. Perhaps this indicates the existence of an “America West effect”, similar to the “Southwest effect” outlined in previous research studies. Whether this exists at other airports in the country has not yet been determined; still, we do note that America West has a rather clear effect on fares for flights flown from Philadelphia.

The third hypothesis explored the impact of non-discount airlines. Contrary to what we initially thought, the number of non-discount carriers operating flights to a specific destination has a positive impact on airfares. This explanatory variable does not

possess a great degree of statistical significance (its p-value is 0.1794), but the fact that it is positive was somewhat surprising. We had conjectured that, as the number of competitors increases, fares concomitantly drop. Based on the data gathered in our study, the presence of non-discount airlines on a particular Philadelphia-destination flight does not lead to lower fares.

We offer some brief remarks on the interpretation of the remaining explanatory variables. Mileage, as one would expect, is positively (and significantly) related to fares. The same holds true for flights involving a layover, as opposed to trips that are non-stop in nature. On the other hand, the population of the specific destination has little, if any, effect on fares. We suppose this may be the case due to the extreme variability of population values for the 130 destinations in our data set. New York, the largest city in our list, had a population in excess of 8,000,000, while several had populations just above 100,000 (those towards the tail end of the Table 2 list). Perhaps if we had separated our data into, say, “large”, “medium-sized” and “small” cities, we could have obtained a better idea of the effect of population on airfares.

Frequently, flights are divided into long-haul versus short-haul trips. The U.S. Department of Transportation’s (1999) definition of long-haul (short-haul) flights consists of any trip longer (shorter) than 750 miles. For purposes of this study, we shall observe the Department’s defining threshold. Complying with such a limit left us with 79 long-haul flights and 51 short-haul trips. The reason we are interested in this distance breakdown is to enhance our understanding of the relationship between airlines fares, low-cost carriers, and whether the particular flight was long-haul or short-haul.

The long-haul and short-haul model results are provided in the two remaining columns of Table 4. Considering first the long-haul case, we observe that its explanatory power is slightly above that provided by the full data set. Further, there exist many similarities between these results and those illustrated with the prior analysis. Four of the five low-cost carriers have negative coefficients, again supporting the notions in our first hypothesis. In fact, these four explanatory variables are each significant at the 1% level. Again, the lone exception is Frontier Airlines as its coefficient is positive, though relatively insignificant.

The presence of America West serving a specific destination continues to provide the most substantial downward pressure on airline fares. Southwest comes in at second place, similar to the results obtained in the complete data set. The number of non-discount carriers, as before, has a positive impact on fares. However, in this particular case, this variable now has a relatively high degree of statistical importance (significant at the 5% level).

As for the remaining explanatory variables, mileage continues to positively (and significantly) affect fares. The population variable is now negative, but not too significant, while the impact of having at least one layover on a flight now serves to reduce airline fares (in other words, non-stop long-haul flights are more expensive than their layover counterparts). However, this variable has limited predictive ability due to its rather large p-value.

With the short-haul flights, we note that two of the low-cost carriers (America West and Frontier) did not offer any flights from Philadelphia that were less than 750 miles in length; hence, these variables were excluded from analysis in this particular case.

The explanatory ability of these results falls slightly, but is still in the neighborhood of that obtained with the two previous cases.

The short-haul results would appear to confirm the first and second hypotheses outlined above. All three remaining low-cost carriers (AirTran, ATA and Southwest) have negative coefficients, suggesting that their presence on a given Philadelphia-destination pair leads to fare reduction. However, only the ATA variable has a rather acceptable degree of explanatory ability (p-value less than 0.10), although Southwest does come close (its p-value is 0.1156). The fact that the coefficient for the Southwest explanatory variable is the most negative of the low-cost carriers would substantiate the “Southwest effect”. The behavior of the non-discount airlines variable is interesting. Although it is negative (for the initial time in our modeling efforts), it possesses limited predictive power.

Mileage and the impact of having a layover produce similar results to those captured in the complete data set. However, we do observe that the population of a specific destination has a statistically strong, positive effect on fares. Short-haul flights to smaller cities would appear to be less costly than corresponding flight to larger centers.

SUMMARY AND CONCLUSIONS

Low-cost carriers are becoming increasingly popular with the flying public. Discounters garnered a 10% market share in 1992, but now account for 23% of all seats on domestic flights (Aguilar 2004). Their competitive impact on fares is also well-established. In this paper, we have developed a regression model to explore the impact of low-cost carriers on airfares when they compete with their non-discount counterparts in

serving particular destinations. As a case study, we chose flights originating from the Philadelphia International Airport to 130 separate domestic communities with populations in excess of 100,000. Our choice of Philadelphia was dictated by the fact that two low-cost carriers recently entered this airport. Consequently, our results ought to have some semblance of timeliness and relevance.

With the exception of Frontier Airlines, we observed that low-cost carriers do provide downward pressure on fares. There is indeed a “Southwest effect” in operation at Philadelphia, as the presence of this low-cost giant serving a specific destination resulted in lower fares. However, there is apparently an even stronger “America West” effect as its explanatory variable had a stronger impact in fare reduction.

A U.S. Department of Transportation study (1999) showed that for short-haul flights, it is not the number of competitors on a route that produces a downward effect on fares, but rather the type of competitor. We have determined that, using Philadelphia as a case study, long-haul flights also exhibit this phenomenon. Indeed, the presence of non-discount carriers does not competitively impact fares. We observed that the greater the number of non-discount airlines, the greater the fare since this variable had a positive coefficient in two of our three regression cases.

Admittedly, our results may underestimate the Southwest effect. In other words, the presence of Southwest operating flights to a certain destination may result in an even greater fare drop than that shown in our analysis. This may be the case since Southwest’s fares are not indicated on the Orbitz website. It is entirely possible that Southwest may charge an even lower fare than the lowest we observed when gathering our data from Orbitz. Further, Southwest is embarking on ambitious plans to begin flights (either direct

or via connecting service) from Philadelphia to seven additional cities included in our data set (Albuquerque, Boise, Corpus Christi, Hartford, Jacksonville, San Antonio and Tucson). This would increase Southwest service to 43 of the 130 destinations in our model. Such a bold, aggressive move may serve to further reduce fares on these flights, thus augmenting Southwest's pressure on airline fares.

Our findings ought to be important for airport authority officials, airline company management and passengers. Possible future directions in our research involve determining the extent of an "America West" effect at other airports. Does this solely exist in Philadelphia, or (as we currently suppose) does this particular airline apply downward pressure on fares at additional airports? Further, we would like to reevaluate our regression analysis at some future time, once Southwest and Frontier have become more firmly established in their Philadelphia operations. If we recreated our regression models, say, six months from now, do we draw the same set of conclusions as those currently obtained? Is there still a "Southwest effect"? Does America West continue to exert pressure on fares? Indeed, such analysis would help us to understand the longer-term effects of low-cost carrier entry into Philadelphia.

A related, though broad, topic for analysis involves the reactions of non-discount airlines to low-cost competitor entry. Obviously, these non-discount carriers are not oblivious to the competitive environment in which they operate. In fact, US Airways (the dominant Philadelphia carrier) has responded to the latest entries by Southwest and Frontier (Massey 2004; Adams 2004) in an attempt to provide more value to its customers. Beginning on May 2nd, 2004 (just one week prior to Southwest's arrival), US Airways added flights between Philadelphia and some destinations it had never

previously served. Coincidentally, each of these destinations was a city Southwest planned to serve! Moreover, US Airways indicated plans for a strategic shift in its operations by introducing more point-to-point flying, thus mimicking a policy currently used by Southwest. Indeed, it will be interesting to observe the competitive movements made by non-discount airlines at this airport (and others across the country) as they attempt to respond to the pressure provided with the entry of low-cost carriers.

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**Figure 1:
Scheduled PHL Domestic Enplanements**

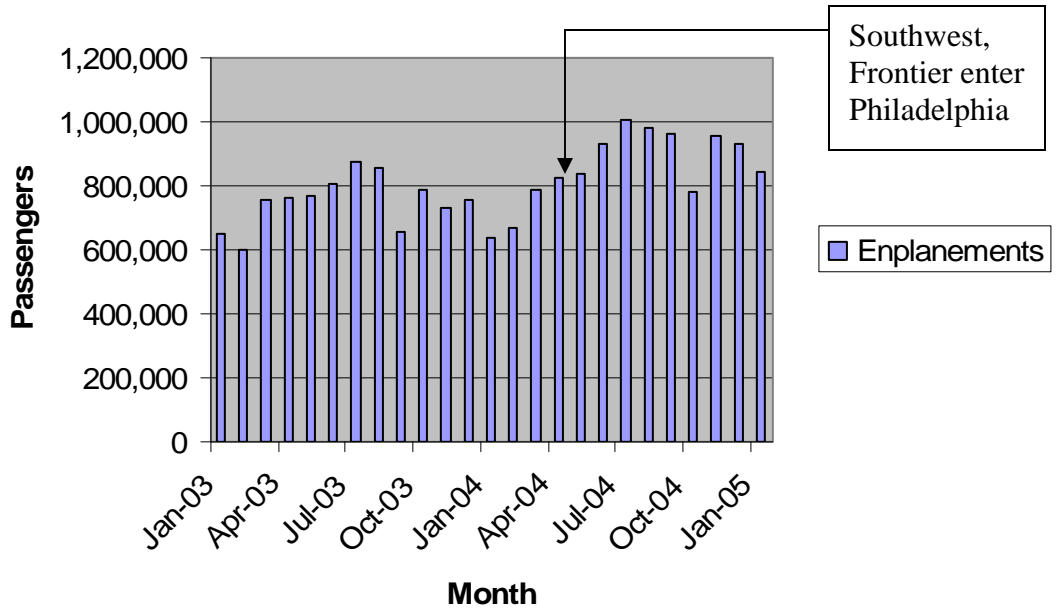


Table 1
List of Domestic Airlines Serving Philadelphia International Airport

1. AirTran
2. America West
3. American
4. ATA
5. Continental
6. Delta
7. Frontier
8. Midwest
9. Northwest
10. Southwest
11. United
12. US Airways
13. USA 3000

Table 2
List of Destinations

1.	New York				
2.	Los Angeles	45.	St. Louis	89.	Amarillo
3.	Chicago	46.	Wichita	90.	Providence
4.	Houston	47.	Santa Ana	91.	Oxnard, CA
5.	Phoenix	48.	Pittsburgh	92.	Dayton
6.	San Diego	49.	Cincinnati	93.	Huntsville
7.	Dallas	50.	Toledo	94.	Ontario, CA
8.	San Antonio	51.	Tampa	95.	Chattanooga
9.	Detroit	52.	Buffalo	96.	Fort Lauderdale
10.	San Jose	53.	Corpus Christi	97.	Springfield
11.	Indianapolis	54.	Raleigh	98.	Salinas, CA
12.	San Francisco	55.	Newark	99.	Tallahassee
13.	Jacksonville	56.	Lexington, KY	100.	Syracuse
14.	Columbus, OH	57.	Anchorage	101.	Brownsville, TX
15.	Austin	58.	Louisville, KY	102.	Eugene
16.	Baltimore	59.	St. Petersburg	103.	Savannah
17.	Memphis	60.	Bakersfield	104.	Flint
18.	Milwaukee	61.	Birmingham	105.	Sioux Falls
19.	Boston	62.	Norfolk	106.	New Haven
20.	Washington, DC	63.	Baton Rouge	107.	Topeka
21.	El Paso	64.	Lincoln, NE	108.	Evansville
22.	Seattle	65.	Greensboro	109.	Hartford
23.	Denver	66.	Rochester	110.	Fayetteville, NC
24.	Nashville	67.	Akron	111.	Cedar Rapids
25.	Charlotte	68.	Madison	112.	Lansing
26.	Portland, OR	69.	Fort Wayne	113.	Columbia, SC
27.	Oklahoma City	70.	Montgomery	114.	Abilene
28.	Tucson	71.	Shreveport	115.	Beaumont, TX
29.	New Orleans	72.	Lubbock	116.	Waco
30.	Las Vegas	73.	Mobile	117.	Peoria
31.	Cleveland	74.	Des Moines	118.	Springfield, IL
32.	Long Beach	75.	Grand Rapids	119.	Lafayette, LA
33.	Albuquerque	76.	Richmond, VA	120.	South Bend
34.	Kansas City	77.	Spokane	121.	Manchester, NH
35.	Fresno	78.	Augusta, GA	122.	Allentown
36.	Atlanta	79.	Modesto	123.	McAllen, TX
37.	Sacramento	80.	Orlando	124.	Wichita Falls, TX
38.	Oakland	81.	Boise	125.	Erie
39.	Tulsa	82.	Columbus, GA	126.	Green Bay
40.	Omaha	83.	Jackson, MS	127.	Cape Coral, FL
41.	Minneapolis	84.	Little Rock	128.	Pueblo, CA
42.	Honolulu	85.	Salt Lake City	129.	Burbank
43.	Miami	86.	Reno	130.	Athens, GA
44.	Colorado Springs	87.	Laredo		
		88.	Knoxville		

Table 3
Number of Destinations Served by Each Discount Airline

Airline	Number of Destinations
AirTran	32
America West	34
ATA	27
Frontier	25
Southwest	36

Table 4
Linear Regression Model Results

Variable	Original	Long-haul	Short-haul
Constant	142.97 *** (23.04)	199.91 *** (32.15)	126.06 *** (39.79)
Mileage	0.0693 *** (0.0093)	0.0631 *** (0.0116)	0.0741 ** (0.0345)
PopDest	0.0095 (0.0059)	-0.0036 (0.0137)	0.0183 *** (0.0061)
Stop	54.79 *** (13.19)	-2.80 (22.68)	84.21 *** (18.20)
AirTran	-28.33 ** (12.31)	-60.39 *** (20.81)	-11.49 (14.79)
America West	-79.73 *** (18.71)	-81.44 *** (19.73)	---
ATA	-30.15 ** (12.10)	-52.62 *** (18.72)	-30.48 * (17.29)
Frontier	6.66 (15.19)	4.70 (15.54)	---
Southwest	-50.72 *** (12.16)	-63.30 *** (14.77)	-35.82 (22.30)
Non-discount carriers	4.35 (3.22)	9.96 ** (4.11)	-0.0502 (4.9723)
R ²	0.5739	0.5925	0.5475
Significance levels: * p< 0.10 ** p< 0.05 *** p <.01			