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Transportation Research Forum

Hub Premiums In An Era of Low-Cost Carrier Competition And Financial Distress

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Contents

- ▶ Hub Premiums – Previous Research
- ▶ Hub Premiums in the Light of Recent Industry Trends
- ▶ Empirical Analysis & Preliminary Results



In a number of studies in the late 1980s and early 1990s, researchers have repeatedly proven the existence of hub premiums

Selected Examples

Previous Findings of Hub Premiums Research

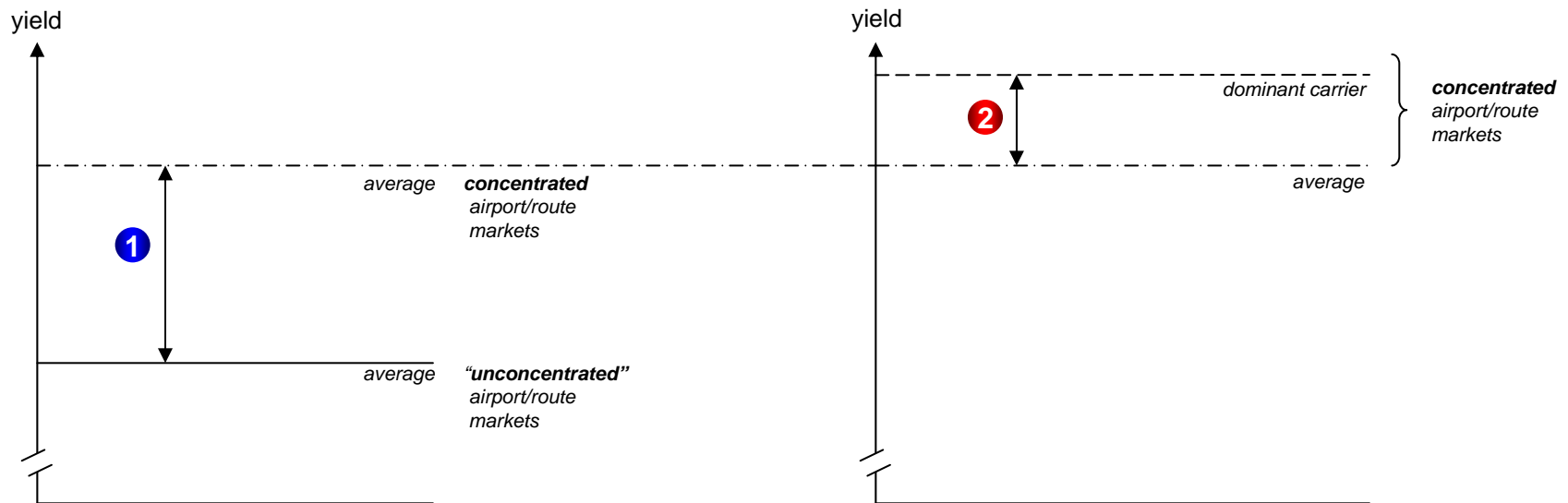
Estimated Hub Premiums

- ▶ **GAO (1989, 1993):**
 - “fares for travel originating at concentrated airports vs. fares for trips originating at unconcentrated airports” (1989) → + 27%
 - “fares for trips originating in Charlotte, a concentrated airport vs. fares at unconcentrated control airports” (1993) → + 70%
- ▶ **Borenstein (1989):**
 - “carrier with an airport enplanement share of 50% vs. direct competitors with only 10% of the traffic at the endpoints” → + 12%
 - “TWA yield/mile for flights to/from St. Louis vs. similar flights that did not originate or terminate in St. Louis” → + 81%
- ▶ **Dresner and Windle (1992):**
 - “hub premiums, as an effect of airport concentration” → + 1-2%

Hub premiums may be decomposed into market concentration and market power effects

Illustrative

Components of Hub Premiums



➔ **1** Market Concentration
• Airport
• Route

➔ **2** Market Power
• Airport
• Route

Throughout the 1990s, however, LCCs have increased their market shares and induced substantial fare decreases

Market Shares of Low-Cost Carriers¹⁾

1993	
United	21.2%
American	20.4%
Delta	17.4%
Northwest	12.2%
Continental	8.9%
USAir	7.4%
TWA	4.8%
Southwest	3.5%
America West	2.4%
Alaska	1.2%
Midwest Express	0.2%
Comair	0.1%
Atlantic	0.1%
Aloha	0.1%
Horizon	0.1%
Others	0.2%



2003	
American	18.6%
United	15.8%
Delta	15.1%
Northwest	10.6%
Continental	9.0%
Southwest	7.6%
US Airways	5.8%
America West	3.3%
Alaska	2.2%
ATA	1.9%
JetBlue	1.7%
AirTran	1.1%
Comair	0.7%
Spirit	0.7%
Frontier	0.7%
Others	5.2%

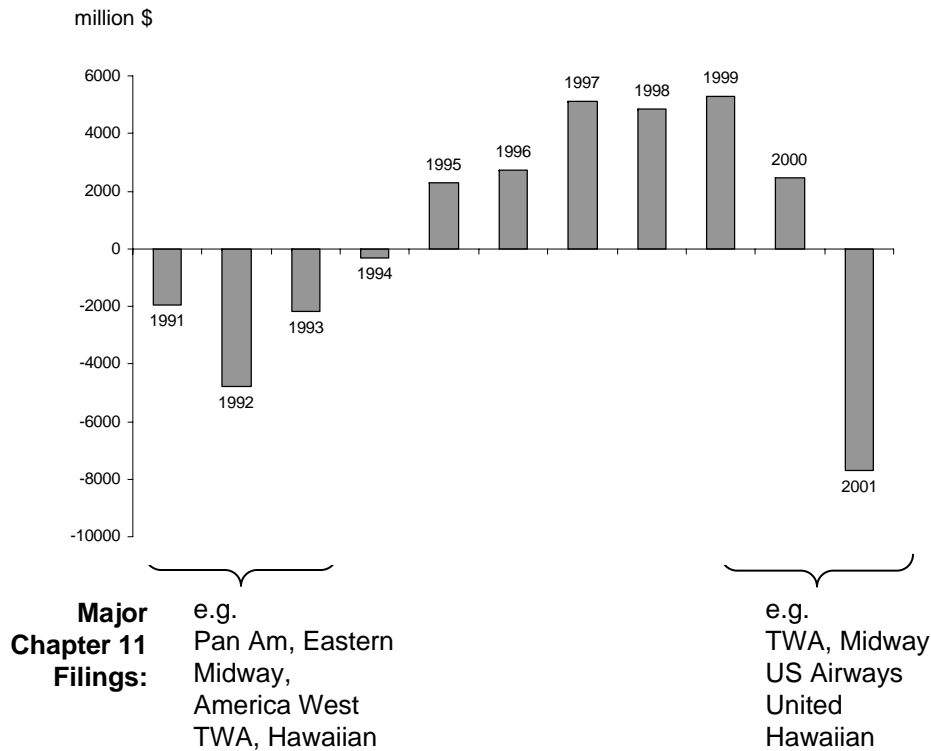


Comments
<p>Various studies have empirically analyzed the direct and indirect effect of low-cost carriers on fares:</p> <ul style="list-style-type: none"> ► Morrison (2001): Direct effect of Southwest Airlines: \$ -3.4 billion Effect of actual, adjacent and potential competition: \$ -9.5 billion ► Dresner, Lin and Windle (1996): Direct effect of Southwest Airlines: -53% yield reductions Effect on adjacent route markets: -8% to -45% yield reductions

(1) Standard & Poor's (2003), based on revenue passenger miles, data from U.S. Department of Transportation

While low-cost carriers have thrived, established airlines have been experiencing major financial distress

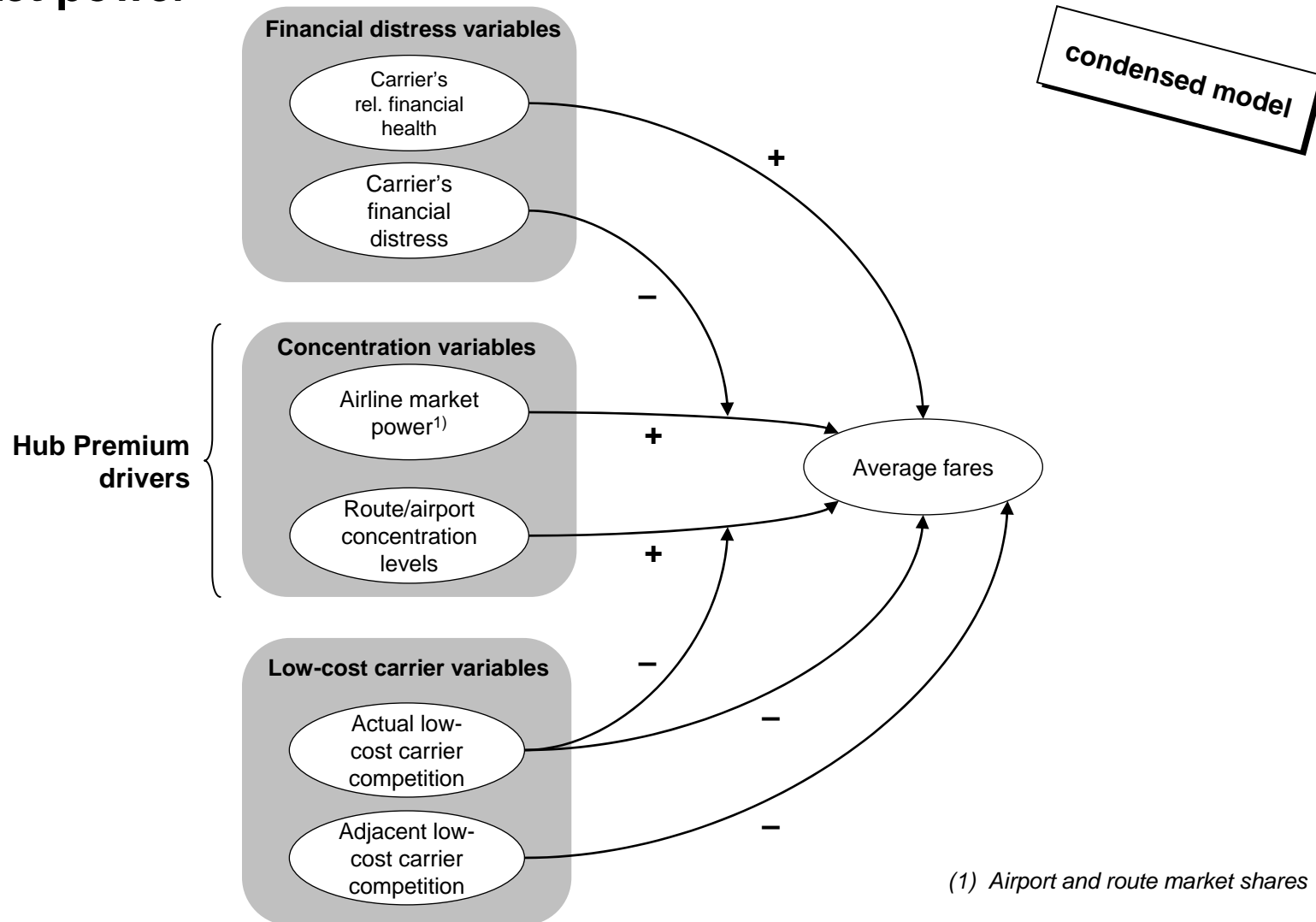
Industry Net Profit/Loss & Major Chapter 11 Filings



Comments
<ul style="list-style-type: none"> ▶ Financially distressed airlines typically scale back their operations (e.g. US Airways reduced # of Pittsburgh departures from 500 in 2001 to 400 in 2003) ▶ Borenstein and Rose (1995) demonstrated that: <ul style="list-style-type: none"> - Bankrupt airlines typically reduce their fares in the quarters before and after their Chapter 11 filing - Financially healthier competitors, in turn, typically increase their services and fares

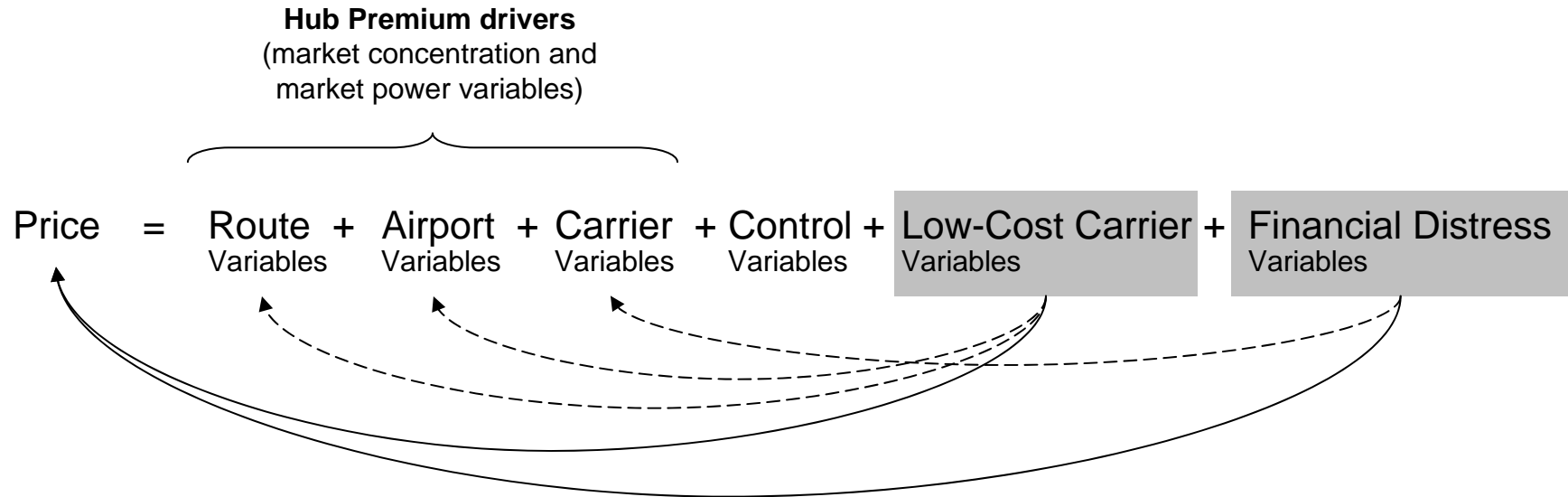
Source: ATA, ATA annual report 2002

Given these industry trends, it is questionable to what extent carriers are still able to capitalize on market concentration and market power



Our analysis is based on a price estimation equation suggesting direct and interaction effects of LCC competition and financial distress

Price Estimation Equation



← direct effects
← interaction effects

The base model consists of 25 variables and is estimated using data from the U.S. top 1000 domestic route markets in 1992, 1997, and 2002

Key Variables and Data

Key Variables

- ▶ **Hub premium variables**
 - Route HHI
 - Maximum Airport HHI
 - Maximum Airport Market Share
 - Route Market Share
- ▶ **Low-Cost Carrier variables**
 - LCC dummy variable
 - “LCC competitors for non-LCC carrier” dummy variable
 - “LCC competitors for LCC carrier” dummy variable
 - “Adjacent route markets with LCC presence” dummy variable
- ▶ **Financial distress variables**
 - Difference of a carrier’s and its route competitors’ Z scores
 - “Chapter 11 filing” dummy variable (used to model interaction effects only)

Data

- ▶ Quarterly data for 1992, 1997, and 2002
- ▶ 34,541 usable observations (out of a total 35,114 observations; one aggregated observation per carrier per route per quarter)
- ▶ Data sources: DOT DB 1A (10% ticket sample of all U.S. domestic passenger traffic) – top 1000 routes, DOT Form 41 Traffic, Form 41 Financial Data, (schedules B1, P12), Table T-1; ATA ; Bureau of Labor Statistics



In the preliminary regression analysis the hub premium, LCC and financial distress variables have the expected signs and are significant

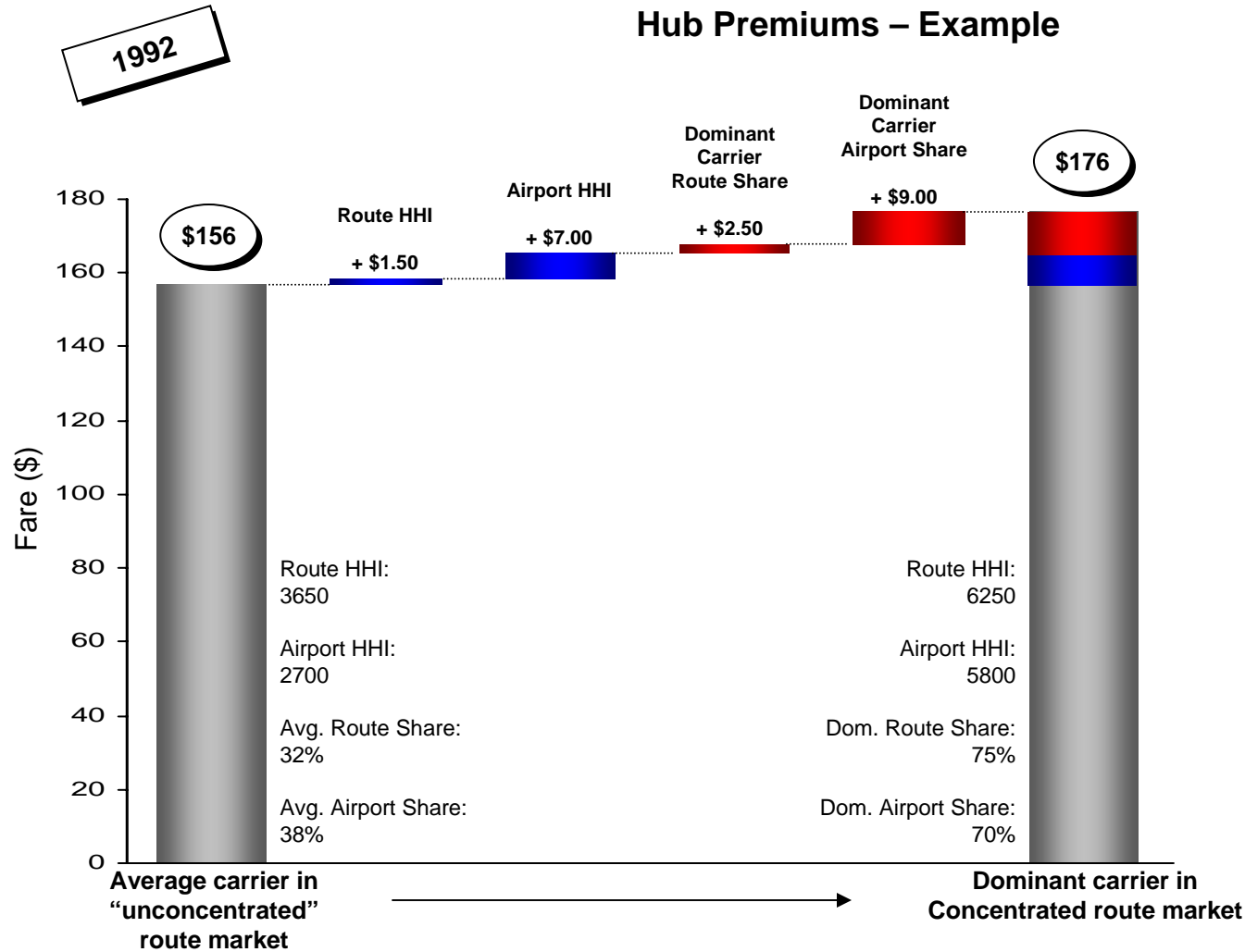
Excerpt		Variable	Coefficient ¹⁾	P> t
		Constant	-6.90	0.00
		Distance	0.40	0.00
		SlotRoute	0.11	0.00
		TouristRoute	-0.15	0.00
Market concentration	{	RouteHHI	0.04	0.00
		MaxAirportHHI	0.09	0.00
Market power	{	MaxAirportShare	0.07	0.00
		RouteShare	0.05	0.00
		Coupons	-0.17	0.00
		AirlinePass	-0.09	0.00
		Loadfactor	-0.04	0.08
		AirlineCost	0.03	0.01
		LCC	-0.37	0.00
		LCCCompForNonLCCs	-0.19	0.00
		LCCCompForLCCs	-0.03	0.00
		AltRouteLCC1M	-0.02	0.00
		ZScoreDiff	0.02	0.00
		IndustryCost	1.77	0.00
		1997	-0.30	0.00
		2002	-0.64	0.00

Comments
<ul style="list-style-type: none"> ▶ The dependent variable is “Fare” (all fares deflated to Q1 1992) ▶ The coefficients for all four hub premium driver variables are positive and significant supporting the contention that market concentration and market power increase fares ▶ The coefficients for the LCC variables are all negative and significant as expected ▶ The “ZScoreDiff” variable is positive and significant indicating that airlines that are financially healthier than their route competitors tend to charge higher fares

Number of observations 34541 Adj. R-squared 0.7162

(1) based on log-linear specification of the model

The empirical results show that both market power and market concentration lead to significant fare increases

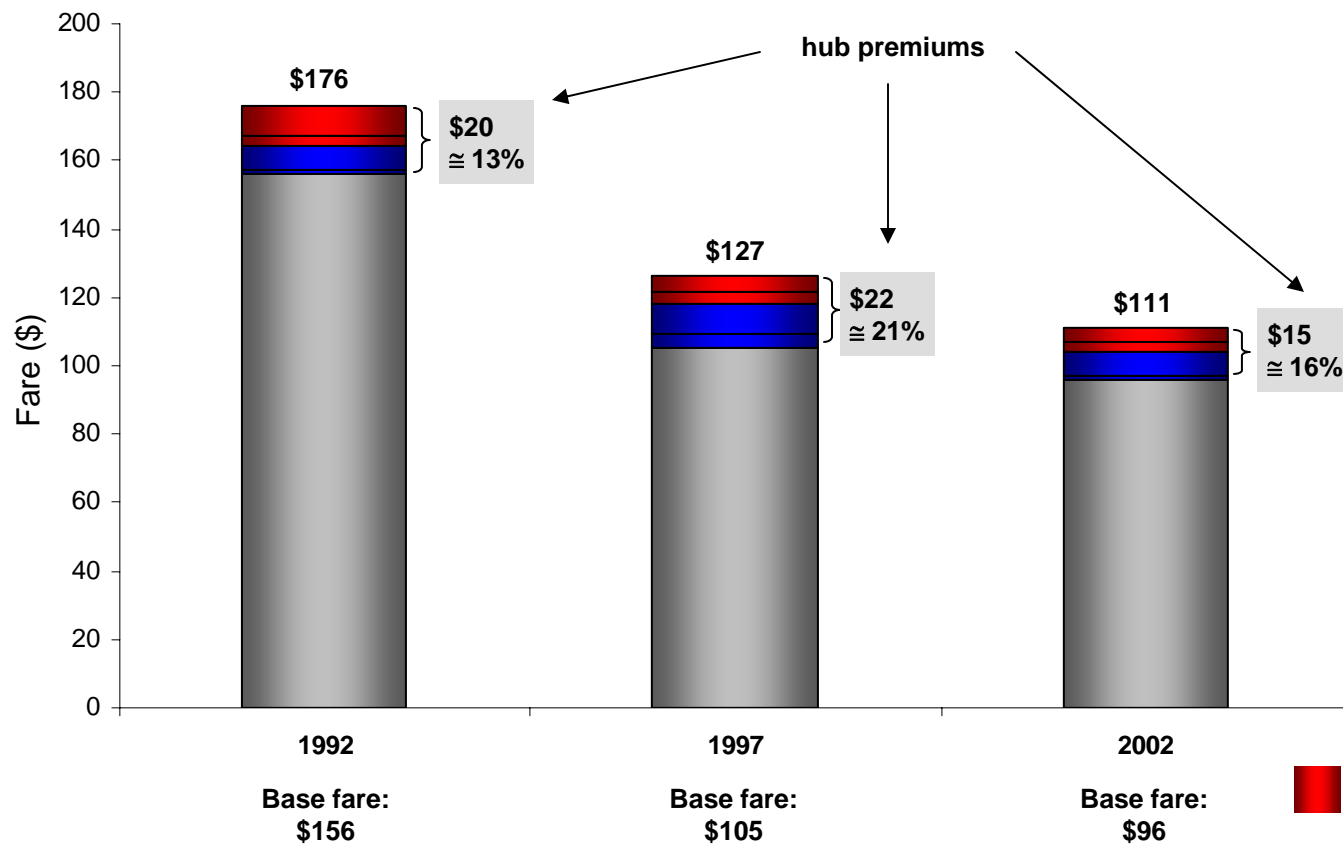


In this example, the **hub premium amounts to \$20 or 13% of the base fare** in an "unconcentrated" market

- 1** Market concentration leads to a price markup of \$8.50
- 2** Due to its **market power** the dominant carrier achieves a markup of an additional \$11.50

Hub premiums appear to vary over time – possibly as a function of the industry’s financial health

Hub Premiums Over Time

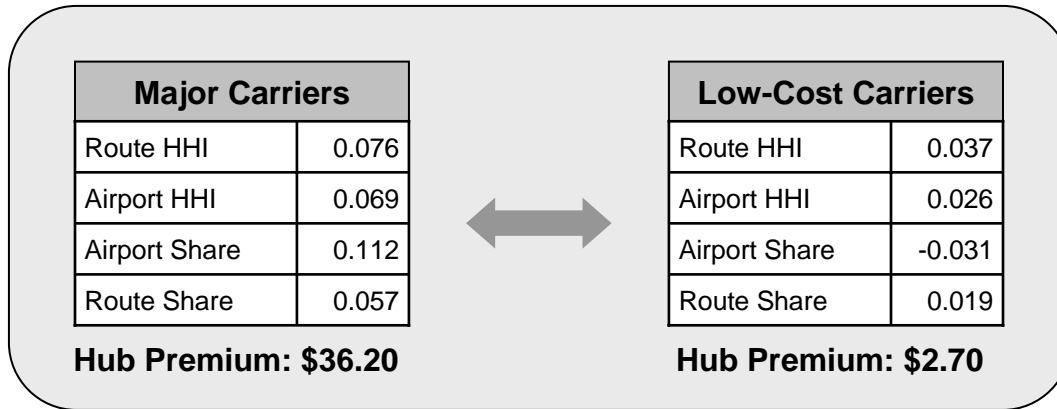


- ▶ Fares have decreased significantly over time
- ▶ Hub premiums were highest in 1997 which may be an indication that hub premiums are indeed contingent on the industry’s financial health

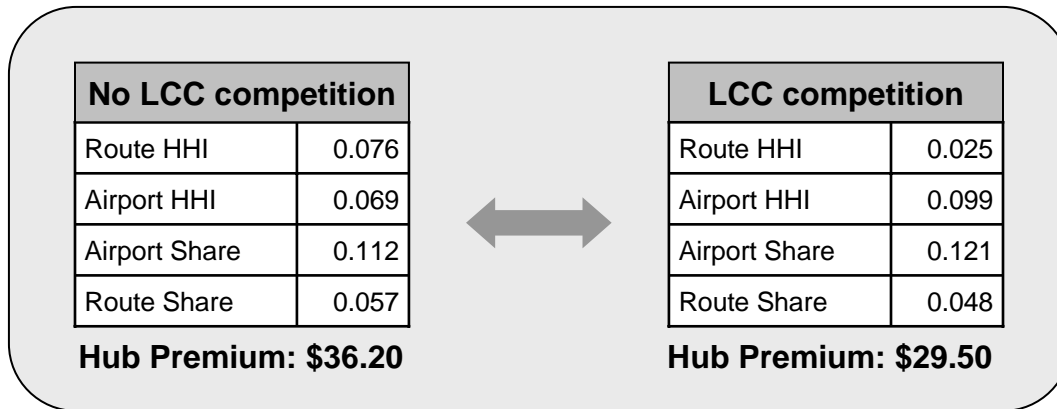
■ **Market power:** Airport share, Route share
■ **Market concentr.:** Airport HHI, Route HHI

Some preliminary tests also indicate that the presence of low-cost carriers has indeed reduced hub premiums

Hub Premiums And Low-Cost Carriers



- ▶ On average, hub premiums earned by low-cost carriers are **93% lower** than major carriers' hub premiums (when there is no direct LCC competition)



- ▶ On average, the major carriers' hub premiums are **18% lower** when there is low-cost carrier competition than when there is no LCC competition

Note: all coefficients significant at the less than 1% level; avg. hub premiums were obtained by changing power/concentration levels from 25th percentile to 75th percentile with all other variables held constant at their mean parameter values

In summary, LCCs and financial distress seem to have lowered hub premiums – further analyses will investigate these effects more closely

Summary and Outlook



So far, our results:

- ▶ reconfirm the existence of hub premiums (i.e. price markups related to market concentration and market power)
- ▶ demonstrate a decline of fares and variability of hub premiums between 1992 and 2002
- ▶ are an indication of the moderating effect of LCCs and financial distress on hub premiums



Our next steps include:

- ▶ a closer examination of the impact of LCCs and financial distress on hub premiums, most importantly an analysis of the hypothesized interaction effects
- ▶ a more detailed analysis of the changes of the regression results over time



We expect to find that:

- ▶ hub premiums are less of an issue today than they were in the earlier stages of hub premiums research and, therefore, do not warrant regulatory intervention
- ▶ hub premiums are likely to further decrease in the future as LCCs expand their operations and financial distress continues to reshape the industry