Are Airlines a Problem Market? A U.S. Perspective

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Conflicting history of U.S. airlines since deregulation in 1978

- Lots of entry and exit
- Declining real fares
- Significant economic losses in the 1980s and 2000s, small profits in the 1990s

BUT

- Concentration on many routes
- Airport dominance => Airport premia
- High-cost firms maintain high market shares
- Mergers increasing national concentration

Early research found market power from route and airport concentration

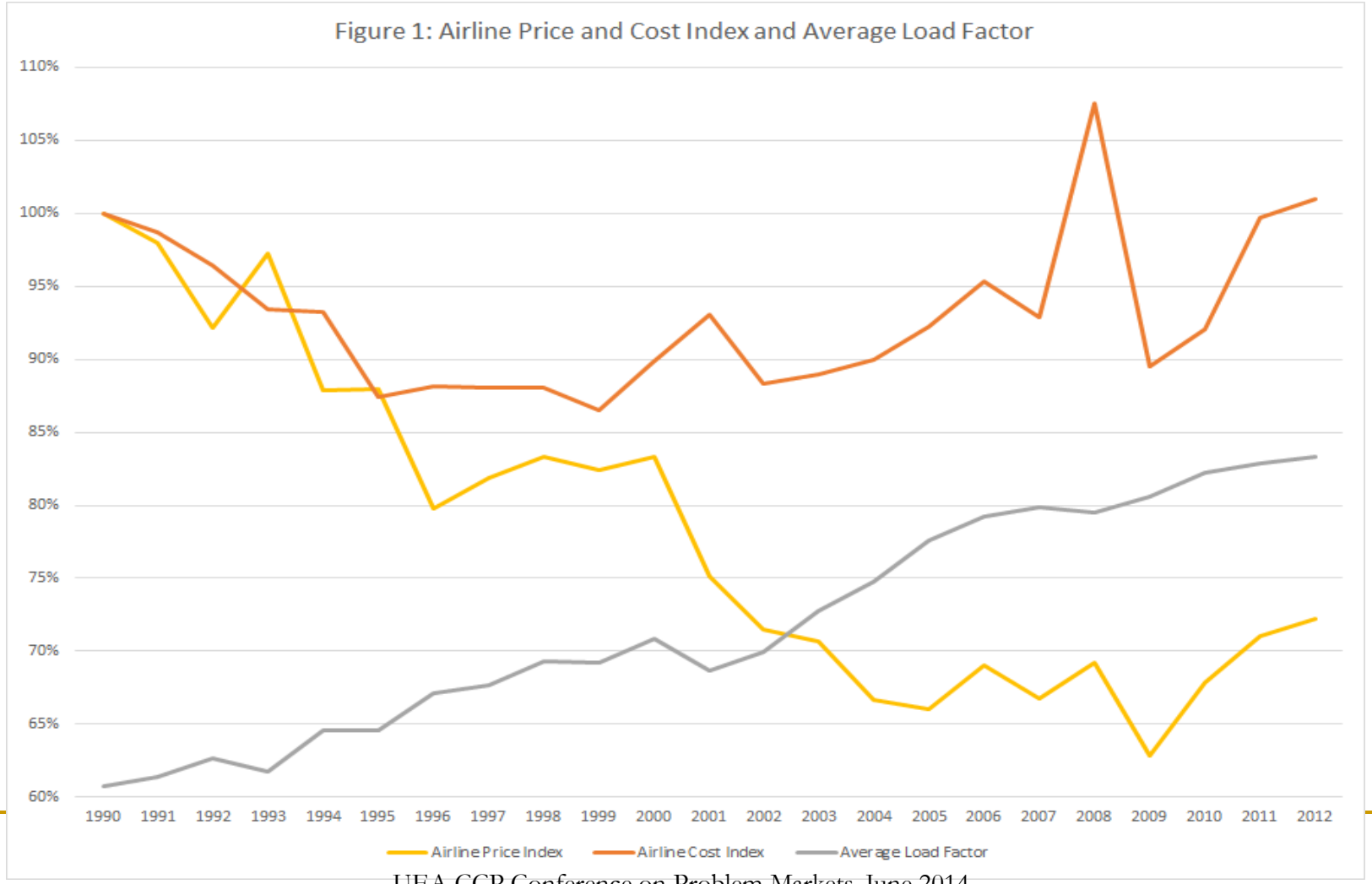
- Supported by Levine (1987) after he had been CEO of a startup airline
- Contestable airline markets rejected by numerous studies
- Market power associated with airport dominant position above and beyond route concentration or share
- Some finding of density economies
  - not finding of network scope economies

Three trends since the 1980s

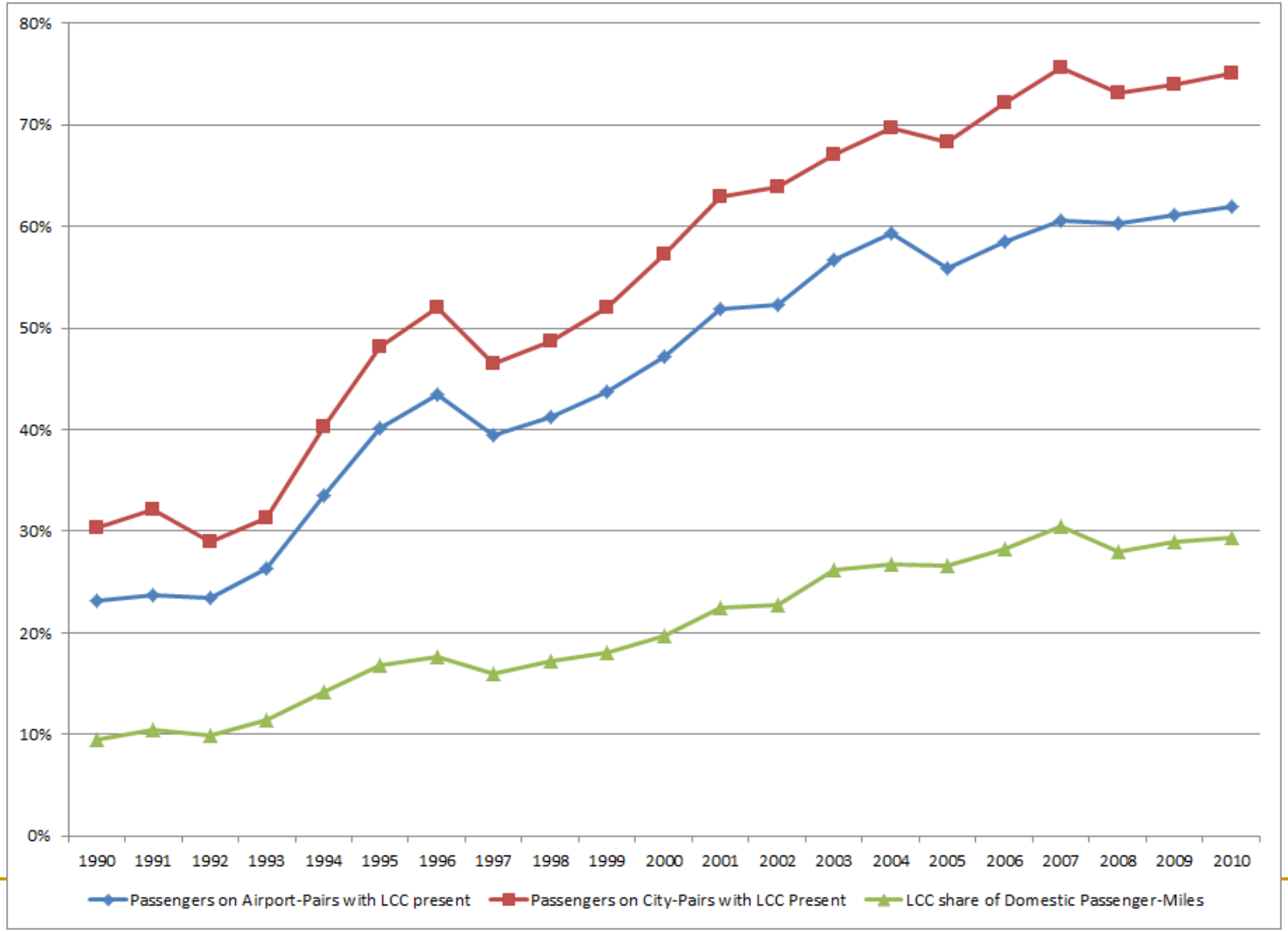
- Expansion and contraction of hub-and-spoke networks
- Steadily increasing load factors
- Expansion of low-cost carriers (LCCs)

- What explains the large decline in real price?
  - What's the role of changes in market power?
  - What does that suggest post-consolidation?
- I focus mostly on 1990-2010

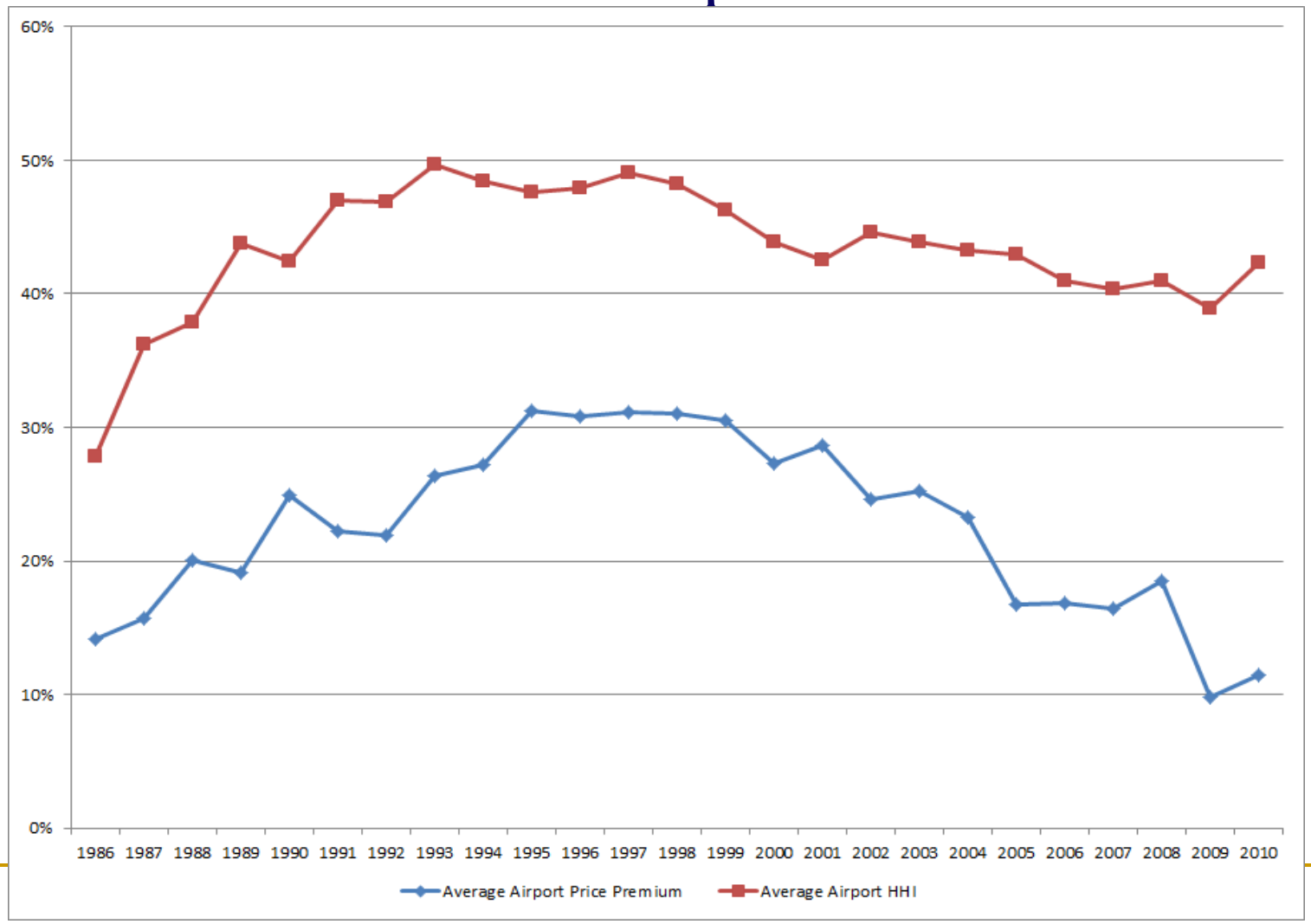
Changes in average price, operating cost and load factor since 1990



Market Impact of Low-Cost Carriers



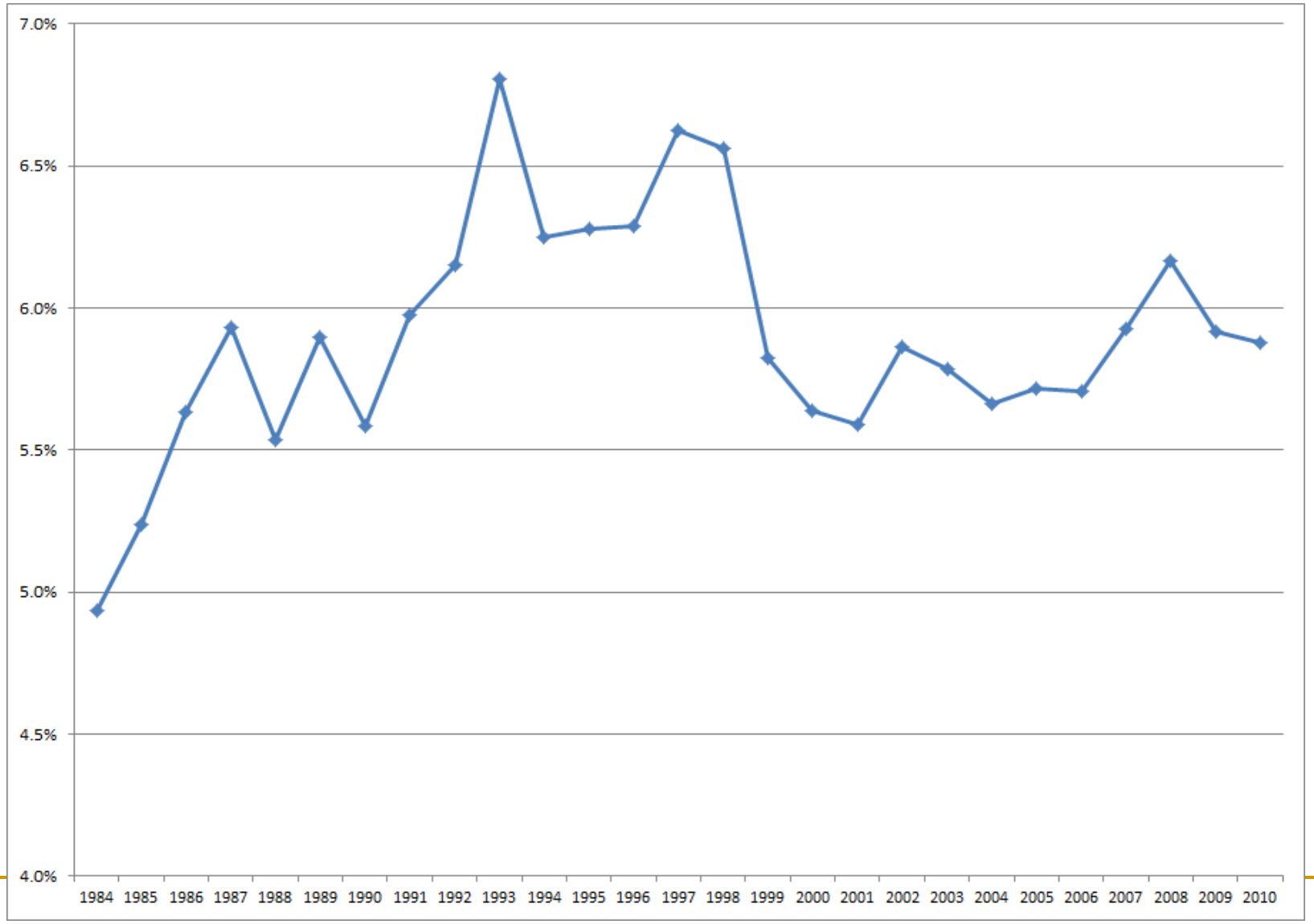
Concentration and price premia at 10 concentrated hub airports



"Share Gap"

- Example from Dallas/Ft.Worth (DFW)–Charlotte (CLT) route. US Airways (US) is dominant at CLT, America (AA) at DFW
- In 2010, on DFW-CLT, US got 65% of passengers whose trip originated at CLT, 38% of passengers who originated at DFW
  - American got 22% at CLT, 49% at DFW
- Share gap is seen in the industry as measure of regional advantage: advertising, marketing, loyalty programs
  - Frequent flyer and corporate discount programs

Share Gap over time



Share Gap is strongly associated with airport dominance and business travel

- First analysis in Borenstein, *Quarterly Journal of Economics*, 1991, using 1986 data
  - Differential share by point of ticket origination
    - as function of differential endpoint airport dominance and the business orientation of route
- Same analysis for 1984-2010 shows
  - Share gap a bit more associated with airport dominance and biz travel now than in 1990s
- Airline loyalty as strong as ever

Analyzing Airport Dominance Effect with Share Gap

- Differential share of passengers by endpoint
  - Logistic transformation due to limited range

$$dlgDirRtShr_{ijk} = ln[\frac{DirRtShr_{ijk}}{(1 - DirRtShr_{ijk})}] - ln[\frac{DirRtShr_{jik}}{(1 - DirRtShr_{jik})}]$$

- Function of differential own and competitor dominance on *other* routes from endpoints

$$dAptShr_{ijk} = AptShr_{ik} - AptShr_{jk}$$

$$dOthAptShr_{ijk} = \frac{\sum_{\forall m \neq k} RouteShr_{ijm} \cdot AptShr_{im}}{\sum_{\forall m \neq k} RouteShr_{ijm}} - \frac{\sum_{\forall m \neq k} RouteShr_{ijm} \cdot AptShr_{jm}}{\sum_{\forall m \neq k} RouteShr_{ijm}}$$

  - And interactions with *BizShare* on route

Dep Variable:	1984-2010 dlgDirRtShr	1984-1985 dlgDirRtShr	1986-1990 dlgDirRtShr	1991-1995 dlgDirRtShr	1996-2000 dlgDirRtShr	2001-2005 dlgDirRtShr	2006-2010 dlgDirRtShr
dAptShr	0.874***	0.317***	0.739***	0.914***	0.891***	0.906***	0.911***
	(0.0177)	(0.0613)	(0.0298)	(0.0305)	(0.0270)	(0.0178)	(0.0184)
dOthAptShr	-0.807***	-0.0987	-0.560***	-0.836***	-0.848***	-0.866***	-0.875***
	(0.0261)	(0.0673)	(0.0472)	(0.0390)	(0.0367)	(0.0272)	(0.0290)
Observations	254,027	12,822	41,336	41,552	48,388	54,073	55,856
R-squared	0.461	0.031	0.217	0.443	0.497	0.573	0.595

Dep Variable:	1984-2010 dlgDirRtShr	1984-1985 dlgDirRtShr	1986-1990 dlgDirRtShr	1991-1995 dlgDirRtShr	1996-2000 dlgDirRtShr	2001-2005 dlgDirRtShr	2006-2010 dlgDirRtShr
dAptShr	0.819***	0.154	0.695***	0.865***	0.834***	0.827***	0.857***
	(0.0319)	(0.113)	(0.0631)	(0.0715)	(0.0579)	(0.0300)	(0.0283)
dBizAptShr	0.0822**	0.235*	0.0541	0.0650	0.0855	0.124***	0.0916***
	(0.0365)	(0.134)	(0.0709)	(0.0754)	(0.0614)	(0.0356)	(0.0352)
dOthAptShr	-0.626***	0.117	-0.381***	-0.650***	-0.658***	-0.674***	-0.684***
	(0.0429)	(0.112)	(0.0936)	(0.0740)	(0.0718)	(0.0451)	(0.0401)
dBizOthAptShr	-0.293***	-0.319**	-0.262**	-0.285***	-0.305***	-0.309***	-0.339***
	(0.0508)	(0.132)	(0.107)	(0.0845)	(0.0788)	(0.0532)	(0.0516)
Observations	254,027	12,822	41,336	41,552	48,388	54,073	55,856
R-squared	0.465	0.038	0.219	0.446	0.501	0.580	0.601

Observations weighted by passengers . Robust standard errors, clustered by route, in parentheses
*** p<0.01, ** p<0.05, * p<0.1

- In 1984-85, much lower coefs and R-squared

So why have airline prices and hub airport premia fallen?

- Empirical analysis of markup equation. Optimizing firm sets $P = \frac{MC}{(1 + 1/\epsilon)}$
- MC would be SRMC if firms had complete pricing flexibility, but they don't. Also, we can't match quarterly data to very SR factors.
- ε is elasticity, incorporating the long-run NPV tradeoff between price and quantity, in market demand and in competitive interactions, including potential entrants

Implementing estimation of equilibrium markup equation

- Dependent variable is a measure of price
- RHS variables representing costs, quality, demand and market power
- Observation: yrQ2/route/carrier/dir-COP
  - Route is airport-pairs or city-pairs
  - Adjust for commuter partners
- Estimate for four 5-year epochs: 1991-95, 1996-2000, 2001-05, 2006-10
- Weighted by passengers, clustered on routes

Market Power Indicators Over Time

- Declining impact of Airport Dominance
  - In 1990s, effect is larger than effect of route share
  - By 2006-2010 effect is essentially zero
- Steady effect of Share Gap
  - Routes with large share gap have high prices after controlling for route share and route concentration
- Interpretation: Airport access/amenities advantages have declined (AIR21 regulation), but loyalty impact remains strong

Airline Prices 1990-2010

- Airline cost reductions, including increased load factors, offset fuel cost increases, but prices fell 37% by 2009
  - About 10% recovery by 2012
- Fares at dominated airports and on business routes declined relative to other routes, combined up to 20% drop by 2009
- But airline loyalty/marketing advantages remain very strong and strongly associated with business travel and dominated airports

Airline prices in the next decade

- Already rising before most recent mergers took effect, continuing since then
  - Much of that likely just rationalization from P<LRMC
- Share gap analysis suggests airlines have maintained strength from loyalty programs
- Leveraging loyalty programs seems likely to be more important with 4 major players left
  - Raising barriers to new entrants
  - Dividing markets, possibly softening competition