CHOOSING APPROPRIATE CONTROL GROUPS IN MERGER EVALUATIONS

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The Pros and Cons of Merger Control

INTRODUCTION

- Explore how the selection of the comparison group can affect the results of differences-in-differences analysis.

- Focus on Delta-Northwest merger:
  - Airline industry features 1,000s of routes that were unaffected by the merger.
  - Merger occurred at a time of recession – highlights importance of appropriate control group.

- Provide one example and discussion of possible future work.

IMPORTANCE OF MERGER RETROPECTIVES

- Empirical evidence on the price effects of mergers:

  - Can determine whether past antitrust enforcement was applied correctly

  - Can help regulators to develop more effective techniques to forecast the likely effects of mergers on competition

CHALLENGES IN MERGER RETROSPECTIVES

- It can be difficult to get appropriate data.

- Necessitates knowledge of what prices would have been had the merger not occurred.
  - Look at prices of merging firms before and after the merger.
  - Use a differences-in-differences approach.

AIRLINE MERGER RETROSPECTIVES

Paper	Merger Examined	Control Group	Results
Borenstein (1990)	TWA-Ozark and Northwest-Republic which occurred in 1986	Industry average prices for similar distance routes. -Number of competitors -Service out of hubs	Northwest-Republic merger led to a price increase.
Kim and Singal (1993)	14 airline mergers from 1985-1988	Routes on which neither of the merging firms operated of similar distances.	Prices increased by 10% on average.

DELTA-NORTHWEST MERGER

- In April 2008 Delta Air Lines and Northwest Airlines announced plans to merge.

  – $3.1 billion transaction – created the largest airline in the world

- Approved by the DOJ after a 6-month investigation.

- By January 2009 ground operations and reservations systems had been combined.

- In the next year the airlines combined terminals and gates at various airports and reward programs.

OTHER PRESSURES ON AIRFARE

- Decrease in demand due to recession:
  - High unemployment rates
  - Decrease in corporate budgets
  - Recession hit different communities to differing degrees

- Introduction of baggage fees and increase in ancillary fees.

DATA

- DB1B data: Passenger Origin-Destination Survey of the US DOT
  - 10% sample of all airline tickets
  - Quarterly from 2006-2011
  - Exclude Q2 2008-Q1 2009

- Official Airline Guide to identify airline schedules.

- Census data.

CONNECT ROUTES

- Focus of this paper are connecting routes.

- May be less harm on these routes because easier entry?
  - Fewer and fewer independent carriers.
  - Large potential for harm on routes with overlap:

Routes	4,222
Passengers	36 million
Volume of Commerce	$8 billion

DESCRIPTIVE STATISTICS

	All Routes	Affected by the Merger	Unaffected by the Merger
Average Fare	$257	$248	$270
Average Number of Miles	1,058	1,101	1,000
Average Number of Competitors	2.9	3.7	1.9
Average Number of LCCs	0.2	0.3	0.1
Average HHI	6,038	4,867	7,635
Average Endpoint Unemployment Rate	7.8%	7.9%	7.7%
Average Endpoint Population	1,637,874	1,657,204	1,611,531
Number of Routes	7,320	4,222	3,098
Number of Passengers	16,822,929	13,660,845	3,162,078

REGRESSION ANALYSIS

$$ln(Price)_{qm} = a + b*overlap\_pre_m*post_q + c*avg\_pop_{qm} + d*avg\_unemp_{qm} + r + t$$

| Variables	Coefficient
Merger Effect	0.04* (0.005)
Simulated HHI	
Average Population	$-3.09*10^{-6}$* ($5.79*10^{-7}$)
Average Unemployment	-5. 21* (1.29)
Observations	111,792

- Price effect of the merger is about 4% on connecting routes.
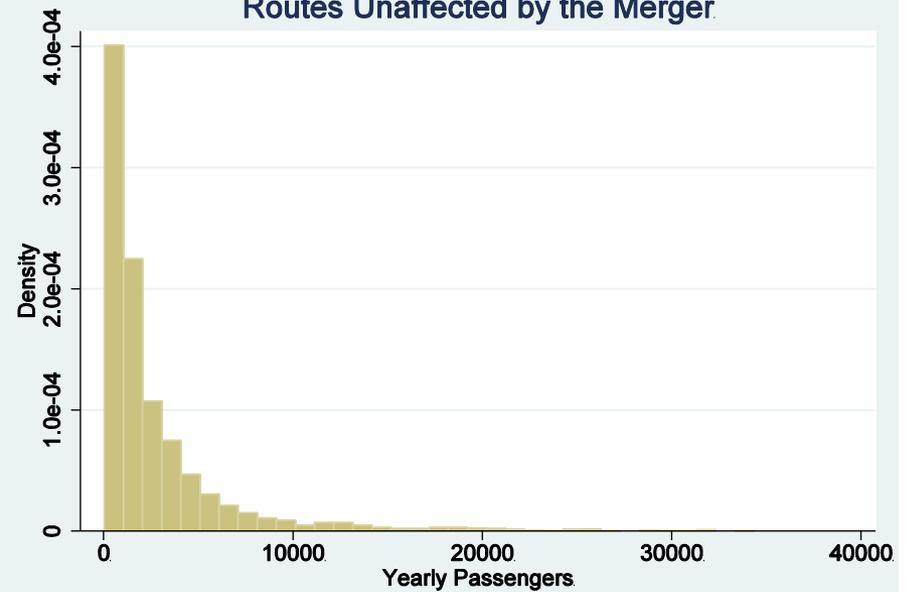
EFFECT OF THE MERGER BY ROUTE SIZE

Merger Effect Variables for:	
Routes with < 2,000 Passengers	0.03* (0.006)
Routes with 2,001-4,000 Passengers	0.03* (0.006)
Routes with 4,001-10,000 Passengers	0.04* (0.006)
Routes with 10,000 + Passengers	0.06* (0.005)
Average Population	$-3.269*10^{-6}$* $(1.38*10^{-7})$
Average Unemployment	-6. 05* (1.31)
Observations	111,792

ONE DIFFERENCE IN TREATED AND CONTROL ROUTES
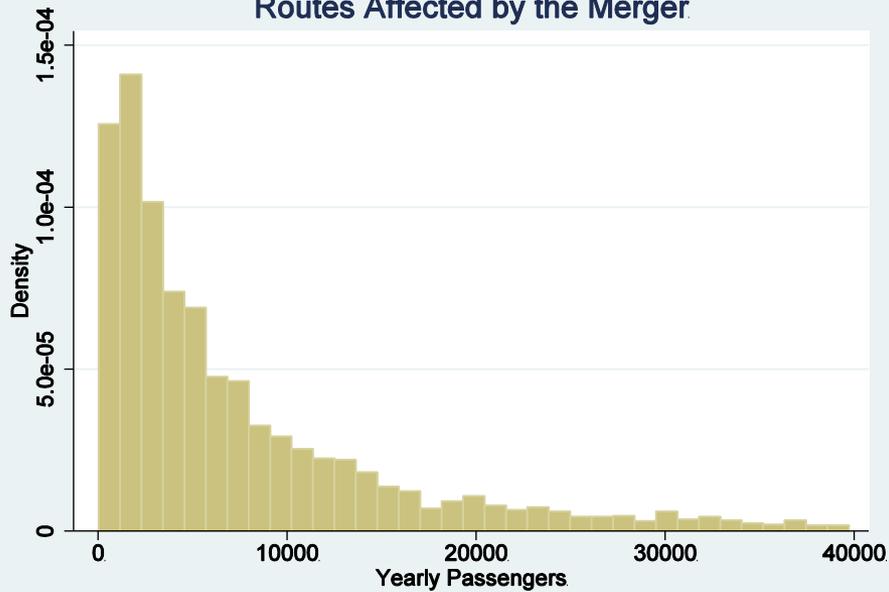
PRICE CHANGES IN BY ROUTE SIZE

Size of Route (Yearly Passengers)	Affected by the Merger		Unaffected by the Merger	
	% Change Price	# of Routes	% Change Price	# of Routes
0-2,000	-1.0%	1,094	-4.8%	2,026
2,000-4,000	-1.0%	1,155	-2.3%	690
4,001-10,000	-0.5%	878	-0.0%	244
10,001+	+1.7%	1,095	+1.1%	138
All	**0.0%**	**4,222**	**-3.2%**	**3,098**

REGRESSION RESULTS WITH DIFFERENT SET OF CONTROL ROUTES

Route Size: More than 10,000 Passengers

	Control Group: All	Control Group: Similar Number of Passengers
Overlap	0.064* (0.003)	-0.002 (0.011)
Observations	67,088	19,728

DIFF-N-DIFF WITH BEST MATCH CONTROL ROUTE

- Design a control group of routes based on the number of passengers pre-merger.
  - For each treated route find a route from those not affected by the merger that is most similar in terms of yearly passengers.

	Coefficient
Overlap	0.01* (0.004)
Simulated HHI	
Observations	128,672

OTHER FACTORS THAT MAY AFFECT CHOICE OF CONTROL ROUTE

- Levels of fares
- Pre-merger trends in fares
- Number of competitors, number of LCCs
- Initial concentration level
- Demographic characteristics
- Number of passengers

FUTURE WORK

- Matching estimators where control routes are selected on the basis of multiple characteristics.
    - Can incorporate endogenous outcomes.
    - However, can be sensitive to the number of controls that are selected.

- Construct synthetic routes, which are weighted averages of all available routes
    - Weights are selected so that the synthetic route most closely resembles the treated route.