

The Impact of Hub Dominance and Airport Access on Entry in the US Airline Industry

Martin Dresner, Robert Windle and Yuliang Yao

GARS – Hamburg, Germany

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Agenda

- Introduction
- Route Entry Logit Model
- Airport Entry Model
- Model Reconciliation and Conclusions

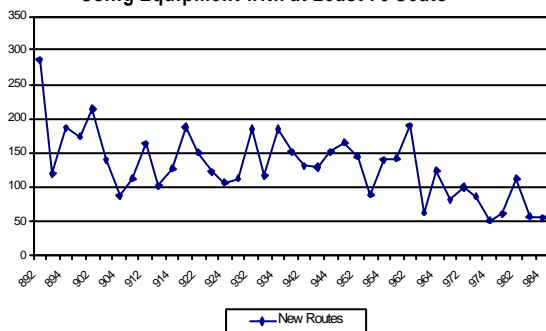
Introduction

- US Department of Transportation findings - airline prices in real terms are 33 percent lower than 20 years ago.
- However, concerns remain over the failure of new entrant carriers and impediments to new entry.

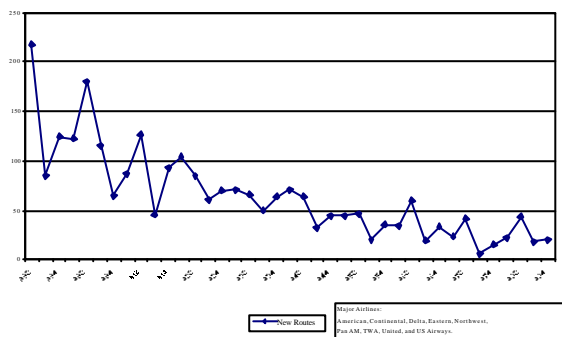
Introduction

- Our data show that new entries onto routes declined significantly during the 1990s.

Number of New Routes Served by Carriers Using Equipment with at Least 70 Seats

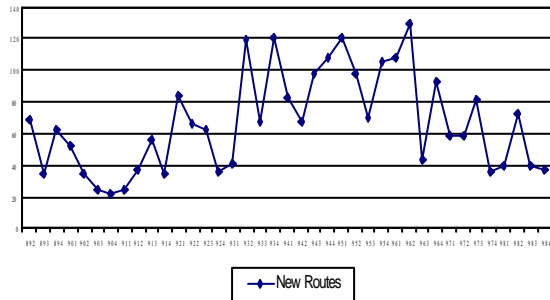


Number of New Routes Served by Major Legacy Carriers Using Equipment with at Least 70 Seats

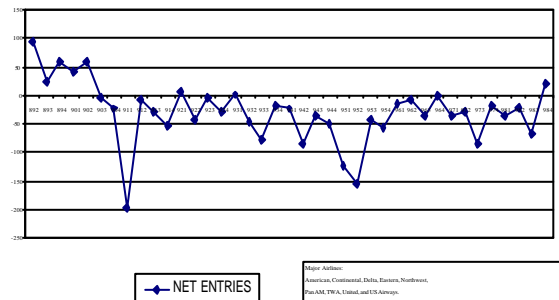


Major Airlines:
American, Continental, Delta, Eastern, Northwest,
Pan AM, TWA, United, and US Airways.

Number of New Routes Served by Non-Major Carriers Using Equipment with at Least 70 Seats

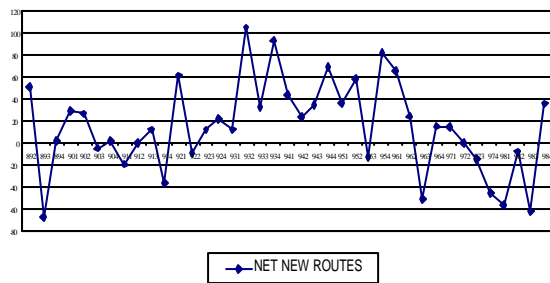


Number of Net new Routes Served by Major Legacy Carriers Using Equipment with at Least 70 Seats



Major Airlines:
American, Continental, Delta, Eastern, Northwest,
PanAm, TWA, United, and US Airways

Number of Net New Routes Served by Non-Major Carriers Using Equipment with at Least 70 Seats



Introduction

- Potential barriers cited by the Department of Transportation arise from: Computer reservation systems, frequent-flyer programs, travel agent commission overrides, predatory behavior by airlines, economies of scale in operations, and external airport constraints (e.g., environmental regulations).

Route Entry – Logit Model

- We examine the impact of 3 potential barriers on Route Entry:
 - Slot Controls
 - Gate Constraints
 - Gate Utilization During Peak Periods

Logit Model: Route Entry

- Entry = f (Entry Barriers, Other Route Characteristics, Entrant Characteristics)
- Entrant Characteristics - Not significant and dropped from model.

Logit Model - Data

- Collected data on all entries onto the top 500 US air routes from the 3rd quarter of 1996 to the 2nd quarter of 1997.
- Entries: All new non-stop services involving average fleet size of at least 70 seats (58 entries).

Logit Model – RHS Variables

- Lagged Yield: Average revenue per mile for all passengers on a route in the quarter prior to the year of our dataset.
- Slot Controls: Dummy variable for the routes with at least 1 endpoint at one of the four slot-controlled airports.

Logit Model – RHS Variables

- Gate Constraints: Dummy variable for the routes with at least 1 endpoint at one of the six gate-constrained airports identified in a 1996 survey by the US General Accounting Office of airline executives. Gate constrained airports had a high percentage of exclusive use gates.

Logit Model – RHS Variables

- Gate Usage During Peak Periods: Derived from a 1998 study by the Airports Council International - North America. The airports reported on the usage rates of gates during their busiest 3 hour period in their busiest month. We used the highest of the two percentages for each route endpoint in our sample.

Logit Model – RHS Variables

- Coupons – The average number of flight coupons (a proxy for flight segments) flown on a route in the quarter before the dataset.
- Missing Congestion Dummy – A dummy variable inserted when the peak utilization rate was not available at either endpoints.

Results – Logit Model

Variable	Estimated Coefficient
Constant	-2.64*
Lagged Yield	0.60^
Coupons/Flight Segments	0.96
Slot Controls	-0.60
Peak Gate Utilization	-2.76*
Gate Constraints (Exclusive Use Gates)	-0.13
Missing Congestion Dummy	-1.64*

* Significant at .01, ^ Significant at .1.

Results - Sensitivity Analysis

Gate Constraints	Slot Controls	Peak Gate Use	Coupons	Predicted Probability Of Entry
0	0	.53	1	.208
1	0	.53	1	.217
0	1	.53	1	.152
0	0	.95	1	.057
0	0	.53	2	.407
1	1	.95	1	.042

Model: Airport Entry

- Examined entry from the airport, rather than the route, perspective.
- Looked at how airport leasing arrangements, hub dominance, and other variables have affected entry.

Model: Airport Entry

- Entry = f (Total Gates, Exclusive Use Gates, Slot Controls, Gate Congestion, Airport Dominance, Population, Personal Income, Year Dummy)
- Gathered all entry data for 1992 and 1998 from 46 airports for which we could obtain gate leasing data.

Variables: Airport Entry

- Entry - Total number of new direct services.
- Total Gates - Total number of gates.
- Exclusive Use Gates - Total number of exclusive use gates.
- Slot Control - Dummy variable if the airport was slot controlled.
- Airport Dominance - Enplaned passenger share of largest carrier.

Variables: Airport Entry

- Gate Congestion – Gates/Passenger
- Population - Number of people in the metropolitan area.
- Personal Income - Average per capita income in the metropolitan area.
- Year Dummy - 0 for 1992, 1 for 1998.

Results: Airport Entry

Variable	All Entries	Majors	Southwest	Other Carriers
Total Gates	0.41*	0.16*	0.05	0.33*
Exclusive Use Gates	6.05	-1.61	2.53	7.27
Slot Controls	-16.39~	1.81	-54.11*	-20.24*
Gates/Passenger	-1.54*	-0.69^	-0.62~	-1.26*
Dominance	-22.72^	-1.95	-19.34^	-19.44~
Year Dummy	-27.77*	-19.73*	5.36	-19.30*

Significance: * = .01, ^ = .05, ~ = .10

Reconciling the Results

- Exclusive use gates do not appear to deter entry (holds for both models).
- Gate utilization deters entry (logit model) but there are more entries at airports with higher gate utilization (airport model).
- Hub dominance deters entry (airport model).
- Higher yields encourage entry (logit model).

Conclusions

- **We have more work to do!**
- The leasing arrangement for gates at airports does not seem to affect entry.
- Airlines appear to be rational in choosing routes to enter – i.e., tend to enter routes with higher yields not dominated by other carriers.