

# The Effect of the Internet on Performance and Quality: Evidence from the Airline Industry

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- Information is crucial for efficient markets. Particularly, Internet reduces search costs and leads firms to set lower prices







# Mean Scheduled Flight Duration (1990 - 2007)









# Main Data Sources

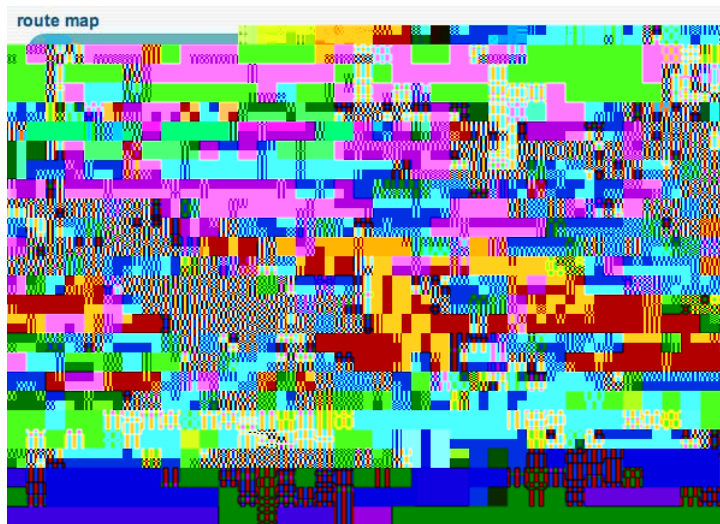
- On-time performance data - flight level data that include scheduled and actual flight times and information on carrier, origin, destination and aircraft type
- Internet usage data across US MSAs for 1997, 1998, 2000, 2001, 2003 and 2007
- Origin and destination price data - to compute 1) average fare and 2) the distribution of passengers' origin airport

We exploit three main sources of variation to identify the effect of the Internet on scheduled and actual flight times:

- 1 Differences in Internet penetration over time
- 2 Differences in Internet penetration across the US
- 3 Differences in the competitive level across markets

# Internet Measure

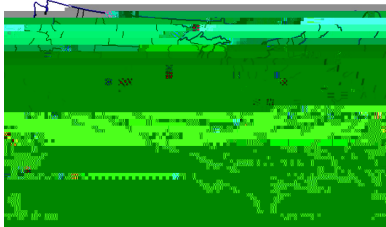
How to measure Internet usage on Delta's Flight from Atlanta to Denver?



# Internet - Stylized Example

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Delta's Flight from Atlanta to Denver



Origin	Passenger Share	Internet
Atlanta	18%	40%
Philadelphia	8%	50%
Boston	8%	60%
Orlando	8%	20%
Miami	8%	20%
Denver	50%	50%
Weighted Average		43.4%

The basic framework is a panel data fixed-effects regression

$$\text{Duration}_{fijt} = \beta_1 \ln_{ijt} + \beta_2 \text{HHI}_{jt} + \beta_3 \ln_{jt} \text{HHI}_{jt} + \beta_4 \ln(\text{Fare}_{ijt}) \\ + \gamma_c X_{fijt}^c + \alpha_j + \alpha_{acft} + \alpha_{it} + \alpha_{ki} + \mu_{fijt}$$

flight  $f$  by airline  $i$  on directional segment  $j$  on day  $t$

- $X_{fijt}^c$  - congestion controls (# of flights)
- $\alpha_j$  - directional airport-pair (flight distance and direction)
- $\alpha_{acft}$  - type of aircraft (speed, fuel-efficiency)
- $\alpha_{it}$  - carrier-day (differences across airlines' scheduling decisions)
- $\alpha_{ki}$  - origin-carrier (number and location of gates)

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Two features strengthen this identification strategy:

Different competition levels across flight segments originating from the same airport

Flights departing from the same airport carry passengers who began their journey at different airports/MSAs



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We do not find the same effect of the Internet in markets with low-cost-carriers

# How Internet and Flight Delays Related?

As Internet use increases { price competition ensues and product quality will

- Improve because: 1. passengers using the Internet can compare flight delays across airlines; 2. scheduled times are longer
- Worsen because firms compete vigorously at the price dimension at the expense of the less salient measures of product quality
- Which effect dominates?
- Does competition mitigate or exacerbate the net effect?

# Dependent Variables - Arrival Delays



