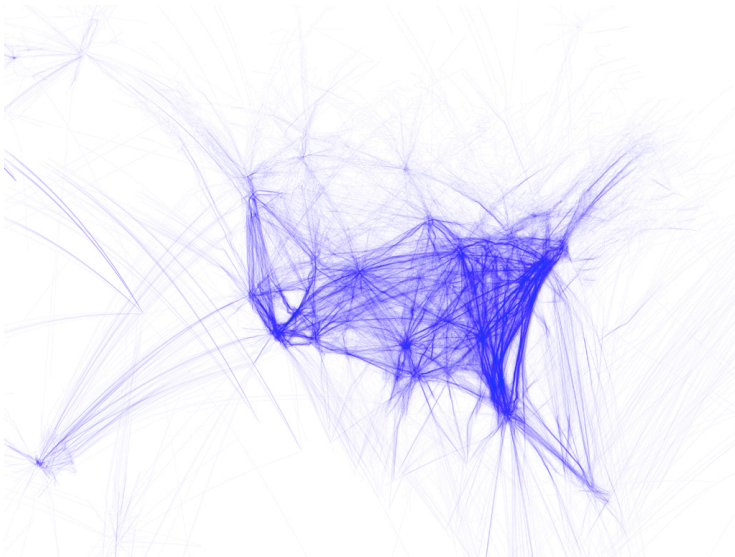


Project 2: The Plight of the Late Flight

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- Question of Interest
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Overview

- Data: Bureau of Transportation Statistics (BTS)
- Last 25 years
- 30 Unique carriers
- 376 Unique origins



Question of Interest

Are there any airlines that have shown consistent improvement in delays, across the entire country, over the 25 years of flight data?



How do we define "improvement" in delay?

- Improvement is defined as negative change in delay time, where delay can be measured using the following metrics:
 - Arrival delay
 - What customers care about
 - OR
 - Carrier + Late Aircraft delays
 - What carriers are able to control
- Overall improvement metric = Median change in mean delay



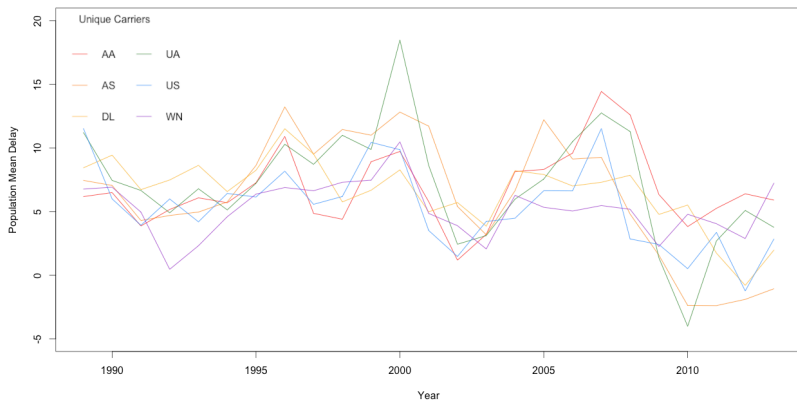
Narrowing Scope

- Ran all airlines and years
- Only kept airlines with 10+ years of service
 - 10+ is enough to discern a pattern
- Aggregating to create yearly averages
 - Average over seasonal effects to compare year to year

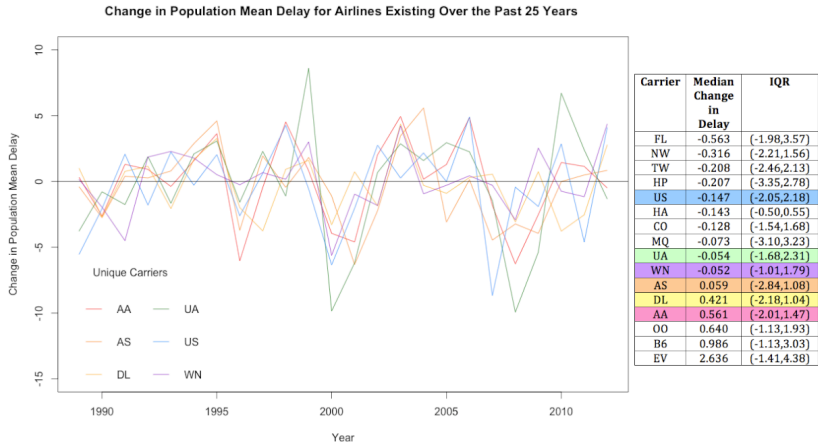


Population-Based Findings

Population Mean Delay for Airlines Existing Over the Past 25 Years



Population-Based Findings





Sample-based Findings

- 1 Stratify by unique carrier
- 2 Stratify by year (1989-2013)
- 3 Stratify by origin airport size
(as determined by flight traffic volume)
 - Proportional sample from strata based on number of flights



Sample Frame

Assumption: Due to coordination of air traffic control efforts, flights originating from airports of similar traffic volume would have similarities in delay patterns

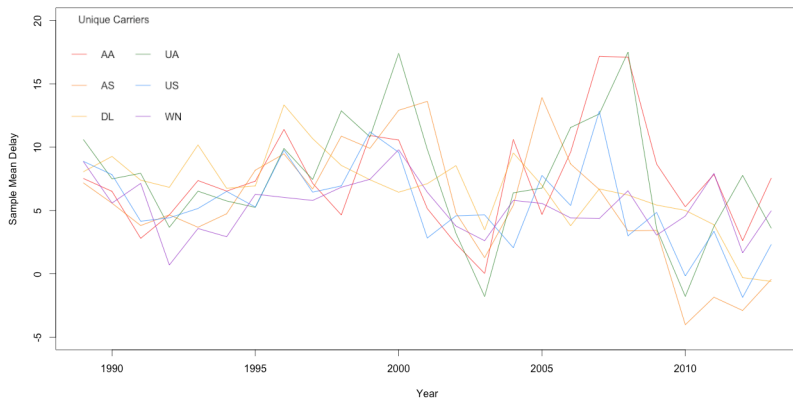
- Found traffic volume for each origin over 25 years
- Found average traffic volume
- Ordered and stratified based on size
 - Create subsets of carriers
 - Used *%in%* when filtering



Findings

Findings

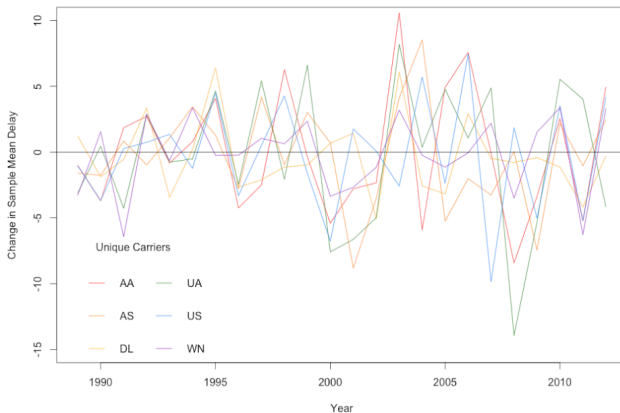
Sample Mean Delay for Airlines Existing Over the Past 25 Years



Findings

Findings

Change in Sample Mean Delay for Airlines Existing Over the Past 25 Years

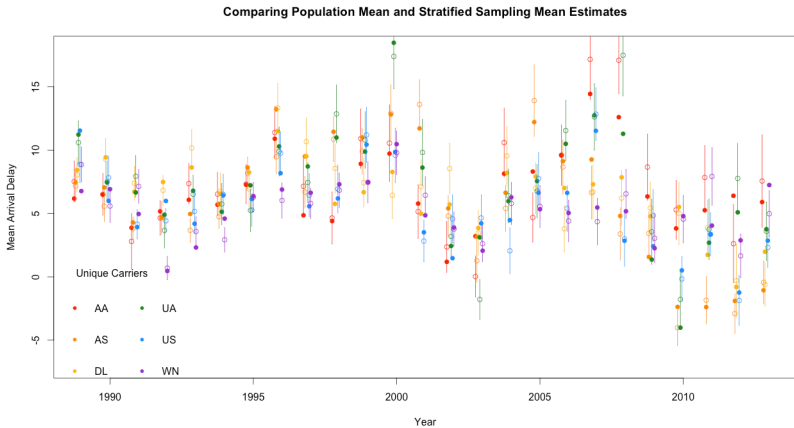


Carrier	Median Change in Delay	IQR
MQ	-1.688	(-3.85, 8.35)
TW	-1.212	(-2.86, 1.23)
CO	-1.155	(-2.31, 2.28)
FL	-1.073	(-3.79, 5.45)
DL	-0.679	(-2.23, 0.81)
AA	-0.595	(-3.46, 3.06)
AS	-0.463	(-2.21, 2.25)
NW	-0.218	(-2.33, 2.94)
B6	-0.178	(-4.39, 8.11)
WN	-0.145	(-1.54, 2.23)
UA	-0.066	(-4.19, 4.68)
US	0.171	(-2.78, 2.27)
HP	0.702	(-3.90, 3.66)
HA	0.864	(-0.47, 1.11)
OO	1.478	(-2.76, 2.66)
EV	2.878	(-4.35, 6.33)



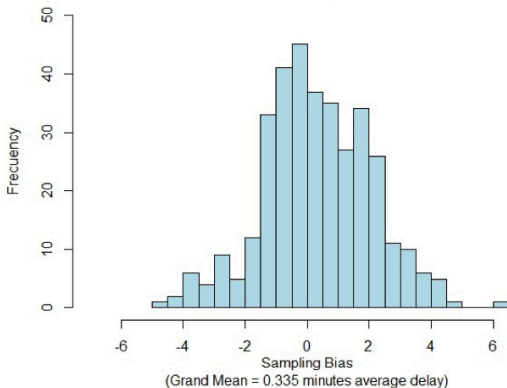
Sampling Performance

Sampling Performance: 76% Coverage



Bias

**Frequency Distribution of Sampling Bias
for Mean Arrival Delay per Year per Airline**



The "Simple" Answer





Cognitive Time vs Computational Time





Data Visualization



Google? Which airline is sexy?