Why New York City Subway Delays Don't Affect All Riders Equally
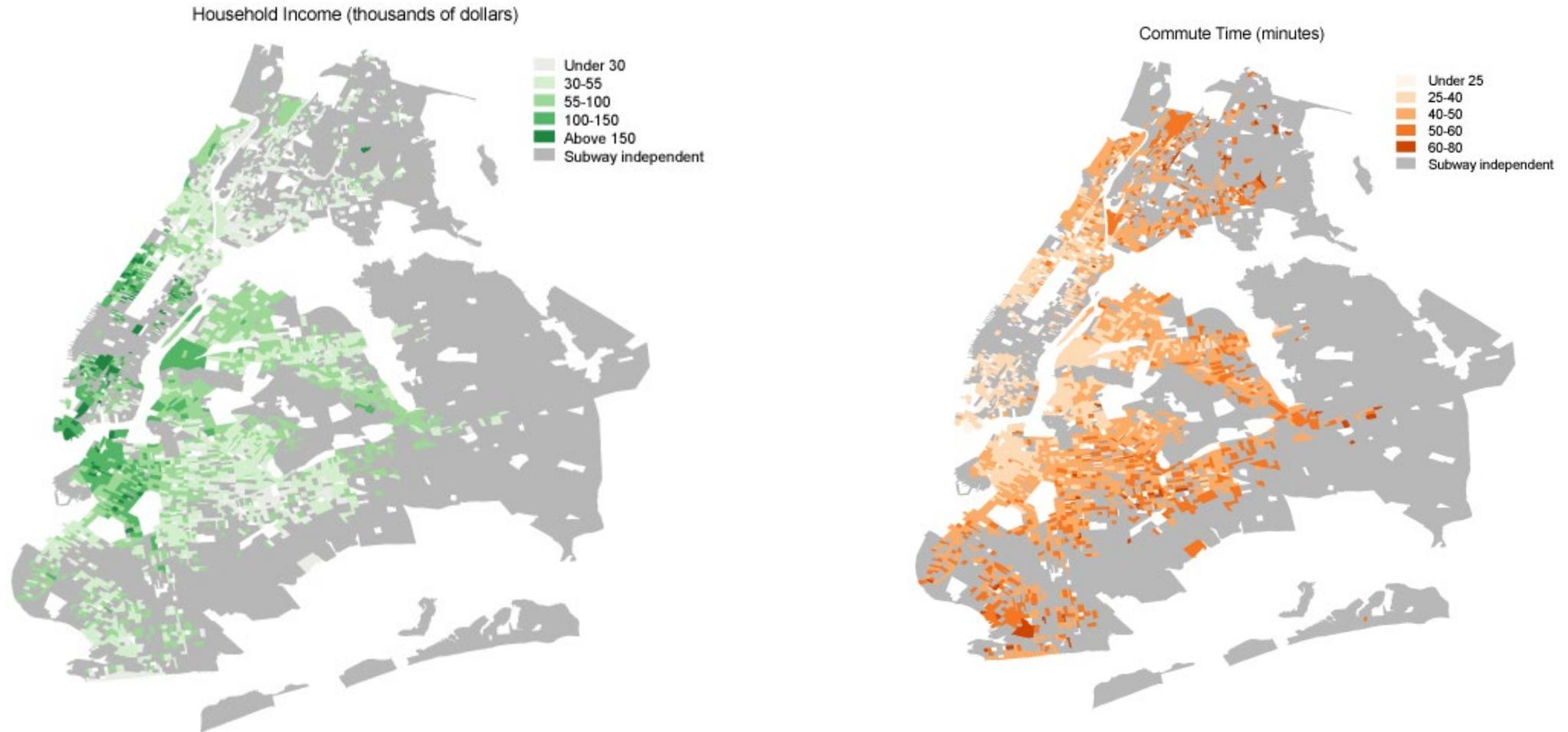
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Motivation

- Quality of subway an increasingly salient issue for New Yorkers

- Half of all New Yorkers in Manhattan, Brooklyn, the Bronx and Queens take the subway to work

- Subway riders are widely distributed across the city and across the income distribution.

- However, commute duration is more sensitive to income for subway riders than for people who walk or take taxis or buses

Richer Areas of NYC Have Lower Commute Times

Household Income (thousands of dollars)

Under 30
30-55
55-100
100-150
Above 150
Subway independent

Commute Time (minutes)

Under 25
25-40
40-50
50-60
60-80
Subway independent

- All data from 2012-2016 American Community Survey
- Grayed out areas are places where most people don't use the subway to get to work

Income a More Powerful Predictor of Commute Time Among Subway Riders
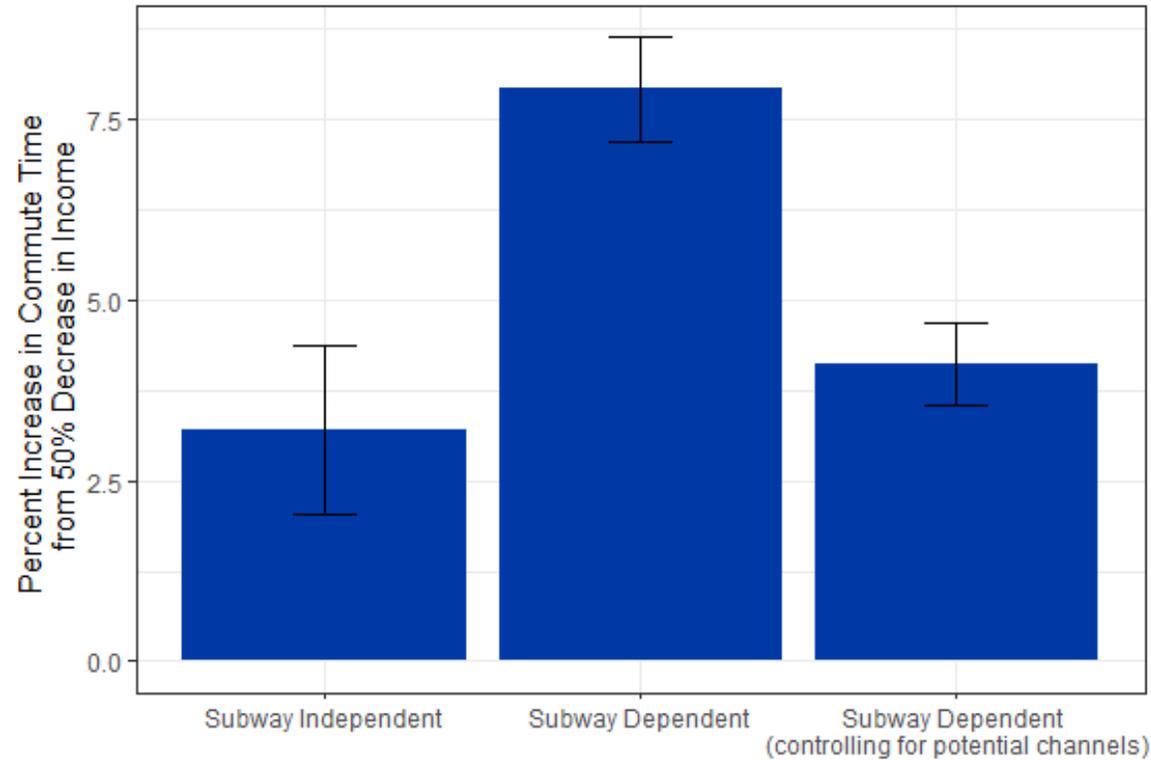
- Data from 2012-2016 ACS and authors' calculations.
- Tick marks show statistical uncertainty in estimated relationship

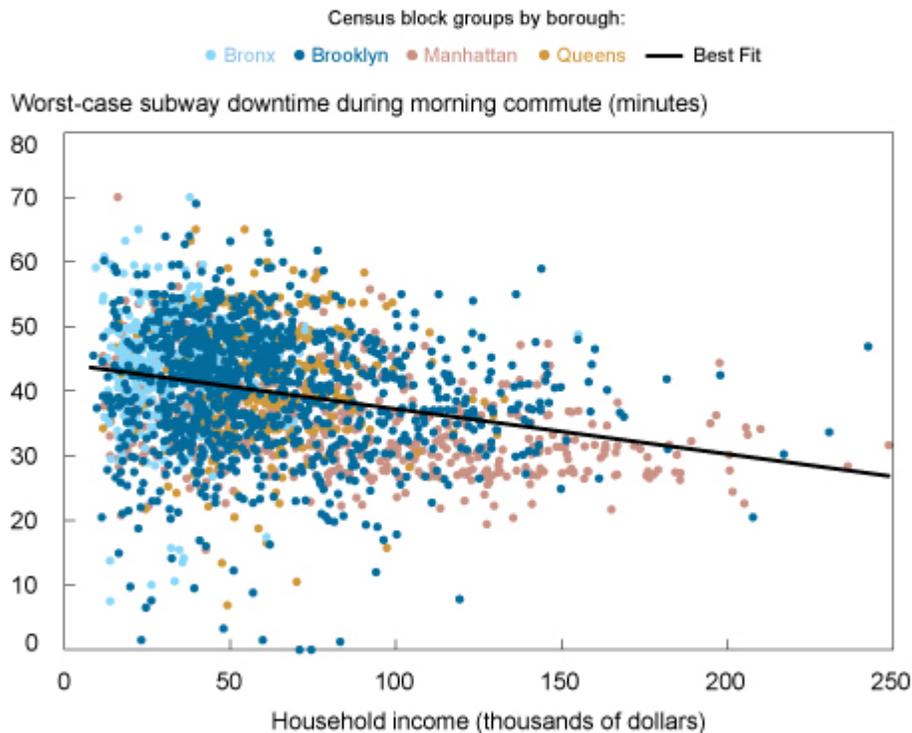# Income a More Powerful Predictor of Commute Time Among Subway Riders (II)

- Subway dependent places have a much stronger relationship between income and commute length than subway independent places.

- This difference disappears if you control for
  - distance to Manhattan
  - number of nearby subway lines, and
  - number of nearby subway stations.

- Consistent with subway access being an expensive good that is better provided in richer neighborhoods.

Subway Delays and Income

- People might plan their commutes around the maximum time it takes to get to work rather than average time, since lateness may have significant consequences.

- The further that people live from work, the more chances to encounter delays.

- Therefore, people living on the outskirts – who tend to be lower income – may be disproportionately affected by delays.

Subway Downtime Disproportionately Affects the Poor

Duration of Worst-Case Downtime Declines as Household Income Rises

Census block groups by borough:
• Bronx • Brooklyn • Manhattan • Queens — Best Fit

Worst-case subway downtime during morning commute (minutes)

Household income (thousands of dollars)

Sources: 2012-16 American Community Survey Five-Year Estimates; Metropolitan Transit Authority; authors' calculations.

- We collected 4 months' worth of real-time data on subway downtime in NYC by scraping MTA website.

- We simulated the worst-case subway downtime that people living in different neighborhoods of New York encountered if they were taking the subway to Manhattan.

- The neighborhoods with the worst case subway downtime are disproportionately populated by the poor.

Concluding Thoughts

- We have shown that the poor bear the brunt of subways getting worse as they live in the areas with lowest subway access.

- The poor may also be less flexible in limiting damage from subway delays (e.g. by getting a taxi).

- Long subway delays mean people risk losing pay, or even jobs.

- Long commutes decrease amount of time people have to take care of their health, their children and to invest in their skills.