



**The Block Center for Technology and Society  
Future of Work Initiative**

<https://www.cmu.edu/block-center/>

Using New Transportation Options to Drive  
Low-Income Citizens to Greater Success

**Lee Branstetter and Beibei Li**

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# Ever since the 1965 Watts Riots, experts have recognized the persistent problem of “spatial mismatch” in American cities...

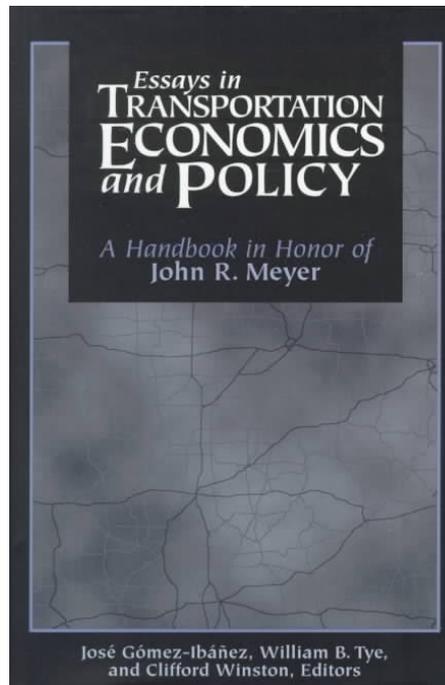
- The McCone Commission concluded that lack of jobs and inadequate transportation to jobs played a large role in creating the conditions that led to urban unrest.
- In 1968, John Meyer concluded that “post-war changes in urban structure and urban transportation...have caused a relative deterioration in the access to opportunities, if not in the actual mobility of the poor”
- Nearly 50 years later, this is *still* an issue confronting American metro regions.
- But from an economics perspective there are still a number of open questions...



Los Angeles, August 1965



Former CIA Director  
John McCone



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# The problem for economists...

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**Imagine an isolated community...**



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# On the periphery of a major city...



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**Which is suddenly linked to the core by a new mass transit system...**



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## Workers can change location in ways that complicate causal inference...

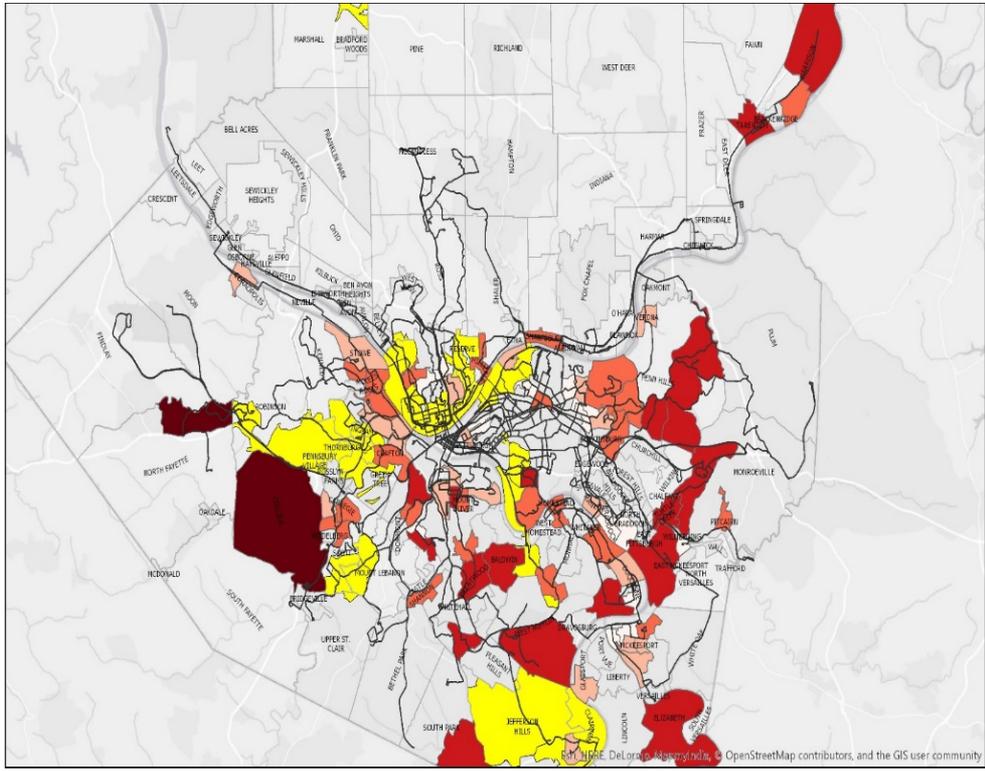
- Rapid mass transit makes the island a more attractive place to live...
- So, better educated/more motivated workers move in, and use the new mass transit link to commute to the urban core.
- The original residents are pushed into other neighborhoods as rents rise.
- And we can infer relatively little about the impact of better transportation links on the employment prospects of the original residents.
- To figure out the real impact, we need a randomized controlled trial (RCT). Those are hard to come by in transportation economics.

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## Traditional transportation technologies have significant drawbacks...

- Low-income populations (and the jobs appropriate for their skill levels) have shifted from the urban core to to the urban periphery.
- Expansion of conventional fixed route mass transit is expensive for society, time-consuming, and an inefficient way to move small numbers of people around the urban periphery...

# Pittsburgh's mass transit system does not work well for everyone



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## Traditional transportation technologies have significant drawbacks...

- Low-income populations (and the jobs appropriate for their skill levels) have shifted from the urban core to to the urban periphery.
- Expansion of conventional fixed route mass transit is expensive for society, time-consuming, and an inefficient way to move small numbers of people around the urban periphery...
- But personal cars are expensive for users and sit idle 95% of the time...
- Efforts to deal with spatial mismatch have made little headway in the face of these shortcomings.

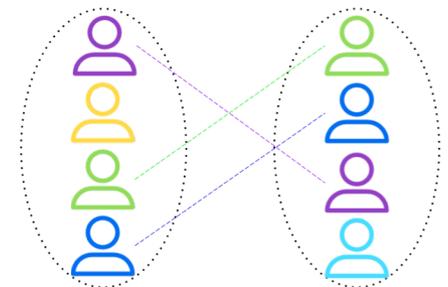
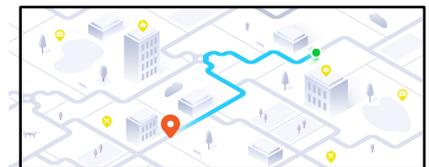


# And a host of other smartphone-activated new flexible transportation options...



# Increasingly, researchers have access to new means of mobility measurement...

- Widespread diffusion of smartphones, even among the urban poor...
- Allow low-income residents to access new transportation options and synergistically combine them with existing mass transit.
- The GPS capabilities embedded in smartphones enable us to track the increase in geographic mobility attained.
- And, if we could get access to administrative data from sources like UI records, SNAP, TANF, and Medicaid...
- Then we could infer the impact of this additional geographic mobility on socioeconomic mobility, in the short run and the long run...



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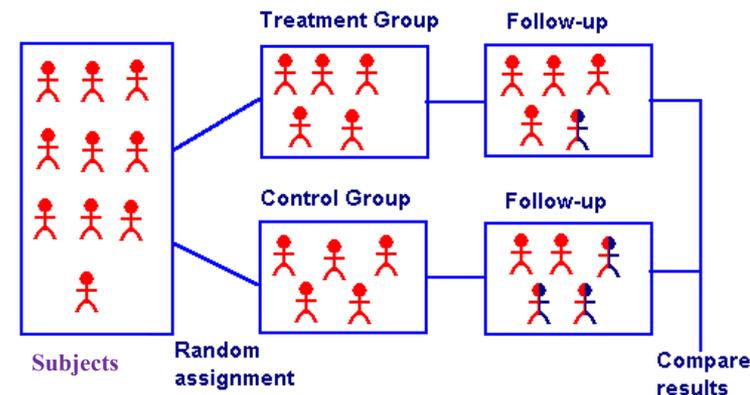
**To what extent will disadvantaged citizens will really use these new options, even if they are subsidized?**

**To what extent will their geographic mobility be increased?**

**To what extent will their socioeconomic mobility be increased?**

# The best way to find out: a randomized experiment

- Transportation “credits” can be randomly assigned to members of target populations...
- The mobility of the treated group and the control group can be tracked with great accuracy using data generated by cell phones.
- The impact of this additional mobility on income, employment, and health could be inferred from administrative data.
- But large numbers of residents need to be recruited into these studies in order to get accurate inference.
- And this all needs to be done in way that protects participants’ interests and privacy.



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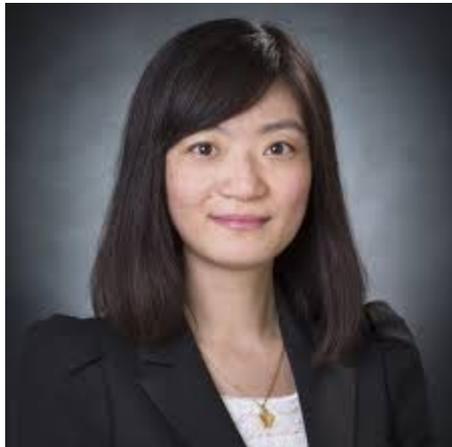
# **Study # 1: The impact of access to ride-hailing on the income and employment of low-income mothers**

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# Study # 1: The impact of access to ride-hailing on the income and employment of low-income mothers

**Mobility21**

HILLMAN  
FOUNDATION



Beibei Li



Lowell Taylor



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# Recruitment (with the help of Allegheny County DHS)

- Access to birth records can help identify mothers with children in appropriate age ranges.
- DHS also has data on receipt of social services (e.g., TANF) that target low-income households and disproportionately serve single mothers with children.
- And DHS has phone/email information that can facilitate outreach to a random sample of poor mothers in Pittsburgh.
- With help from DHS, we can recruit more than 1,000 (mostly single) mothers in the region, and randomly assign them to the treatment and control groups.



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## The Treatment Group

- Individuals will receive \$200 per month of ride-hailing “credits” for 6 months. We track how these credits are used.
- Participants will download and use a GPS-tracking “app.”
- Participants will receive \$10 per month for filling out surveys on employment, job search activity, etc.
- DHS can track receipt of social services, income, employment, etc. – even after the official end of the study.

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## The Control Group

- Participants will receive a one-time allocation of \$200 in ride-hailing credits
- Participants will download and use a suite of apps.
- Participants will receive \$10 per month for filling out our surveys on employment and wages.
- DHS can track receipt of social services, use of training, and, in some cases, income – even after the official end of the study.

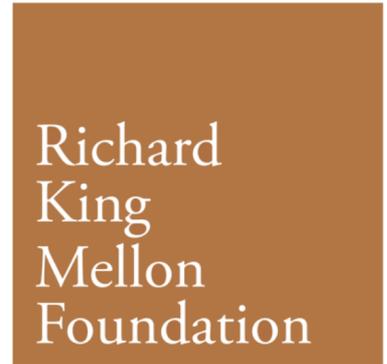
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## Preliminary results from Study #1

- Multiple measures of geographic mobility rise by 8-15%; results are extremely robust.
- Some evidence that participants are also able to shorten travel time limit the variance generated by reliance on mass transit.
- We are now able to infer intermodal transitions from GPS data, which enable us to study how low-income residents are combining ride-hailing with other transit options.
- Quarterly income rises (in some specifications, by nearly \$1,000 per quarter!).
- Likelihood of employment rises significantly (in some specifications, by 10+ percentage points!).
- We are combining administrative data with data from surveys and qualitative data from focus groups.
- Much more work to do – we are still collecting data from participants.
- This study confirms the basic feasibility of our approach and suggests the social benefits of additional access to new transportation options can be very large.

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# Study # 2: The impact of access to a menu of transportation options on the income and employment of low-income residents in Pittsburgh



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# Recruitment (with the help of Allegheny County DHS)

- This project seeks to recruit male and female low-income residents of Pittsburgh's North Side.
- Access to DHS records can help identify qualified residents.
- DHS has phone information that can facilitate text-based outreach to a random sample of potentially qualified participants.
- We are also working with a community-based nonprofit to help recruit, screen, and communicate with potential participants.



MANCHESTER  
Citizens Corporation

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## The Treatment Group

- Individuals will receive a year-long bus pass and 12 months of “credits” for use of e-scooters, bikesharing (including e-bikes), and Zipcar.
- Most transportation providers will share individual level data with us on participants’ use of these transit options, helping us understand how demand for these options varies according to user characteristics, weather, etc.
- Participants will download and use a GPS-tracking “app.”
- DHS can track receipt of social services, income, employment, etc. – even after the official end of the study.

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## The Control Group

- Participants will download and use a GPS-tracking app.
- Participants will receive \$10 per month for filling out our surveys on employment and wages and additional compensation for consistently transmitting GPS data.
- DHS can track receipt of social services, use of training, and, in some cases, income – even after the official end of the study.

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## Preliminary conclusions and next steps

- Smartphones have diffused widely among urban low-income populations.
- This enables us to run large-scale RCTs in which we provide individuals in these populations with access to new smartphone-enabled options and track the geographic mobility thereby induced in a nuanced, detailed, granular way.
- Increasingly, we can infer intermodal transitions from GPS data, and can therefore observe how new and old transit options are being combined by low-income individuals.
- In many contexts, it will be possible to use high quality administrative data sets to track the impact of increased geographic mobility on a broad range of socioeconomic outcomes.
- These data and methods open up important new avenues of research that are extremely relevant for policymakers seeking to address transportation equity and transportation insecurity.
- We have new tools with which to address the old problem of spatial mismatch – and we are morally obligated to assess how they can best be used.

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# Supplemental Slides