Eliminating Fares to Expand Opportunities: Experimental Evidence on the Impacts of Free Public Transportation on Economic Disparities

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Research Question

In recognition that place matters for economic success, a growing number of jurisdictions around the U.S. are reducing or eliminating transit fares for low-income populations. For example, New York, Seattle, San Francisco, and Portland have rolled out large-scale means-tested reduced-fare programs. Several cities, including Seattle, Boston, and Los Angeles, are in the process of or considering reducing fares to zero for those with very low incomes. These reduced-fare programs could ensure more equitable access to job centers, educational opportunities, and other amenities within jurisdictions. They could also improve the efficiency of transportation systems given scale economies in transit and the negative externalities that alternative modes of transportation generate. However, very little evidence exists on whether reduced-fare programs stimulate transit use among low-income individuals, much less whether they affect downstream outcomes such as employment, income, or health.

We study a unique set of field experiments in which a randomly selected group of public assistance clients in King County, Washington (home of Seattle) received up to six months of free public transit. Our RCTs provide us with clean identification of people's sensitivity to transit costs when it comes to transit use and the location of travel. We have an initial paper showing that free fares significantly increase transit use among people with low-income. Follow-up surveys and detailed travel diaries indicate that most of the increase in transit ridership is driven by new trip generation as opposed to transportation mode substitution, and that a disproportionate number of these new trips have a work-related purpose. These results hint that access to free public transportation may have wide-ranging impacts on individuals' economic circumstances.

Financial assistance from the NBER and DOT initiative would support analysis of downstream outcomes that would shed light on these broader impacts of fare-free public transportation. We will take advantage of data we are obtaining from Washington State integrated administrative records. These include Unemployment Insurance (UI) earnings records, public assistance receipt, criminal justice system contact, and healthcare use. We will also use data from Experian on a variety of consumer credit-related outcomes and from Infutor on residential mobility.

Taken together, these administrative data will allow us to test how access to transit affects economic and social outcomes for people with low income. Washington's UI earnings are unusual in that they include both earnings and hours data, so we can directly test if reducing the cost of travel affects labor supply. The data from credit records and public benefits allow us to study economic well-being more broadly, and data on contact with criminal and healthcare

systems allow us to assess the main spillover effects onto public expenditures. Residential location records will allow us to test core theories of urban location. Altogether, we will be able to paint a rich and detailed picture of how improving access to public transportation affects not only people's mobility, but also how it impacts a number of other core aspects of people's economic and social lives.

From a policy perspective, our results will have important implications for how governments endeavor to improve access to transportation services, particularly in disadvantaged communities, since governments must weigh policies like price subsidies with alternatives such as expanding the transit vehicle fleet, changing transit schedules and routing, and making additional physical infrastructure investments. More broadly, our project will strengthen the basis for designing equitable transportation policy in the 21st century.

Experimental Designs

We leverage a unique set of field experiments in which low-income individuals in King County, Washington were randomly selected to receive up to six months of free public transit. Working closely with King County Metro and Washington's Department of Social and Health Services (DSHS), we designed the experiments to examine how offering low-income individuals free public transit affected transit use, mobility, and a variety of downstream outcomes.

In each of the two RCTs, the at-risk population consists of individuals visiting DSHS offices in King County. DSHS verifies eligibility for and administers public assistance programs such as SNAP, Medicaid, and TANF. Clients typically visit these offices to enroll in or renew food, medical, or cash benefits. The first phase of the experiment ran between March 13, 2019 and July 1, 2019 and enrolled 526 individuals who visited one of three selected DSHS offices in the county. The second phase ran between December 6, 2019 and March 13, 2020 and enrolled 1,271 individuals who visited any one of all ten DSHS offices in the county. The second phase was cut short by COVID-19, which both shut down DSHS offices and led Metro to suspend fare collection. Nonetheless, our substantially larger second cohort of study participants allows us to validate the baseline treatment effects from our first cohort. It also permits us to explore the potentially different implications of the treatment during and after the pandemic, a time in which travel habits and work circumstances evolved quickly and dramatically.

As part of the pre-existing process, DSHS customer service agents ask clients whether they are interested in receiving a reduced-fare transit card (an "ORCA LIFT" card) pre-loaded with $10; a person eligible for any other public assistance program is automatically eligible for a LIFT card, which provides a fare of $1.50 per bus ride (45% lower than the regular fare). When the experiment was running, clients who voiced interest in an ORCA LIFT card were offered the opportunity to participate in a study that could provide them with free public transit for a period of time. If a client agreed to participate, he or she was entered into the study and took a short intake survey to gather information on personal identifiers, baseline transit use, and other demographics. The identifiers allow us to link individuals in the data to sources outside Metro, including Washington's UI and DSHS records, Experian credit records, and Infutor address records.

After completing the intake survey, participating individuals were randomly assigned to the control or treatment group. The control group received an ORCA LIFT card pre-loaded with $10 worth of transit (the status quo). The treatment group received up to six months of free transit access on nearly all public Metro buses, commuter buses, light rail, commuter trains, streetcars, and water taxis. The treatment cards were ORCA LIFT cards pre-loaded with monthly passes that converted to a regular card at certain hard-coded dates. Depending on when clients enrolled and from which batch of cards theirs was drawn, treated individuals could have received as few as four weeks of free transit and as many as 24 weeks.

During the enrollment process, all participating individuals were entered into the ORCA LIFT registry. This registry includes basic demographics and allows us to link individuals to treatment status as well as transit use. Using the ORCA LIFT registry as well as data collected in our intake survey, we find that for both cohorts, our treatment and control groups are well balanced on observables and that our study participants are broadly representative of the low-income population of King County.

Preliminary Findings

First, we study differences between the treatment and control groups in transit use tracked with administrative records on card taps. In Figure 1, we show average weekly transit boardings for individuals in the first cohort (those who enrolled between March 13 and July 1, 2019) over the first 20 weeks after enrollment; results for the second cohort are nearly identical. Treatment roughly quadruples boardings per week relative to the control group. Notably, a single trip (for example, from home to work) could involve multiple boardings; when we approximate trips by combining boardings that happen within one hour of each other, we find very similar results. The treatment group takes about four trips per week, compared to one trip for the control group, on average. These differences are highly statistically significant and robust to including a wide range of controls.

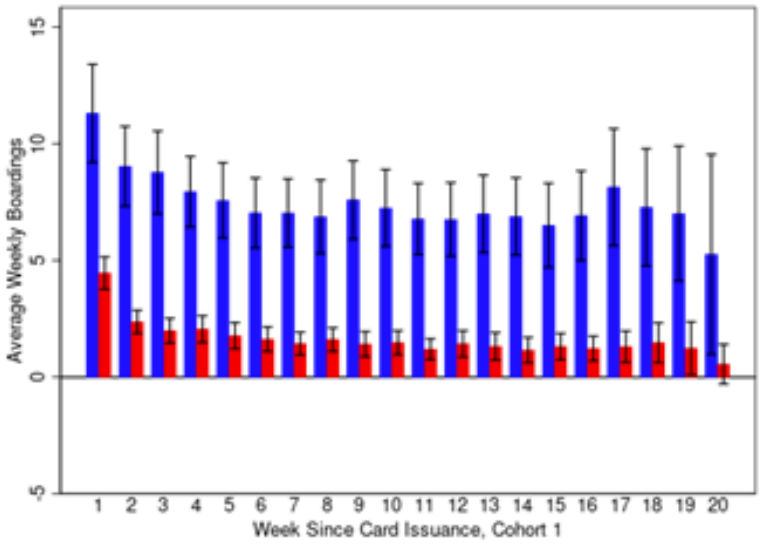


Figure 1. Average weekly boardings for treatment (blue) and control (red) groups.

We proceed to explore heterogeneity in the effects of the treatment across different groups. First, we find very little evidence of differences in the magnitude of the treatment effects across individuals of different races/ethnicities or in different age groups. We find that the estimated treatment effects are in fact larger for individuals in smaller households, which suggests that intra-household card sharing is likely not a major contributor to the large estimated treatment effects. Estimated treatment effects exhibit a U-shaped pattern with respect to prior transit use: those who already used transit a lot (more than 25 days in the month before enrollment) as well as non-users (those who reported zero days of use in the month before enrollment) saw the largest treatment effects, indicating the program induced changes in transit use along both intensive and extensive margins. Most of the additional trips appeared on weekdays, but during off-peak hours, and on routes that were not overly crowded. The latter suggests that any negative congestion externalities associated with providing free fares were minimal.

In order to better understand the mechanisms behind the observed effects, we ran a series of text (SMS)-, web-, and phone-based surveys of study participants. These surveys gathered additional information on travel volumes, destinations, transportation modes and payment methods, and other downstream outcomes. The survey responses provide us with additional visibility into several aspects of individuals' responses to the treatment. For instance, the surveys indicate that most of the increase in transit ridership we observe is driven by new trip generation as opposed to transportation mode substitution. The surveys also reveal that a disproportionate number of these new trips have a work-related purpose. These results hint that the observed increase in travel may have wide-ranging effects on people's economic circumstances. The next phase of this project aims to study an array of downstream outcomes to shed further light on changes in economic circumstances that result from free access to public transportation.

Project Plan

We are currently working on several extensions to this work that NBER and DOT support would help us complete. We expect to receive several administrative datasets by the end of 2021 that would be the focus of this work.

First, we will take advantage of rich administrative data maintained by Washington's DSHS, a key partner in our study. We have an agreement with the division within DSHS that maintains a database of linked administrative records to which we can match our study participants. The resulting matched dataset will include data from Washington State's ESD on employment, earnings, and hours of work for all study participants. It will also include data from DSHS on public assistance receipt and health care utilization. Additionally, it contains data from arrest records on individuals' contact with the criminal justice system. Since enrollment in our experiment occurred at DSHS offices, and each participant in our study is also assigned a DSHS identification number, we anticipate a near-perfect (if not perfect) match rate between study participants and DSHS administrative records. We expect to have these data by December 2021.

We already have access to two other data sources. First, we obtained detailed consumer credit records for participants in both phases of our experiment from Experian in August 2021. These data allow us to study whether treatment affected a variety of credit-related outcomes, such as credit scores, delinquency on bills and other payments, credit inquiries (for example, for auto

loans), estimated income, debt, and more. Finally, we have access to consumer reference address histories from Infutor, which allow us to test for whether transit subsidies induce residential mobility. NBER and DOT support would provide resources that would help us incorporate and analyze these administrative data sources in late 2021 and 2022.

Research Team

Matthew Freedman is a Professor of Economics at the University of California, Irvine. David C. Phillips is an Associate Research Professor of Economics at the Wilson Sheehan Lab for Economic Opportunities at University of Notre Dame. Both Freedman and Phillips have extensive research in urban economics and public policy. Rebecca Brough, a graduate student in economics at the University of California, Davis and a former research associate at the Wilson Sheehan Lab for Economic Opportunities, is a co-author on this research. This project is being conducted in close collaboration with King County Metro and Washington's Department of Social and Health Services. Earlier components of this research were supported by the Institute for Research on Poverty (IRP).

Conflict of Interest Statement

The members of the research team, Matthew Freedman (University of California, Irvine) and David C. Phillips (University of Notre Dame), have no conflicts of interest to report regarding the project described in this application.