Creating Moves to Opportunity
in Seattle and King County
Randomized Controlled Trial Pre-Analysis Plan*

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Abstract

This note contains the pre-analysis plan to evaluate the Seattle-King County Creating Moves to Opportunity (CMTO) Demonstration Project randomized controlled trial (RCT), which aims to help families with children who receive Housing Choice Vouchers have the opportunity to move to and persist in higher opportunity neighborhoods. Families with children under 15 who receive a Housing Choice Voucher from the Seattle Housing Authority and King County Housing Authority who elect to participate in the study will be randomly assigned to either the treatment group (642 families), which receives access to CMTO services, or the control group (642 families), which has access to the normal support services provided by the housing authorities to new voucher-holders. CMTO services include housing locator services (housing search assistance, neighborhood education, and support in preparing rental applications) and access to flexible financial assistance to help cover costs associated with opportunity moves (e.g. security deposits, moving expenses). Additional outreach will be conducted to landlords in opportunity neighborhoods, and landlords will receive financial incentives for leasing to CMTO families to help increase the supply of units available to families. Future phases of research may involve randomizing the types of services families receive. Herein, we describe the outcomes and statistical specifications we will use to evaluate the effectiveness of the program. The primary outcomes of interest are (1) if CMTO services increase the number of families moving to high opportunity neighborhoods, and (2) how long they persist in those neighborhoods.

Keywords: housing, intergenerational mobility, welfare, housing vouchers, neighborhood effects, information frictions, equality of opportunity, migration
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1 Introduction

Among advanced nations, the United States has one of the lowest rates of upward income mobility, which is driven by extremely low rates of upward mobility in our most economically and racially segregated cities (Chetty, Hendren, Kline, and Saez, 2014). A wave of emerging research provides new evidence that growing up in a high-poverty neighborhood has a negative effect on a number of important life outcomes, including earnings, education, and health, and prevents children who grow up in these neighborhoods from advancing economically. Conversely, helping families move to lower-poverty neighborhoods improves long-term outcomes for their children, thereby promoting upward mobility.

Studying more than five million families who move across counties in the U.S., Chetty and Hendren (2018a QJE) find that every year a child spends growing up in a better neighborhood improves their outcomes in adulthood, including earnings and college attendance. Similarly, long-term analysis of the Moving to Opportunity (MTO) experiment by Chetty, Hendren, and Katz (2016 AER) finds that young children (under age 13) whose families were randomly provided vouchers to move from high-poverty housing projects to lower-poverty neighborhoods earned substantially more in adulthood, were more likely to attend college, attended higher-quality colleges on average, and were less likely to become single parents.

The Creating Moves to Opportunity (CMTO) project is an ongoing collaboration between academic researchers and public housing authorities (PHAs), with guidance, advice, and support provided by J-PAL North America, MDRC, non-profit housing practitioners, housing advocates, foundations, and government partners. The aim of the CMTO project is to focus on developing and evaluating potential interventions to facilitate long-lasting moves to opportunity through the Housing Choice Voucher program, particularly for families with younger children. Although the U.S. spends $20 billion annually on the Housing Choice Voucher (HCV) program, 80 percent of vouchers are used in moderate- or high-poverty neighborhoods. If approaches can be developed to improve how families interact with the Housing Choice Voucher program, there is serious potential to help young children living in poverty move to better neighborhoods and improve their long-run educational and labor market outcomes.

1.1 Research Questions

This study seeks to answer several research questions related to neighborhood mobility.

- What explains low levels of moving to opportunity neighborhoods among families with children using federally sponsored Housing Choice Vouchers?

- Are there institutional barriers, informational frictions, financial constraints, or tastes and preferences that lead so few families using vouchers to move to opportunity neighborhoods?

- What is the most effective way to support moving to opportunity?

2 Intervention

The Seattle and King County Housing Authorities (SHA and KCHA) will provide treatment group families with a bundle of services and resources not previously offered. For example, families will receive access to housing locator services to assist in their housing search. The services provided will include marketability counseling to help the families prepare for their housing search, opportunity area education to introduce families to the opportunity neighborhoods, and assistance in finding available apartments. These services will be provided by a third-party provider. Participating families will have access to financial assistance to help cover costs that may be higher in opportunity neighborhoods, such as security deposits, moving expenses, and application fees, in the event families do not have the funds to cover those expenses themselves. Landlords in opportunity areas will also have incentives to lease to voucher-holders, including access to a risk mitigation fund to cover damages above and beyond a security deposit. There will be more intensive recruitment efforts to increase the number of landlords willing to lease to voucher-holders in opportunity areas during the program as well.

2.1 Mobility Services

Families enrolled in the study assigned to the treatment group will receive the following additional services not available to families in the control group, who will receive status-quo support by Public Housing Authority (PHA) staff finding and leasing an apartment. The third-part provider who is providing mobility services is staffed with Family Navigators, who work primarily with the families, and Housing Navigators, who interface more with landlords.

2.1.1 Marketability Coaching

Such coaching prepares families to be tenants in the private rental market, including addressing barriers to renting, budgeting, and preparing materials needed for rental applications. Key elements include:

- Screen for rental barriers: work with families to understand their barriers to renting (e.g. credit, criminal, eviction history) and provide resources to help family address issues and/or prepare explanation for applications

- Create budgeting and savings plan: help families plan for costs associated with moving, assess resources family has and potential needed financial assistance

- Prepare rental portfolio: coach families through preparing materials needed for rental applications, including references

- Practice communicating with landlords: discuss how to interact with landlords and role play as needed

- Learn tenant responsibilities: educate families on how to be a good tenant and landlord expectations from tenants

2.1.2 Opportunity Area Education

The educational program is aimed at teaching families on what opportunity areas are, providing information for families on amenities in opportunity neighborhoods, and facilitating neighborhood tours. Key activities include:

- Goal setting: help family set goals for their housing search; document goals to refer back throughout the housing search process

- Assess priorities and ingoing perceptions: discuss family's needs and priorities, including transportation, schools, etc.; determine family's ingoing attitude towards housing search (level of open-mindedness to moving, specific neighborhoods of interest)

- Introduce opportunity areas: explain what an opportunity area is, and show where relevant opportunity areas are, highlighting those that might best fit the families' needs

- Tour neighborhoods: visit neighborhoods firsthand in groups of 1-2 families, highlighting amenities

- Continued opportunity area education: additional support and information provided to families unsure about moving to opportunity neighborhoods throughout the program

2.1.3 Housing Search Assistance

Housing Search Assistance involves supporting families during the housing search process, including helping them structure their housing search and providing references to units with landlords interested in leasing to CMTO families. This service includes

- Housing search workshop: during enhanced briefing at voucher issuance, Navigators present briefly on tips for conducting a successful housing search

- Create a housing search plan: families work to develop a plan for how they're going to look for housing, including setting search goals, action steps and timelines

- Support housing search process: Navigators help arrange unit viewings, determine unit eligibility, and provide unit referrals from CMTO landlord list

- Connect with Housing Navigators: families connected with housing navigators early in search process for support on applications and leasing units, as well as referrals

- Process family leasing paperwork: Housing Navigators help family fill out PHA leasing packet and sign lease

2.1.4 Flexible Financial Assistance

The financial assistance component entails providing flexible funds to help families overcome additional costs associated with moving to a high opportunity neighborhood. Allowable expenses include:

- Application fees for viable units in opportunity neighborhoods

- Security deposits or fees

- Up to $250 per family in discretionary funds to reduce barriers

- Financial assistance limit $3,500 per family

2.1.5 Access to Landlords from Landlord Outreach

Treatment-group families will also have access to opportunity-area landlords recruited by the Housing Navigators. CMTO landlord engagement will focus on three main interventions, available only to landlords in designated opportunity areas:

- Landlord outreach: Housing Navigators will conduct outreach to landlords to recruit them to rent to CMTO families, and develop a database of units for CMTO family referrals

- Financial incentives: Landlords in opportunity areas will have access to a risk-mitigation fund that will cover damages to the unit beyond the security deposit, up to $2,000.

- Expedited lease up: Housing Navigators will handle significant portions of the lease-up process to ensure fast processing time and minimize delays in leasing up due to additional PHA requirements.

3 Outcomes

As the RCT's focus is to test which interventions alleviate constraints that decrease the likelihood of families moving to opportunity neighborhoods, the primary short-run outcome of interest indicating intervention effectiveness will be the likelihood of moving to an opportunity neighborhood along with a measure of treatment persistence and intensity by analyzing exposure-weighted neighborhood quality metrics. We will also attempt to measure other secondary short-run outcomes. The first is the overall housing voucher lease-up rate. The predicted impact of the CMTO treatment on the overall lease-up rate is ambiguous since the additional services from CMTO could increase the lease-up rate, but a focus on housing search in higher-quality neighborhood where lease-up is more difficult could reduce the lease-up rate. Other medium-run outcomes that we will try to collect include children's educational outcomes from school records and household income from administrative tax data. Past research, including MTO research, suggests it is unlikely that changes in neighborhood environments will have substantial short-run or medium-run impacts on either children's test scores or adult economic outcomes. In the longer-run, based on prior research on opportunity neighborhood exposure during childhood, we hypothesize that CMTO induced changes in childhood exposure to different neighborhood environments will generate effects on longer-run child outcomes for the CMTO children in early adulthood such as residential neighborhood quality, college attendance, household income, and marital status.

3.1 Short-run Outcomes

The primary outcomes are the lease-up rate in an opportunity area and exposure to higher opportunity neighborhood quality. The secondary outcome is the housing voucher lease-up rate.

1. Initial lease up rate in an opportunity area (defined at the household-level as $1 =$ lease up in opportunity neighborhood; $0 =$ does not lease up in opportunity neighborhood)

2. Exposure to higher opportunity neighborhood quality. Our primary measure of this will be exposure-weighted mean neighborhood quality for the two years after random assignment using the Chetty and Hendren (2018b QJE) mean upward mobility rate of each neighborhood (Census tract).

$$\text{Neighborhood Quality}_i = \frac{1}{T} \sum_{t=1}^{T} \text{Mobility Rate}_{n(i,t)} \tag{1}$$

where Mobility Rate is measured using the Chetty and Hendren (2018b QJE) data and methodology to be the average percentile rank in the national income distribution for children who grow up in neighborhood n and whose parents' income is at the 25th percentile of the national income distribution. For each household in treatment and control, we will observe the neighborhood $n(i,t)$ that household i resided in t months after random assignment. Our initial short-run outcomes will measure neighborhood quality using $T = 24$ total months.

We will consider alternative ways to measure the exposure to neighborhood quality, including

(a) Share of post-random assignment period spent residing in a high opportunity neighborhood (using discrete measures of high opportunity)

$$\text{Opportunity Share}_i = \frac{1}{24} \sum_{t=1}^{24} Opportunity_{n(i,t)}$$

where $Opportunity_{n(i,t)}$ is an indicator for whether the neighborhood $n(i,t)$ in which household i resides at time t is an opportunity neighborhood

(b) Point-in-time measures include measuring opportunity neighborhood residency status (binary or continuous measure using tract-level upward mobility rate) at a given amount of time after random assignment. For example, an initial outcome may be measured as $\text{Opportunity}_{n(i,T)}$, an indicator for whether each household is living in an opportunity neighborhood $T = 12$ months after being randomly assigned to treatment or control groups.

3. Housing voucher lease up rate ($1 =$ lease up with the housing voucher; $0 =$ does not

lease up). This is a secondary outcome.

3.2 Medium-run Outcomes

1. Children's standardized test scores (state percentile rank)

2. Household adults' employment and earnings

3.3 Long-run Outcomes

1. Post-random assignment childhood exposure-weighted neighborhood quality from random assignment to age 18 (or early 20s based on Chetty and Hendren, 2018a QJE). This is the primary measure of neighborhood environment that the intervention is designed to support.

2. Core outcomes from IRS tax data as defined in Chetty, Hendren, and Katz (2016 AER) include

   (a) Individual earnings

   (b) Household income

   (c) College attendance from age 18-20

   (d) College quality from age 18-20

   (e) Marital status

   (f) Poverty share in neighborhood of residence (%) using Census tract if feasible and zip code otherwise as the measure of neighborhood

3.4 Treatment Effect Heterogeneity: Subgroup Analysis

The core subgroups we will examine for differences in the short-run primary outcomes of lease-up in an opportunity area and neighborhood quality exposure are: (1) Race of householder; and (2) Administering PHA (Seattle Housing Authority vs. King County Housing Authority).

Based on past research, we hypothesize that CMTO longer-run impacts on children's outcomes may vary by:

1. Gender

2. Age at random assignment

3. Race

4. Administering PHA (Seattle Housing Authority or King County Housing Authority)

4 Evaluation Design

4.1 Sampling and Identification strategy

All households with at least one child under age 15, applying for federal housing choice vouchers through SHA or KCHA, deemed eligible (e.g. meeting income requirements), and selected off of a waiting list for that program will be offered enrollment in CMTO. If they consent to participate in the study, they will be randomly assigned to a treatment group or a control group (equally sized). In the first phase of the evaluation, households in the treatment group will have access to all the CMTO services in addition to the regular services provided by the housing authorities for new HCV participants. The control group will only have access to the normal housing authority services. A second phase of research is planned to further test the more promising components of CMTO services and understand their relative cost effectiveness. The services to be tested in this phase will be selected based upon qualitative research during the first phase around which services households are finding most helpful in making opportunity moves.

Randomization will be at the household level and will be facilitated by a random number generated on a PHA office computer. Our power calculations are based on pooling results from two strata—the Seattle Housing Authority and the King County Housing Authority.

4.2 Data Collection

Based on the historical number of study-eligible households issued vouchers each year across the two PHAs, we anticipate approaching 1284 households to offer enrollment in the intervention. We will track core short-run outcomes on treatment and control groups using PHA administrative data. Subsequent analysis will attempt to use Washington state school test-score data for the children and IRS administrative tax data for the household members.

4.3 Power Calculation

Assuming conventional 80% power and 95% confidence intervals, preliminary power calculations suggest that the minimum detectable effect size in the first year of the intervention is a 5 percentage-point change (46%) in the likelihood of moving to an opportunity neighborhood when comparing treatment and control groups. Using statistics provided by the

Seattle and King County Housing Authorities, we based our calculations on assumptions on the annual number new households with at least one child under age 15 issued a voucher each year ($N = 1284$), equally sized treatment and control group sizes, and the usual fraction of households issued vouchers who move to an opportunity neighborhood absent any intervention (11%, standard deviation $\sigma = 0.31$). Although we are interested in outcomes conditional on voucher take up, randomization will occur at the level of issued voucher, and we assume that historical 68% lease-up rates (weighted average across SHA and KCHA) will prevail for both treatment and control. We further assume that $\gamma = 5\%$ of households assigned to the treatment group will opt-out of services.

To calculate the minimum detectable effect size with an expected sample size of 1284 households, we follow equation (4.3) in Orr (1999)

$$\text{Minimum Detectable Effect} = k\sqrt{\frac{\sigma^2}{n_{treatment}} + \frac{\sigma^2}{n_{control}}}$$

$$= k\sqrt{\frac{4\sigma^2}{(1-\gamma)N}} = 0.0502$$

where $k = 2.8$ is a constant determined by desired statistical size (5%) and power (80%); $\sigma^2 = 0.098$ is the variance of the unconditional outcome of interest (the fraction of households issued a voucher that lease up in an opportunity neighborhood); $\gamma = 0.05$ is the fraction of sample that decline program participation. Orr specifies the minimum detectable effect in terms of the size of the eventual treatment and control groups $n_{treatment}$ and $n_{control}$. We have equally sized treatment and control groups, which are drawn from those that consent to intervention participation. Thus, in our setting, $N = 1284$ is the total number of vouchers to eligible households expected to be issued during the study across the two housing authorities, and $n_{treatment} = n_{control} = (1-\gamma)N/2$.

Although this is a large effect in relative terms, it is small in absolute terms (less than an extra 100 households a year moving to opportunity neighborhoods), and it is smaller than effects seen in the original Moving to Opportunity experiment evaluation and those estimated non-experimentally for the Baltimore Housing Mobility Program. In year two, we anticipate two or three treatment arms with more focused interventions based on qualitative lessons learned from year one, each consisting of smaller sample sizes and resulting in larger minimum detectable effects.

4.4   Risk and Treatment of Attrition

In our power calculations, we have allowed for a certain fraction γ of households offered participation to decline to participate in the program. Preliminary non-experimental piloting has suggested enthusiasm for program participation. Nevertheless, increases in γ will reduce our sample size and raise the minimum detectable effect.

We have not allowed for post-study attrition. In principle, participants could opt-out of continuing to participate in the study at any time. Participants could also leave the country, in which case our ability to track outcomes for them would be limited. Based on our conversations with our PHA partners, we do not believe this to be a significant source of concern but acknowledge the potential negative effects of attrition on our power. However, we will statistically test for the balance of attrition across treatment and control groups and whether differential attrition may be affecting our results, as described below.

4.5   Potential Treatment Change After Year 2

After evaluating initial short-run outcomes and conducting qualitative research to ascertain participant and administrator satisfaction across various potential services in the bundle of supports described in section 2.1 above, we may add additional treatment groups that will focus on one particular intervention each. We would specify the analysis plan for evaluating those treatments before beginning that randomization, but such analysis would follow the strategies aligned here. Multiple treatment arms will allows us to isolate which services are the most effective and cost-efficient at supporting moves to opportunity neighborhoods. Such precision will be particularly useful in scaling the project to other geographies. Conducting an initial RCT with all potential services provided to members of a single treatment group ensures that we have maximum power to detect some degree of success in the first year. If, however, we need a longer time period to provide a fair test of services (for example, because the results of specifications described in section 5.1.2 suggest that staff are still improving the delivery of services), we could keep the bundle of services instead of dividing into multiple treatment arms.

5 Econometric Specifications

5.1 Intention to Treat Specifications

5.1.1 Basic Specifications

Our basic treatment effects specification to estimate the intent-to-treat effects of the intervention on outcomes is

$$y_i = \beta \cdot Treatment_i + \alpha_{s(i)} + \varepsilon_i \tag{2}$$

where y_{is} is an outcome for enrolled household i, $Treatment_i$ is an indicator for whether the household was randomly assigned to the treatment group, and $\alpha_{s(i)}$ are strata fixed effects (indicators for households whose vouchers are administered by each housing authority). The coefficient of interest is β, which captures the difference in average outcomes between treatment and control groups.

To account for sampling variation in the composition of treatment and control groups, we will also measure treatment effects conditional on a set of control variables X_i as

$$y_i = \beta \cdot Treatment_i + X_i'\delta + \zeta_{t(i)} + \alpha_{s(i)} + \varepsilon_i \tag{3}$$

where X_i includes household-level controls from the baseline survey drawn from the following variables: gender, age of adults at random assignment, age of children at random assignment, race, native language, family structure, relationship status, disability status, employment status and income, tenure in baseline neighborhood, baseline neighborhood quality, and the administering PHA. The choice of baseline covariates to be included in the specification will be determined by using the state-of-art approach to penalize overfitting such as LASSO (at present) or the preferred machine learning approach for covariate selection available at the time the analysis is done. The vector ζ_t contains calendar-time fixed effects for the month in which household i was randomly assigned to treatment or control.

5.1.2 Treatment Effect Dynamics

To detect whether the effectiveness of the treatment has varied over time, we can interact our treatment indicator with time dummies to estimate

$$y_i = \beta_{t(i)} \cdot Treatment_i + X_i'\delta + \zeta_{t(i)} + \alpha_{s(i)} + \varepsilon_i \tag{4}$$

where $\beta_{t(i)}$ allows for the treatment effects to change with the time $t(i)$ of random assignment for household i. This would allow us to learn, for example, whether the mobility services

seemed to become more effective over time from learning-by-doing as staff converge on a set of best practices.

5.1.3 Treatment Effect Heterogeneity

To explore whether the effect of treatment is different across subgroups of participating households, we will estimate

$$y_i = \beta_1 \cdot Treatment_i + \beta_2' \cdot Treatment_i \times X_i + X_i'\delta + \zeta_{t(i)} + \alpha_{s(i)} + \varepsilon_i \tag{5}$$

where Z_{is} is a vector of covariates (potentially overlapping with X_i) mentioned in section 3.4 (race and PHA for mobility outcomes and race, gender, age at random assignment, and PHA for longer-run child outcomes). This specification allows us to see whether service effectiveness varies within the population based on exogenous characteristics. We also will be open to future methodological advances in machine learning and related approaches to assess treatment effect heterogeneity.

5.2 Local Average Treatment Effect Specifications

While the above specifications are reduced-form effects, we will use our treatment indicator to estimate treatment-on-the-treated instrumental variables regressions to measure the causal effect of using provided services or of living in an opportunity neighborhood.

5.2.1 Effect of Using Services

We are also interested in the effect of utilizing the mobility services offered by the intervention. Using 2SLS, we will estimate the system

$$y_i = \beta \cdot Services\,Take\,Up_i + X_i'\delta + \zeta_{t(i)} + \alpha_{s(i)} + \varepsilon_i \tag{6}$$
$$Services\,Take\,Up_i = \pi \cdot Treatment_i + X_i'\eta + \xi_{t(i)} + \varphi_{s(i)} + v_i \tag{7}$$

where β represents the causal effect of using services on an outcome y, which could be useful for separately understanding the value of offering the services from the value of using the services.

5.2.2 Exposure Models

As employed by Chetty, Hendren, and Katz (2016 AER) and Chetty and Hendren (2018a QJE), we are interested in the causal effect of each additional year a child spends in an

opportunity neighborhood, weighted by the quality of that neighborhood. The first stage for such a question would be an intent-to-treat specifications as detailed above using the number of years spent in an opportunity neighborhood as an outcome as defined similarly to equation (1) as

$$\text{Exposure to Opportunity}_i = \sum_{t=1}^{T_i} \text{Mobility Rate}_{n(i,t)}$$

where T_i is the number of months post-random assignment corresponding to when the child turns 18 and Mobility Rate$_{n(i,t)}$ is a neighborhood quality measure as described above. The system of equations to be estimated by 2SLS would be

$$y_i = \beta \cdot \text{Exposure to Opportunity}_i + X_i'\delta + \zeta_{t(i)} + \alpha_{s(i)} + \varepsilon_i \quad (8)$$
$$\text{Exposure to Opportunity}_i = \pi \cdot Treatment_i + X_i'\eta + \xi_{t(i)} + \varphi_{s(i)} + v_i \quad (9)$$

To interpret β, we may use the average change in exposure to opportunity for a family who moves to an opportunity neighborhood in our study. We may also measure exposure alternatively as

$$\text{Years Exposed to Opportunity}_i = \sum_{t=1}^{T_i} Opportunity_{n(i,t)}$$

where $Opportunity_{n(i,t)}$ is again an indicator for whether the neighborhood child i lived in at time t was considered an opportunity neighborhood.

5.3   Detecting and Accounting for Attrition

To check for differential attrition between treatment and control groups, we will define $Attrit_i$ as an indicator variable for whether household i (or person i) was observed at baseline but not at endline. We will then run reduced-form specifications of $Attrit_i$ on treatment indicators and controls as in section 5.1 to estimate whether attrition is statistically different in the treatment group versus the control group. Using $Attrit_i$ as the outcome in equation (5) will allow us to learn whether attriting households are different in terms of a wide variety of baseline characteristics and whether households with a high likelihood of attriting were differentially likely to do so across treatment and control.

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