Kathryn Wantlin
Professor Chetty
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Project 1

Analyzing Effects from Creating Moves to Opportunity Data

The ongoing Creating Moves to Opportunity (CMTO) Project seeks to provide vouchers to low income families to facilitate moves to better neighborhoods. Based on previous studies, these types of moves have great potential to improve income outcomes for children, especially young children, and the pilot studies conducted in partnership with the King County Public Housing Authority (KCHA) and the Seattle Public Housing Authority (SHA) give us data to quantitatively analyze the magnitude of the effect. In looking at the differences between the treatment and control groups, and adjusting for non-compliance, we can see the effect of receiving the suite of services (in addition to the voucher itself) and also how this translates to actually taking up improved housing.

First, we must note that the setup of the study includes randomization into treatment and control groups conditional on the assignment variable, *pha* (public housing authority under whose jurisdiction a household lives). This is because each Public Housing Authority (KCHA and SHA) handled recruitment into the experiment and randomization separately, although they followed the same procedure afterward. Thus, since the groups are categorized separate first, randomization was done separately, that is conditional on whether or not you were in KCHA or SHA. This is analogous to the Tennessee STAR study, where students were randomized into classes, but it was done conditional on school that the student was in and also each student's

grade. That is, class year and grade level were the assignment variables in this example, and we can follow similar logic to understand that *pha* is the assignment variable in our CMTO study.

|	Control Mean	Treatment-Control Difference	Standard Error for Difference
hoh_age	34.51378	-0.4625667	0.5484415
child_count	2.413534	0.0438966	0.0889882
child_age	6.74423	-0.2046105	0.2576274
hh_income	19658.64	-498.9723	840.2586
origin_pop2010	5416.434	-208.8352	105.5613

In the table above, we have calculated, in the first column, means of 5 relevant characteristics for families in the control group. In the second column, we have the difference between the mean in the treatment group and the mean in the control group for these characteristics, and in the third column we have the standard error for the difference in means (with unequal variances). From this, we see that the treatment-control difference is roughly 3% of the respective control mean or less for each characteristic, signalling that the balance table consistent with families having been randomly assigned to treatment and control groups by the Housing Authorities. Although the standard error for the difference complicates this slightly, the standard error is also a marginal fraction of the respective control mean, meaning that overall we can generally say that random assignment was successful when tested by these characteristics, and that concerning these characteristics, the treatment and control groups are similar enough that any if we were to try to isolate the causal effect of being in the treatment group (and actually

receiving treatment), our result will not be contested by other confounding characteristics that could lead us to say that a characteristics that is different between the two groups could be related to any differences we observe between the two groups rather than the causal effect we may be trying to isolate.

Another factor complicates our analysis -- compliance. The to find the compliance rate on our data, we measure the effect of being assigned to the treatment group on the probability of receiving CMTO services. Here, the compliance rate is 77.51097%, the percentage of people assigned to receive Section 8 vouchers actually used the service. Dealing with non-compliance can be tricky. We cannot simply compare outcomes for those who actually received the treatment and those who did not receive the treatment; this will underestimate the causal effect of receiving the treatment because not everyone assigned to the treatment group received the treatment and some people assigned to the control group did receive it. We also cannot simply drop observations in the treatment group that did not receive the treatment and drop observations from the control group who actually received the treatment; this will be theoretically unsound because we are not taking into account the fact that that, for example, some people in the treatment group, if they had taken up the treatment, might provide different data and that by removing people, we are biasing our results to be only reflective of types of people who would take up the treatment if assigned to receive it and who would not otherwise find ways to receive the treatment.

The intent-to-treat (ITT) effect of the CMTO services on signing a lease in a high opportunity area is .1804002; that is, compared to the average in the control group that got just vouchers, households who got vouchers and additional assistance were on average 18%

more likely to be leasing in a high opportunity area. The "treatment on the treated" effect (TOT) of the CMTO services on signing a lease in a high opportunity area is .23274153. This was calculated by dividing the estimated ITT effect by the compliance rate. TOT is meant to estimate the causal effect of using a Section 8 on leasing in a high opportunity area. We can think of this intuitively as us trying to find the effect, assuming 100% compliance. Since we have our ITT effect and roughly 78% compliance rate and we want to find TOT effect with 100% compliance, we can effectively "solve" for our TOT effect by dividing our ITT effect by the actual compliance rate.
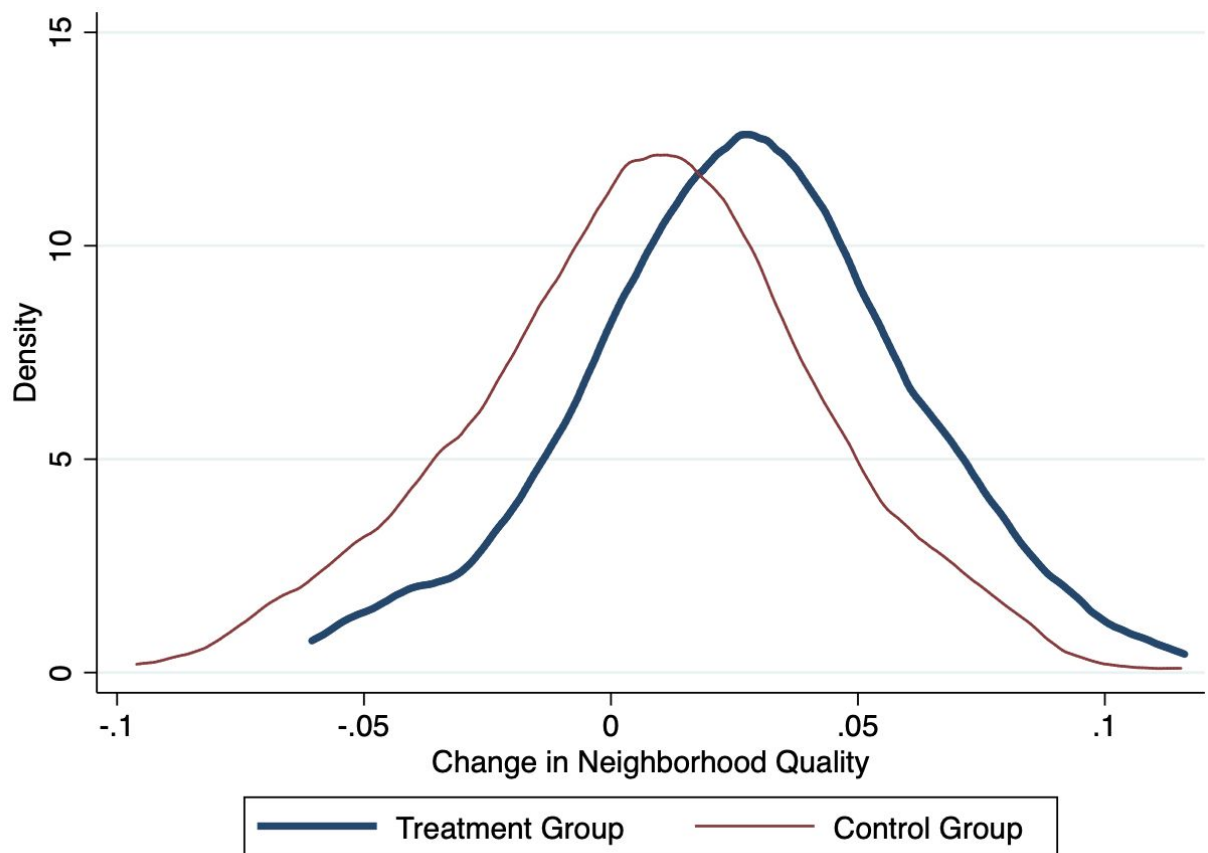
On the graph above, we are seeing the change in rank for low-income kids, conditional on whether or not they were assigned to the treatment or control groups. On average, those in the

treatment group experienced a larger increase in rank, though there is significant overlap, likely due to some households in the control group possibly making a move on their own or some treatment group households never using their vouchers despite additional assistance. The average change in rank for the control group is actually roughly 0 (slightly positive), and both the treatment and control group distributions appear roughly normal.

There is evidence of heterogeneous treatment effects. Although for households with family income greater than the median in the sample and households with family income less than (or equal to) the median in the sample, the TOT estimates are very similar (.2395519 and .2254983, respectively), the TOT estimate for families in KCHA was much higher than for families in SHA (.3459119 vs. .1197396, respectively). This difference might be due to several factors. One reason might be that ITT effects were similar in both areas, but some issue, such as a shortage of available units in high opportunity areas in King County, drove down the compliance rate such that the estimated TOT effect was higher than that for Seattle. SHA might also be less effective at communicating or delivering the additional suite of services to its treatment group, resulting in a lower estimated TOT effect, among other possible reasons.

Abstract

The CMTO study offers low-income households vouchers to move to high opportunity neighborhoods, and in a comparison of houses under KCHA and SHA, we see the causal effect of providing additional assistance to Section 8 voucher recipients. We found that, after testing with several characteristics, none were confounding and we the control and treatment groups were indeed properly randomized and valid. We saw an estimated ITT effect of .1804002, a

77.51097% compliance rate, and thus an estimated TOT effect of .23274153. Heterogeneous

treatment effects were also found concerning the PHA a household was in.