COVER MEMO:

THE U.S. DEPT. OF HOUSING AND

URBAN DEVELOPMENT's

MOVING TO OPPORTUNITY

DATA ARCHIVE

Last updated: 6/27/2017

1.   Overview

This document provides information on the Moving to Opportunity (MTO) restricted access dataset (RAD) that repackaged multiple waves of MTO data to make them more accessible for future research under the approval of the U.S. Department of Housing and Urban Development (HUD). MTO was a randomized housing experiment administered by HUD. The demonstration program gave low-income families with children who were living in public housing (or assisted housing) in high-poverty neighborhoods a chance to move to lower poverty neighborhoods. Of the families who volunteered for MTO, over 4,600 families were deemed eligible. Abt Associates randomly assigned families to one of three treatment groups:

(1) an experimental or low-poverty voucher group that received a housing voucher that could only be used to lease in a low-poverty (< 10%) census tract,

(2) a Section 8 or traditional voucher group that received an unrestricted housing voucher, or

(3) a control group that did not receive a voucher but remained eligible for any government assistance to which they otherwise would have been entitled.

To evaluate the effects of the program, researchers have collected data on participants at multiple points in time. The consolidated data archive includes information from the baseline survey (1994-1998), canvass surveys (1997 and 2000), interim evaluation surveys (2002), and the final evaluation surveys (2008-2010). Evaluations focused on outcomes across different domains including employment and earnings, income and assistance, education, housing and mobility, risky behavior, physical health, and mental health.

The data archive includes:

- program information such as treatment assignment, date of randomization, and compliance status,
- demographic information such as participant age, gender, race, ethnicity, and education level,
- survey responses from adults, children, and youth,
- parent reports about their child,
- achievement test scores,

- school history and school characteristics,
- physical measurements and dried blood spot assay results,
- linguistic recodes for adult and youth speech samples,
- residential history (census tract level),
- interviewer observations of the neighborhood,
- interviewer observations of the household, and
- weights for analyzing the data.

2.   Source of the Data and Required Acknowledgment

HUD provided the MTO data and must be acknowledged as the source of the data in any publication using this data. Publications must also indicate that "The contents of this document do not necessarily reflect the views or policies of HUD or the U.S. Government."

3.   MTO Evaluation Funders

4.   Background on the MTO Experiment

The MTO demonstration was authorized by the U.S. Congress in section 152 of the Housing and Community Development Act of 1992. HUD launched MTO to test whether offering housing vouchers to families living in public housing projects in high-poverty neighborhoods of large inner cities could improve their lives and the lives of their children by allowing them to move to lower-poverty neighborhoods. From 1994 to 1998, the MTO demonstration enrolled 4,604 low-income households in Baltimore, Boston, Chicago, Los Angeles, and New York. Eligibility for MTO was limited to households with children in public or other government-subsidized, project-based housing in selected high-poverty areas. Enrolled families were assigned at random to one of three groups:

1. The **low-poverty voucher (LPV) group** (originally called the <u>experimental group</u>) received Section 8 rental assistance certificates or vouchers that they could use only in census tracts with 1990 poverty rates below 10 percent. The families received mobility counseling and help in leasing a new unit. One year after relocating, families could use their voucher to move again if they wished, without any special constraints on location.

2. The **traditional voucher (TRV) group** (originally called the <u>Section 8 group</u>) received regular Section 8 certificates or vouchers that they could use anywhere; these families received no special mobility counseling.

3. The **control group** received no certificates or vouchers through MTO, but continued to be eligible for project-based housing assistance and whatever other social programs and services to which they would otherwise be entitled.

Forty-eight percent of families in the LPV group and 63% of families in the TRV group "complied" with the treatment by moving using a housing voucher obtained through MTO.

5.   MTO Data Collection Waves

Researchers have collected survey data on MTO participants at different points in time:

Baseline (1994-1998): At the time families applied for the MTO program, the household head filled out a survey with information about the household and basic information about each household member.

Short-Term Site by Site Findings (<u>not</u> included in archive): A few years into the program, research teams at each site collected data for preliminary studies of the program's effects. See www.mtoresearch.org/interim.htm for a list of articles with short-term findings.

Canvasses (1997 and 2000): Families were canvassed and asked a limited set of questions.

Interim evaluation (2002): Abt Associates, under contract with HUD, and in partnership with researchers at the National Bureau of Economic Research (NBER) conducted an evaluation of the program 4 to 7 years after

random assignment. (The interim evaluation excluded families randomized in 1998 at the Los Angeles site because too few years had passed since they entered the program.) The interim evaluation was conducted under Principal Investigators Larry Orr (Abt Associates) and Lawrence F. Katz (NBER) and project director Judith D. Feins (Abt Associates), with guidance from Jeffrey Kling (Princeton University, NBER) and Jeffrey Liebman (Harvard University, NBER). Interviews were conducted with 3,526 adults, 1,783 children ages 8 to 11, and 2,829 youth ages 12 to 19. In addition, achievement tests were administered to children and youth ages 5 to 19. The interim survey asked questions about housing, neighborhood, employment and education, income and public assistance, outlook and social networks, physical and mental health, and household composition. Links to the main findings from the interim evaluation are available at www.mtoresearch.org/interim.htm. The report to HUD by Orr et al. (2003) and Kling, Liebman, and Katz (2007) provide overall findings from the interim evaluation. See the following appendices in Orr et al. (2003) for more information on data collection (Appendix A); samples, analytic methods, and weights (Appendix B); and descriptive tables and maps (Appendix C).

Final impacts evaluation (2008-2010): The final evaluation of MTO was conducted under the direction of Principal Investigator Lawrence F. Katz (NBER and Harvard University) and Project Director Jens Ludwig (NBER and University of Chicago). Coauthors on the evaluation included Lisa A. Gennetian, Lisa Sanbonmatsu, Greg J. Duncan, Ronald C. Kessler, Emma Adam, Thomas W. McDade, and Stacy Tessler Lindau. HUD contracted with NBER to conduct the 10- to 15-year evaluation of MTO. The Institute for Social Research (ISR) at the University of Michigan conducted the interviews under the direction of Nancy Gebler. Interviews were conducted with MTO adults (mostly female) and youth ages 10-20 as of 2007. One adult with priority given to females was selected for interview from each low-poverty voucher and control group household and, for budgetary reasons, one adult was selected from a random two-thirds of the traditional voucher group households. [In selecting an adult to interview from each household priority was given to female adults who were thought to be more likely to be the children's caretakers. The priority order for selecting both the interim and final evaluation samples was: female heads of the core household, female spouses of the core household head, female baseline heads, female spouses of the baseline head, and finally, non-female heads of the core households. The baseline head is often but not always the same person as the "sample adult." The baseline head completed the baseline survey, providing information on both the household and its individual members. Up to three youth ages 10-20 (as of 2007) were selected from each household for interview. ISR completed interviews with 3,273 adults and 5,101 youth between June 2008 and April 2010. The overall effective response rate (ERR) for the adult survey was 89.6%, and the ERRs by MTO treatment group were similar: 90.8% for the low-poverty voucher group, 86.6% for the traditional voucher group, and 90.0% for the control group. For the overall findings from the final evaluation, see Ludwig et al. (2013) and the report presented to HUD (Sanbonmatsu et al., 2011). Additional findings have been reported on adult well-being (Ludwig et al., 2012), adult diabetes and obesity (Ludwig et al., 2011), youth mental health (Kessler et al., 2014), African-American Vernacular English (Rickford et al., 2015), and crime and delinquency (Sciandra et al., 2013).

Subsequent research by Chetty, Hendren, & Katz (2016) presents evidence on impacts on MTO children using administrative data from tax returns. (Administrative data is NOT included as part of this archive.)

Qualitative data is not included on this archive. For examples of some of the qualitative research that has been on MTO, Please see www.mtoresearch.org for examples of some of the qualitative research that has been conducted by different research teams.

6. Archive Datasets

The data is organized into 20 non-PII datasets as described in Table 1.

Table 1. Datasets in the archive

SAS® dataset name	Description	Level	# of Vars	# of Obs
BASELINE / CANVASS				
MTO_BASCNV_PERS	Baseline person-level info plus info from core move and canvasses	Person	81	19929
MTO_BASCNV_HHLD	Baseline household-level info plus info from core move and canvasses	Family	299	4608
INTERIM EVALUATION				
MTO_INT_ANLY_CHILDYTH	Interim person-level child and youth analysis file with recoded survey outcomes, covariates, weights, school characteristics, and census tract characteristics	Person	413	6683
MTO_INT_ANLY_ADULT	Interim-person level adult analysis file containing recoded survey outcomes, covariates, weights, and tract characteristics	Person	293	4248
MTO_INT_RAWSVY_ADULT	Interim adult/household raw survey data	Person	595	3526
MTO_INT_RAWSVY_YOUTH	Interim youth raw survey data	Person	361	2829
MTO_INT_RAWSVY_CHILD	Interim child raw survey data	Person	73	1783
MTO_INT_RAWSVY_POCY	Interim parent-on-child raw survey data	Person	101	5581
MTO_INT_SCH_HX	Interim wide file summarizing school history (up to 7 schools per child) and detailing name, NCES ID, and grades attended	Person	54	5576
MTO_INT_ROSTER	Interim roster file (info on who was in the household at interim)	Person	49	20613
MTO_INT_ADDRHX	Interim residential address history (for replication purposes). Spell start and cease dates have been limited to calendar quarter. Geographic information has been limited to census tracts. Addresses on this file are only through the interim period.	Person-Address Spell	22	48737
FINAL EVALUATION				
MTO_FIN_ANALYSIS	Final evaluation person-level analysis file containing recoded survey data, covariates, weights, physical measurements, select dried blood spot results, and test scores	Person	1056	15892
MTO_FIN_RAWSVY_ADULT	Final evaluation adult raw survey data	Person	1514	3273
MTO_FIN_RAWSVY_YOUTH	Final evaluation youth raw survey data	Person	1134	5101

SAS® dataset name	Description	Level	# of Vars	# of Obs
MTO_FIN_ADDRHX	Final evaluation residential address history. Geographic information is limited to census tract. Spell start and cease dates are limited to calendar quarter. Only core members are included on the file. File covers period from random assignment through the final evaluation.	Person-Address Spell	90	70082
MTO_FIN_RAW_DWELLING	Final evaluation list of all MTO residential dwellings and visited addresses. Limited to census tracts.	Dwelling	69	85671
MTO_FIN_RAW_DWELLMAP	Final evaluation mapping of MTO members to the list of dwellings.	Person Dwelling Updates	40	456950
MTO_FIN_LING_TOKEN	Final evaluation linguistic analysis file at the linguistic token-level.	Token	260	45283
MTO_FIN_SCH_HX	Final evaluation school history with one record per person, grade, school, and year. Constructed using a combination of data from the interim and final evaluations.	Person-Grade-School-Year	50	72189
MTO_FIN_ROSTER	Final evaluation roster of household members that indicates who was living in the household at final and who had left the household. Also includes adult reports on household members that are not captured elsewhere in the data. The 22609 records on this file represent every person (and phantom) from the Person 2007 file and the long-term survey data. There is one observation per person and the file includes both core and non-core individuals (who can be identified by the f_svy_core_imp variable)	Person	123	22609

7.   Key Variables and Variable Naming Conventions

Table 2 lists some of the key variables on the MTO file. Files are generally linked using either the person ID (PPID), the family ID (FAMID), or the dwelling ID (DWELLID or SPID). Data can be linked across waves and across family members. Treatment status is indicated by RA_GROUP. Baseline covariates start with the prefix "x_". The interim survey weights start with the prefix WT_TOT and the final survey weights start with F_WT_TOT.

Most variables have a prefix that is specific to a particular wave and subject matter, as shown in Table 3. For example, the raw variables from the household employment module of the final survey all start with HEM*.

Variable suffixes are often used to indicate the subsample to which a variable applies (_a = adults, _y = youth), deflation of dollar values (d09 = in 2009 dollars), or the relative years post-random assignment to which the address data applies.

Table 2. Key Variables on the Restricted Access Dataset

Category	Variable and description	Data files
IDs		
Study Family ID	**famid** 7-digit ID number assigned to each family participating in MTO. The first digit of the FAMID indicates the site, the second digit the treatment group, the third digit indicates voucher versus certificate, and the fourth through seventh digits are a sequence number. [A family or household level file can be linked to a person-level file using FAMID. If FAMID is not on a file but PPID is available, FAMID can be recreated by using the first 7 characters of PPID. A person-level file will generally have multiple people with the same FAMID and thus merging a person level file to a family level file is usually a many-to-one merge.]	most files
Study Person ID	**ppid** 10-digit ID for each person. The PPID consists of the 7-digit FAMID + a 3-digit roster id. Most files can be linked together using PPID. FAMID can be recreated from PPID by substringing the first 7 characters of PPID.	most files
Study Dwelling ID	**dwellid** – six character study identifier for an address in the dwelling table **spid -** dwellid used to identify a particular "spell" in the address history file	dwelling, dwellmap, and address history files

Category	Variable and description	Data files
	[To link the address history files to the dwelling file, rename the SPID variable in the address history file to DWELLID and then link to the dwelling file by merging on DWELLID. Note that SPID is not unique in the address history file while DWELLID in the dwelling table is unique so this would be a many-to-one-merge.]	
RANDOMIZATION / TREATMENT		
Treatment Group Categories and flags	**ra_group** 1 = Low-poverty voucher (LPV) group (also called the "Experimental" group) 2 = Traditional voucher (TRV) group (also called the "Section 8" group) 3 = Control group **ra_grp_exp** – flag for the LPV (or experimental) group **ra_grp_s8** – flag for the TRV (or Section 8) group **ra_grp_control** – flag for the control group **ra_poolgrp_exps8** – combined flag for the LPV and TRV groups	analysis files
Date of randomization	**ra_date** – date on which the MTO family was randomly assigned to a treatment or control group	analysis files
Compliance Status	**f_svy_cmove** –flag indicating that the family moved using an MTO housing voucher or certificate (LPV or TRV) 1 = core mover (e.g., complier) 0 = not a core mover (e.g., control or noncomplier)	analysis files

Category	Variable and description	Data files
	[In the interim files, this variable is "**svy_cmove**"]	
SAMPLES		

Sample categories for analysis.	**f_svy_sample2007** – categorical variable indicating the final evaluation sample:
	
	    "AD" = adult sample
	    "YT" = youth sample (up to 3 youth per family ages 10-20 as of December 31, 2007)
	
	    "GC" = grown children sample
	
	(Interim sample variable is **svy_sample**.)
		analysis files

Core membership	**f_svy_core_imp**– flag indicating that the person is a core member of the household (member who planned to move with the family if they were offered a voucher).	
Samples used for specific papers	flags to identify main samples analyzed for interim evaluation papers: **flag_paper_ema_a** – article summarizing effects across different domains from the interim evaluation (adult sample; Kling, Liebman, and Katz, 2007) **flag_paper_ema_y** - article summarizing effects across different domains from the interim evaluation (youth sample; Kling, Liebman, and Katz, 2007) **flag_paper_jhredu** – article on effects of MTO on achievement test scores (Sanbonmatsu et al., 2006) flags to identify main samples analyzed for final evaluation papers:	

Category	Variable and description	Data files
	flag_paper_happy_sci - article on effects of neighborhoods on well-being (Ludwig et al., 2012) **flag_paper_aerpp** – article on effects of neighborhoods on adult and youth outcomes (Ludwig et al., 2013) **flag_paper_nejm** – article on effects of neighborhoods on adult diabetes and obesity (Ludwig et al., 2011) **flag_paper_ymh** – article on youth mental health (Kessler et al., 2014)	
DEMOGRAPHICS		
Gender	**f_svy_gender**– gender of the individual. M = Male, F = Female	
Race	**f_svy_race -** race of individual 1=African-American, 2=White, 3=American Indian, 4=Asian/Pacific Islander, 5=Other	
Ethnicity	**f_svy_ethnic** – Ethnicity: 1=Hispanic, 2=Not Hispanic	
Age	**f_svy_age_bl_imp** – baseline age **f_svy_age_2007_imp** – age as of Dec 31st, 2007 **f_svy_age_iw** – age as of final survey interview date	
Year of birth	**f_svy_yob_imp** – year of birth or imputed date of birth if only age was available	
SURVEY DISPOSITION		
	f_svy_final_disp or **f_svy_final_desc** - final disposition categories indicating what version of the final evaluation survey the individual completed (regular, pretest, short-form, phone) or reason they were not interviewed.	

Category	Variable and description	Data files
	f_svy_iwcompl_ad – flag indicating completion of adult interview for final evaluation **f_svy_iwcompl_yt** – flag indicating completion of youth interview for final evaluation	
BASELINE INFO		
Site Categories	**ra_site** – the MTO site at which the family enrolled: 1 = Baltimore 2 = Boston 3 = Chicago 4 = Los Angeles 5 = New York City	
Site Dummy Variables	**x_f_ad_site_balt** – Baltimore site flag **x_f_ad_site_bos** – Boston site flag **x_f_ad_site_chi** – Chicago site flag **x_f_ad_site_la** – Los Angeles site flag (New York is the omitted category in the regression models.) [In the interim files, these variables start with the prefix "**x_ad_site**"]	
Baseline covariates	**x_f_*** (interim x_* variables)	
NEIGHBORHOOD POVERTY		

Category	Variable and description	Data files
duration weighted poverty	**f_c9010t_perpov_dw** - poverty rate of the residential census tracts of the member from random assignment until follow-up	
WEIGHTS		
Final survey weights	**f_wt_totsvy** – weight to use for analyzing the final survey data **f_wt_totdm** – weight to use for decision-making analyses **f_wt_tothpy** – weight to use analyzing parent reports about a youth (HPY items) **f_wt_totling –** weight to use analyzing the linguistic data **[Note that if the MTO data is matched to new administrative data, one could use the following weight to adjust for changes in randomization ratios during the study:** **f_wt_totcore98 –** weights to use for administrative data on core members]**	
Interim survey weights	**wt_totsvy –** weight for analyzing interim survey data **wt_totnobs** - weight for analyzing neighborhood observations **wt_totpocy –** weight for analyzing POCY data **wt_totwjr** – weight for analyzing Woodcock-Johnson test scores **wt_totmsr** - weight for analyzing adult height & weight and blood pressure measurements.	

Table 3. Variable Prefixes

Prefix	Variables
BASELINE	
ad	person-level baseline survey items for adults in household
c1	person-level baseline survey items for children ages 6 to17
c2	person-level baseline survey items for children ages 0 to 5
mn	baseline survey main items (usually household level)
CANVASS	
c97	1997 canvass information
c00	2000 canvass information
RANDOMIZATION	
ra_	randomization or program related variables such as randomization group (ra_group), date of randomization (ra_date), etc.
INTERIM EVALUATION	
A# thru N# (e.g., A1 A2)	A = adult survey items on housing and neighborhood from module A B = adult survey items on education and training from module B C = adult survey items on employment and earnings from module C D = adult survey items on income and public assistance from module D E = adult survey items on outlook and social networks from module E F = adult survey items on health from module F G = adult survey items on household composition from module G H = adult survey items on secondary contacts from module H I = adult survey items on severe blood pressure from module I J = adult survey items on education from module J K = adult survey items on health from module K L = adult survey items on behavior from module L M = adult survey items on time use from module M N = adult survey items on MTO experiences from module N
c_ or cc_	cash assistance outcomes
ca_, il_, ma_, md_, ny_	characteristics of schools for California, Illinois, Massachusetts, Maryland or New York respectively
e_	education outcomes
ema	variables constructed for Econometrica article. These include summary indices of the adult's economic self-sufficiency, physical health, and mental health and summary indices of the youth's (ages 15-20) education (EMA_SM_YE), risky behavior (EMA_SM_YR), physical health (EMA_SM_YP), and mental health outcomes (EMA_SM_YM).
h_	health outcomes
m_	mobility outcomes
n_	school characteristics

nb_	neighborhood outcomes
obs	observations
r_	risky behavior outcomes
sc_	school characteristics

sh_	school history recodes
svy_	Basic demographics such as age and gender and other information
x_	Baseline covariates used at interim
w_	work/employment outcomes
wt_	weights
wjr_	Variables related to the scores or administration of the Woodcock-Johnson revised achievement tests.
FINAL EVALUATION	
ddm_	linguistic dialect density measures
f_**_	outcome domains/areas: f_aa_ = achievement test scores f_cv_ = victimization outcomes f_db_ = dried blood spot outcomes f_ec_ = economic outcomes f_ed_ = education outcomes f_em_ = employment outcomes f_ha_ = housing assistance outcomes f_in_ = income outcomes f_mh_ = mental health outcomes f_nb_ = neighborhood outcomes f_ph_ = physical health outcomes f_py_ = parent reports on youth f_rb_ = risky behavior outcomes f_sa_ = savings outcomes f_sc_ = school outcomes f_sn_ = social network outcomes
f_c**_	f_c90 – 1990 census tract measures f_c00 – 2000 census tract measures f_c10 – American Community Survey (ACS) 2005-09 census tract measures f_c9010 – linearly interpolated census measures using census 1990, census 2000, and ACS for 2005-09
flag_paper_	flags identifying samples that apply to specific publications. For example, "FLAG_PAPER_EMA_Y" identifies the sample of youth ages 15-20 (as of 2001) who were analyzed in Kling, Liebman, & Katz (2007).
lang_	linguistic outcomes
f_svy_	demographics and other basic information about an individual or household
f_wt_	final evaluation weights
happy_	well-being measures (happiness)

h**	"H" for adult/household survey plus 2 characters representing each raw survey module:
	HCV = Household Crime Victimization & PTSD HDB = Dried Blood Spot Collection HDE = Mental Health – Depression HDM = Decision Making HED = Education and Training HEM = Employment HGA = Mental Health – Generalized Anxiety Disorder HHC = Housing Consumption and Mobility HHO = Respondent Report of Household Outcomes HIE = Mental Health – Intermittent Explosive Disorder HIN = Income and Public Assistance HK6 = K-6 Index Plus Tranquility HMA = Mental Health – Mania HNB = Neighborhoods HPD = Mental Health – Panic Disorder HPH = Physical Health HPY = Parent on Youth HRL = Relationships and Parenting HRS = Household Listing HSA = Savings and Assets HSC = Mental Health Screener HSN = Outlook and Social Networks HSR = Mental Health Services HSU = Substance Abuse
io	industry and occupation
nwa	observations from the neighborhood walk around
x_f_**	Baseline covariates: x_f_ad = adult characteristics x_f_c1 = characteristic of child age 6 to 17 at baseline x_f_c2 = characteristic of child age 0 to 5 at baseline x_f_ch = child characteristic (across age groups) x_f_hh = household characteristic at baseline x_f_go = grown child characteristic x_f_hood = neighborhood characteristic at baseline x_f_hous = housing/move characteristic at baseline x_f_oa = characteristics of other adult members of the household x_f_release1 = flag indicating included in first release of survey during fielding x_f_site_ = flags for the different sites
y**	"Y" for youth interview plus 2 character abbreviation for each raw survey module. YAT = Older Youth Assessments YCV = Youth Crime Victimization & PTSD

	YDE = Youth Mental Health – Depression YDM = Youth Decision Making YED = Youth Education and Training YEM = Youth Employment YGA = Youth Mental Health – Generalized Anxiety Disorder YHL = Youth Household Listing YIE = Youth Mental Health – Intermittent Explosive Disorder YK6 = K-6 Index Plus Tranquility and Strengths & Difficulties YMA = Youth Mental Health – Mania YNB = Youth Neighborhoods YOD = Youth Mental Health – Oppositional Defiant Disorder YOP = Youth Reports on Parents and Parenting YPD = Youth Mental Health – Panic Disorder YPH = Youth Physical Health YRB = Youth Risky Behavior YSC = Youth Mental Health Screener YSN = Youth Outlook and Social Networks
ymh*	additional variables from the youth mental health article (Kessler, 2014) such as: YMH_BIPOLAR_I_II_Y- a measure of DSM-IV bipolar I or II (12 month), and YMH_CD_3X_Y- a measure of conduct disorder: 3+ instances of 3 of 5 behaviors.

8.   Data sources and measures for the final evaluation

This section briefly describes the main data sources for the final evaluation. [For information on the interim evaluation, refer to the interim HUD report (Orr et al. 2003)].

Survey Data: The adult survey asked respondents a variety of questions about household members, housing and mobility, neighborhoods, social networks, education, employment and earnings, income, public assistance, savings and assets, mental and physical health, decision making, relationships and parenting, and reports on household outcomes. The youth survey asked about neighborhoods, social networks, education and schooling, employment and earnings, risky behavior and behavior problems, mental health, physical health, decision making, and youth reports on parenting. The survey fielding design employed two-phase sampling to obtain responses from a representative subsample of hard-to-locate respondents (Groves et al., 2004). In the main sample phase, SRC sought to contact and interview all of the adults and youth who were in the survey sample frame. They offered $50 to everyone selected for the survey sample frame to complete the surveys. They offered adults an additional $25 to provide biomarkers (like blood spot samples) and $10 for the audio recording. They offered youth an extra $25 to complete the reading and math achievement tests. Once SRC reached a response rate of approximately 75 percent for the adult or youth survey for a site, it selected a random subset of the 35 percent of the remaining cases for more intensive interviewing efforts. In the data analysis, they "weighted up" the interviews they conducted as part of the second phase by $1/.35 = 2.856$ to represent the other hard-to-reach cases that they did not try to interview. The "effective response rate" for the study was 90 percent for the adult sample and 89 percent for the youth sample.

Structured Diagnostic Interview: Embedded within the survey was a structured diagnostic interview to assess mental health disorders such as depression and generalized anxiety. Our diagnostic instrument was based on portions of the World Health Organization's Composite International Diagnostic Interview (CIDI). The CIDI which was revised to make diagnoses according to the definitions and criteria of the DSM-IV (American Psychiatric Association, 1994) and expanded and updated for the WHO World Mental Health Survey Initiative (2004). The CIDI was developed with careful attention to instruction, comprehension, and motivation to increase the accuracy of reports (Kessler and Üstün, 2004) and has been validated through clinical reappraisals (Haro et al., 2006).

Decision making: The long-term evaluation included a decision making experiment within the experiment. The decision making experiment consisted of a single item that asked respondents to choose between receiving $20 with no delay and $25 at some point in the future. The experiment was designed to examine MTO effects on time preferences, especially delayed gratification, and it also offers an opportunity to contrast treatment effects on real stakes preferences expressed in the experiment with hypothetical preferences measured by similar items in the decision making module that are not for-stakes. Random subgroups of the survey-selected Experimental and Control group samples were selected for participation in the decision making experiment. Eligibility for the experiment was also restricted to youth ages 13 to 20 (as of December 2007). Because an additional financial incentive was provided to eligible participants, we selected youth at the family level so that youth in the same family were not offered different incentive amounts.

Biomeasures: Adult and youth height and weight were measured during the long-term survey to allow for the calculation of body mass index. Interviewers took up to two blood pressure readings for adults Interviewers took respondents' blood pressure using a large-sized automated blood pressure cuff (Omron automated

sphygmomanometer model HEM-711DLX) designed to accommodate arm circumferences from 22 to 42 centimeters and also collected blood spot samples. Interviewers asked participants if they could collect a small sample of their blood by pricking their fingers with a small instrument (sterile, single-use lancet) and then collecting enough blood to fill six small circles on a collection card. Respondents were offered an additional $25 incentive (on top of the incentive provided for completing the interview) for this blood sample collection. Among those interviewed and eligible for blood spot collection, the consent rate was over 90 percent. Interviewers to prick the finger of the participant and collected up to six drops of blood on specimen paper, with one spot pretreated for the analysis of glycosylated hemoglobin (HbA1c). The dried blood spots were assayed by Flexsite, Biosafe, and the a lab at the University of Washington. The archive includes dried blood spot assay results for c-reactive protein (CRP) and glycated hemoglobin (HbA1c).

Census Data Linked to Address Histories: To help us understand the neighborhood conditions in which MTO families were living during the course of the program, we reconstructed each family's residential history from random assignment onward. Our strategy was to assemble a best guess of the family's residential history from administrative records and previous canvasses and surveys of MTO families and then ask MTO adults to confirm or correct their full history. After constructing the residential histories, HUD geocoded all addresses to 1990 and 2000 Census tracts and we then linked those tract identifiers to tract characteristics from the 1990 and 2000 decennial censuses and to the 2005-2009 American Community Survey 5-year period data. The tract characteristics were then linearly interpolated and extrapolated to capture neighborhood characteristics at particular points in time and to calculate the tract characteristics of all the addresses that families lived at from the time of random assignment through May 2008, weighting each tract by the duration of time the family lived in that tract.

School Histories: As part of our in-person survey data collection we obtained an in-depth retrospective history of schools that children attended. We asked youth to report all of the schools they attended for each grade from their current or most recent school back through to their grade at baseline (or back through kindergarten for youth who were not yet of elementary school age at baseline). For approximately 60 percent of the youth sample, the school history is constructed by combining youth reports from their most recent school attended to the last school reported by their parents at the interim survey point. One challenge in constructing the school history was to identify all of the specific schools that were mentioned by survey respondents. Most schools were accurately identified by using a school-lookup to identify the school during the interview. For schools that could not be identified during the interview, the respondent was asked for the name and address of the school. The information provided was sometimes, but not always, sufficiently detailed to identify the school. In some cases the respondent did not report the name of the school. Across our sample, we were able to identify the schools for approximately 92 percent of all student-years of elementary and secondary education attended from baseline to interview date. We use the school history to construct measures of school mobility such as counts of the total number of different schools and school districts attended. Additionally, we used the school history information to match the schools attended by the MTO youth to data from the National Center for Education Statistics (NCES) Common Core of Data (1993-94 to 2009-10 academic years; U.S. Department of Education, 2011a) and Private School. For the long-term survey, these youth were asked to report on their schools and grades going back only to the highest grade reported by their parent at interim. Surveys (available years between 1993-94 and 2007-08; U.S. Department of Education, 2011b). This allows us to construct a host of school-level characteristics depicting sociodemographic composition of the student body (racial/ethnic composition, free and reduced price lunch eligibility), school size (the number of students as of October), pupil-teacher ratio, Title I status, and the type of school (magnet or charter). In addition, we matched the schools to the National Longitudinal School-Level State

Assessment Score Database (NLSLSASD) spanning 1999 to 2007 to obtain school-level test score data that we then used to rank the schools within MTO's five main states (NLSLSASD, 2010). We use school-level statistics on the share of students at each school performing at or above proficiency in math and in reading (or language arts scores when reading is not available) to rank schools for a specific grade, academic year, and subject. We then average the reading and math rankings to obtain a combined measure.

Index Outcome Measures: The data include index measures of adult mental health, physical health, and economic self-sufficiency and youth education, risky behavior, mental health, and physical health. The elements of the outcome indices were pre-specified for the final evaluation based on what was constructed for the interim follow-up. Our adult economic self-sufficiency index is composed of: an indicator for whether the respondent is currently employed and not on Temporary Assistance to Needy Families (TANF), an indicator for currently employed, total annual earnings, an indicator for currently on TANF, and total annual income from government programs. Our adult physical health index consists of: self-reported health is fair or poor, the respondent had an asthma attack the past year, obesity, hypertension, and trouble carrying groceries or climbing stairs. Our adult mental health index consists of: a psychological distress index score for the past month, depression in the past year, Generalized Anxiety Disorder in the past year, calm and peaceful during the past month, and normal sleep last night. For youth, the physical health index includes an indicator for fair or poor self-reported health, an indicator for the youth having an asthma attack the past year, an indicator for the youth experiencing a non-sports accident or injury that required medical attention in the past year, and overweight/obesity. The youth mental health index consists of a psychological distress index score for the past month and indicators for ever having had depression and Generalized Anxiety Disorder. The risky behavior index includes indicators for the use of drugs, alcohol, and cigarettes in the past month and for ever having been or gotten someone pregnant. The educational attainment index consists of the ECLS-K math and reading scores, an indicator for current school enrollment or completion of high school or a certificate of General Educational Development (GED), and an indicator for idleness (currently neither in school nor working). To construct the indices, each variable within these outcome indices is first re-scaled so that higher values equal "better" outcomes, then converted to z-scores by subtracting the control group mean and dividing by the control group standard deviation, then averaged across all individual outcomes within the domain, and then re-scaled again so that the index itself has a standard deviation of one. For people missing data on any element of the index, we impute the group average value of that variable, which yields estimates that are the equivalent of the average of the coefficients.

Achievement Tests: The youth in-person interviews included a 45-minute achievement assessment in math and reading as designed for the 5th and 8th grade follow-up waves of the U.S. Department of Education's Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K).6 Youth ages 10 to 12 were administered the 5th grade test and youth ages 13 to 20 were administered the 8th grade test. The ECLS-K assessments are adaptive—respondents first take a short "routing test" that then directs the interviewer to provide them with test forms of different difficultly levels—to reduce the time required to accurately measure a subject's academic achievement level.7 . To avoid "ceiling effects" (cases where some children know everything that is covered on the test and get everything right, so that their actual achievement level cannot be pinned down), the ECLS assessments were supplemented with additional reading and math items from the 10th grade test that was used in the U.S. Department of Education's National Education Longitudinal Study of 1988 (NELS). Because not all youth were asked every test item, the assessments were scored for us by the Educational Testing Service (ETS) to provide estimates of each youth's underlying academic ability (known as a "theta score" in the testing literature) as estimated from a statistical model based on item response theory.

Linguistic measures: The linguistic component of the long-term evaluation was designed for the analysis of differences in speech patterns between the Experimental and Control groups. The linguistic items ask respondents to describe a personal experience and then to either read a passage or repeat phrases stated first by the interviewer. The recoded linguistic data included on the archive comes from responses to an open-ended question about either the happiest or the scariest moment in the respondent's life and to responses to an open-ended question at the end of the surveys about whether the respondent had anything else to say about their neighborhood or housing programs more generally. Random subsamples of adults and youth ages 13 to 20 were selected for the linguistic component from only the low poverty and control groups. Selection of adults for the linguistic component excluded adults who were presumed to be Spanish speakers because they signed a consent form written in Spanish at the time they joined the program. Speech data was collected during the survey interviews. The speech recordings were transcribed by Holly Craig and her team at the University of Michigan and coded for African American Vernacular English (AAVE) versus Standard American English (SAE) usage by a team of linguistics led by John Rickford and Rebecca Greene at Stanford University. Both grammatical and phonological features were coded. The five grammatical language features are use of " ain ' t " rather than standard negators ("aren't", "isn't", and "hasn't"); multiple negation involving the use of negative indefinites such as "never" or "nothing," or "no one" in addition to a negated auxiliary verb such as "shouldn't"; absence of third singular present tense "s" (for example, "He walkØ" for "He walks "); absence of copula or auxiliary "is" or "are" (e.g., "They Ø happy" instead of "They are happy "); and "was–leveling" such as using "They was nice" instead of "They were nice"). Five phonological language features were also examined: consonant cluster reduction (e.g., "fas" for "fast"); r-deletion or vocalization after a vowel (e.g., "mothuh" for "mother"); DH-stopping (e.g., "dis" for "this"); TH-stopping such as "wit" for "with" or "mout" for "mouth"; and, lastly, "ai" monophthongization such as "rad" for "ride" or "ah" for "I"). A token can be a single phoneme or pronunciation segment or a grammatical form. A single phrase could contain more than one example of AAVE use and generate two tokens. Coding of r-deletion and DH-stopping were each capped at 10 tokens per speaker. For more details on the linguistic coding, see Rickford et al. (2015). Note that this archive includes the coded tokens used for analysis but does not include the actual speech recordings, or transcripts. The archive does not include data from the portion of the study involving reading a passage or repeating phrases.

.**9.** **Documentation**

The HUD MTO data archive is described in the following documents.

a) Cover memo. This document provides an overview of the data.

b) Survey Instruments. These documents provide the survey items and any response categories. These documents also indicate skips and often provide the names of the raw survey variables.

- mto_instrument_baseline.pdf – baseline survey instrument
- mto_instrument_interim_adult.pdf – adult/household instrument survey at interim.
- mto_instrument_interim_child.pdf – child survey instrument at interim
- mto_instrument_interim_youth.pdf – youth survey instrument at interim
- mto_instrument_interim_neighborhood_obs.pdf - neighborhood observations instrument at interim

- mto_instrument_interim_hhold_obs.pdf - household observations instrument at interim
- mto_instrument_final_adult.pdf – adult survey instrument at final.
- mto_instrument_final_adult_short.pdf – short version of adult survey at final. Administered to small number of respondents.
- mto_instrument_final_youth.pdf – youth survey instrument at final.
- mto_instrument_final_neighborhood_obs.pdf - instrument for conducting the neighborhood walk around (NWA) at final
- mto_instrument_final_youth_short.pdf – short version of youth survey instrument at final. Administered to small number of respondents.

Note that the MTO survey questions were generally drawn from large national surveys. In the final survey instruments, the "field tag" that follows the variable name often indicates the source of the question (e.g., NCS = National Comorbidity Survey"). Page 6 of the adult and youth survey instruments list the source acronyms. In addition, the interim and final item-by-item justifications in the submission to the Office of Management and Budget indicate the source of each question.

c) Michigan Questionnaire Documentation System (MQDS). These documents contain extremely detailed information about the Blaise computer administration of the final surveys including the "universe" for each question. MQDS is best used only when the simpler "mto_instrument" documentation cannot answer a question about the survey.

- mto_final_mqds_adult_english.doc – MQDS document for the adult (household) final survey.
- mto_final_mqds_adult_spanish.rtf – MQDS document for the Spanish version of the adult final survey.
- mto_final_mqds_youth.doc – MQDS document for the final youth survey.

d) HUD MTO Codebook - This Excel workbook describing the variables in each dataset.

"hud_mto_codebook_confid_20170420.xls" – each dataset has a worksheet in the codebook that lists the names of the variables on the file as well as their position, label, type, length, formats, minimum value, maximum value, and any category codes or other notes.

e) SAS® Content Lists - PDFs with the SAS proc contents of each of the datasets:

(files #1 and #2 intentionally omitted)

Baseline:
contents_03_mto_bascnv_pers.pdf
contents_04_mto_bascnv_hhld.pdf

Interim:
contents_05_mto_int_anly_childyth.pdf
contents_06_mto_int_anly_adult.pdf
contents_07_mto_int_rawsvy_adult.pdf
contents_08_mto_int_rawsvy_youth.pdf
contents_09_mto_int_rawsvy_child.pdf
contents_10_mto_int_rawsvy_pocy.pdf
contents_11_mto_int_sch_hx.pdf
contents_12_mto_int_roster.pdf
contents_13_mto_int_addrhx.pdf

Final:
contents_14_mto_fin_analysis.pdf
contents_15_mto_fin_rawsvy_adult.pdf
contents_16_mto_fin_rawsvy_youth.pdf
contents_17_mto_fin_addrhx.pdf
contents_18_mto_fin_raw_dwelling.pdf
contents_19_mto_fin_raw_dwellmap.pdf
contents_20_mto_fin_ling_token.pdf
contents_21_mto_fin_sch_hx.pdf
contents_22_mto_fin_roster.pdf

f) Value formats. The SAS® program called **"hud_mto_final_fmts.sas"** contains the "proc format" statements needed to create the formats listed in the codebook. The SAS® program called "**hud_mto_macros_attfmts_rev.sas**" contains the snippets of SAS code needed to assign formats to specific variables.

g) Detailed documentation of recodes for select outcomes and mediators. Many of the outcomes and mediators constructed have detailed documentation showing the code used to create them from the raw variables.

dtdic_hud_mto_interim_child_detailed_recodes.pdf
dtdic_hud_mto_interim_adult_detailed_recodes.pdf

hud_mto_fin_youthgc_detailed_recodes.pdf
hud_mto_fin_adult_detailed_recodes.pdf

h) Technical Appendices. This document will contain additional details about the final evaluation's survey fielding, biomeasure data collection (dried blood spots, height, weight, blood pressure), final address history, school history, achievement tests, linguistics, covariates, and weights**.**

Note that Abt Associates provided documentation to the U.S. Department of Housing and Urban Development that may be useful in understanding the interim data.

10. Analyzing the Data

Datasets

The main interim analysis files are **MTO_INT_ANLY_CHILDYTH** (child and youth outcomes) and **MTO_INT_ANLY_ADULT** (adult outcomes). The final evaluation analysis data file, MTO_FIN_ANALYSIS, includes both adult and youth outcomes. The analysis files contain recoded outcomes and mediators, treatment status, and the analysis weights. A separate analysis file (**MTO_FIN_LING_TOKEN**) contains the linguistic tokens for analyzing use of AAVE. The data archive also contains the raw survey data (see files starting with **MTO_INT_RAWSVY*** and **MTO_FIN_RAWSVY***) which can be used to construct additional outcomes. Participants' address histories (at the census tract level) from random assignment through interim are contained on

MTO_INT_ADDRHX and from random assignment through final on **MTO_FIN_ADDRHX**. The final address history was constructed using information on each address (see **MTO_FIN_RAW_DWELLING**) and information from various sources linking participants to specific addresses at different points in time (see **MTO_FIN_RAW_DWELLMAP**). The address history shows the stopping and starting calendar quarter of each address and the census tract. Survey data was also used to construct school histories for the youth at interim (**MTO_INT_SCH_HX**) and at final (**MTO_FIN_SCH_HX**) that could then be linked to school characteristics and school-level test information. Recodes of school characteristics are also contained on the main interim and final analysis files. Lastly, the archive consists of roster files that contain information on both the original and new members of the households (**MTO_INT_ROSTER** and **MTO_FIN_ROSTER**). These files also contain some outcome information gathered through proxy reports from the adult survey.

Final Evaluation Samples

Adults and youth were selected for interview for the final evaluation. Only core household members or members who planned to move with the family if they received a housing voucher were eligible for interview. Up to one adult and three youth were selected for interview from each family.

The variable *f_svy_sample2007* defines the sample status of each individual for the final evaluation. This status takes into account selection into the survey sample, core versus non-core status (including imputed core status for the fifteen families without complete core info), and date of birth updates from the long-term evaluation. It allows one to identify individuals who were part of the sampling frame and those within the sampling frame who were selected for interview:

- All adults in the survey sampling frame (regardless of selection): *f_svy_sample2007* = "AD" or "ES" (n = 4,604)
- Adults selected for interview: *f_svy_sample2007* = "AD" (n = 4,142)

- All youth ages 10-20 in survey sampling frame (regardless of selection): *f_svy_sample2007* = "YT" or "EY" (n = 6,645)
- Youth ages 10-20 selected for interview: *f_svy_sample2007* = "YT" (n = 6,308)

The final disposition variable (*f_svy_final_disp*) provides information on whether an interview was completed, whether it was a phone or in-person interview, and, if an interview could not be completed, why not (unable to locate, refusal, deceased, etc.)

For analyzing individuals with survey data (either self-reported or provided by the adult interviewed), the following samples can be identified:

- Interviewed adults: *f_svy_sample2007* = "AD" and *f_svy_iwcompl* = 1 (n = 3,273)
- Interviewed youth (ages 10-20): *f_svy_sample2007* = "YT" and *f_svy_iwcompl* = 1 (n = 5,201)

Youth survey questions depended on the age of the youth as of December 2007 (see *f_svy_age_2007_imp)* and for some questions on the gender of the youth (see *f_svy_gender)*.

Weights

Researchers should weight the final survey data to account for changes in randomization ratios during the MTO experiment and for the probability of selection into the survey and components of the survey. Weighting is critical for analysis of the data because without weighting the treatment and control groups may be unbalanced in terms of cohort, site, and other characteristics. In general, researchers should use the following weight in analyzing the final survey data:

- *f_wt_totsvy* – the primary weight used for survey data analyses.

This weight is the product of three components weights: 1) **Randomization ratio weight** – At the start of the MTO program, random assignment (RA) ratios were set to produce equal numbers of leased-up families in the low-poverty and traditional voucher groups based on expected lease-up rates. The initial ratios were "8 to 3 to 5": eight low poverty voucher group families to three traditional voucher families to five control families. During the demonstration program, these RA ratios were adjusted to accommodate higher than anticipated lease up rates among low-poverty voucher group families. For a complete list of the randomization ratios for each site, see Exhibit B.3 in Appendix B of the interim evaluation report (Orr et al., 2003). 2) **Survey sample selection weight** – We have survey data for two samples: adults and youth. No adjustment for selection of Experimental and Control group adults into the sample is necessary because we selected a sample adult from each core household. For Section 8 adults, long-term evaluation funding limited adult survey eligibility to a randomly selected 884 of the 1,346 total Section 8 households. The random selection of Section 8 adults was stratified by site and an indicator for whether there were survey-eligible youth in the household. The probability of being selected was 884/1346, and the component weight for Section 8 adults is equal to the inverse probability of selection or about 1.52. For the youth, the weights adjust for the fact that up to three youth ages 10 to 20 were selected from each family for interviewing. 3) **Phase 2 subsampling weight** – The long-term survey data collection was completed as a two-phase process. In the first phase, we sought to interview all selected respondents. Phase 2 of fielding was triggered when the response rate reached approximately 74%. In the second phase, we subsampled a random 35% of the remaining sample and only sought interviews with the selected subsample of respondents. This weight component is equal to the inverse probability of selection into the subsample.

Some parts of the survey involved additional selection criteria and have their own special weights. These weights are:

- *f_wt_totling* – weight for analyzing the linguistic recodes and tokens,
- *f_wt_totdm* – weight for analyzing the decision making experiment items
- *f_wt_tothpy* – weight for analyzing parent reports about a selected youth from the HPY module
- *f_wt_totsvy_ad* – weight for analyzing data reported by the adult about other household members (parent reports, reports on household members)

For analyzing administrative data or other data that focuses on core household members but is not restricted to the interview sample, use:

- *f_wt_totcore98* – used for all administrative data analysis

Lastly, use the following variable for calculating effective response rates:

- o *f_wt_toterr* – used to calculate the effective survey response rate

Baseline Covariates

Estimates of treatment effects reported in the interim and final evaluation reports to HUD and in academic articles typically control for a series of baseline covariates in an attempt to improve the precision of the estimates. Covariates are constructed from baseline survey information as well as basic demographic information such as an individual's age and gender. In the interim data, these covariates start with the prefix "x_" and in the final data they start with the prefix "x_f_." Covariate prefixes further identify subsets of covariates as described in Table 3. The covariate controls used for specific papers may differ depending on the domain and analytic method (e.g., in some cases a more specific or streamlined set of covariates may be needed). (Note that in addition to the main covariates that general start with "x_" there are some covariates (used for particular analyses) that start with the prefix "cov_.")

The standard covariates controlled for in the adult analyses presented in the final HUD report are:

Age dummies: x_f_ad_36_40 x_f_ad_41_45 x_f_ad_46_50

Education x_f_ad_edged x_f_ad_edgradhs x_f_ad_edgradhs_miss x_f_ad_edinsch

Race, ethnicity, gender, and other baseline characteristics: x_f_ad_ethn_hisp x_f_ad_le_35 x_f_ad_male x_f_ad_nevmarr x_f_ad_parentu18 x_f_ad_race_black x_f_ad_race_other x_f_ad_working

Household characteristics: x_f_hh_afdc x_f_hh_car x_f_hh_disabl x_f_hh_noteens x_f_hh_size2 x_f_hh_size3 x_f_hh_size4 x_f_hh_victim

Neighborhood characteristics: x_f_hood_5y x_f_hood_chat x_f_hood_nbrkid x_f_hood_nofamily x_f_hood_nofriend x_f_hood_unsafenit x_f_hood_verydissat

Housing and mobility: x_f_hous_fndapt x_f_hous_mov3tm x_f_hous_movdrgs x_f_hous_movschl x_f_hous_sec8bef

Site: x_f_site_balt x_f_site_bos x_f_site_chi x_f_site_la

Survey fielding first release: x_f_release1

For youth, we controlled for all of the adult covariates (associated with their family) plus covariates specific to the youth:

Information about children who were 0 to 5 at baseline: x_f_c2_hosp x_f_c2_hosp_miss x_f_c2_lowbw x_f_c2_lowbw_miss x_f_c2_read x_f_c2_read_miss

Information about children who were 6 to 17 at baseline: x_f_c1_behprb x_f_c1_behprb_miss x_f_c1_expel x_f_c1_expel_miss x_f_c1_gifted x_f_c1_gifted_miss x_f_c1_lrnprb x_f_c1_lrnprb_miss x_f_c1_schcll

Age as of December 31, 2007: x_f_ch_age10 x_f_ch_age11 x_f_ch_age12 x_f_ch_age13 x_f_ch_age14 x_f_ch_age15 x_f_ch_age16 x_f_ch_age17 x_f_ch_age18 x_f_ch_age19 x_f_ch_age20

Flag indicating baseline age group: x_f_ch_bl_age617

Gender and questions asked for children of all ages: x_f_ch_male x_f_ch_schplay x_f_ch_schplay_miss x_f_ch_specmed

For analysis of the grown children proxy reports, we control for the adult covariates, the child covariates (except age) and then age covariates specific to this group:

x_f_go_age_21 x_f_go_age_22 x_f_go_age_23 x_f_go_age_24_26 x_f_go_age_27_31

Covariates have been constructed so that they have non-missing values for all main sample members. For baseline items with a low level of missing information ($< 5\%$),values were imputed by site, treatment group, age, and gender. Note that these imputed values are often a fractional value for a 0 versus 1 flag. For example, a value of .22 on the flag for working at baseline (x_f_ad_working) would indicate that the average value for adults in the same site and treatment group was 22% working. For items with more than 5% missing, these values were set to zero and a flag was created to indicate that the value was originally missing. These "missing" covariate flags ended with the suffix "_miss". Also note that if an item does not apply to a person because they were not a particular age at baseline, the covariate is given a value of zero. In analyzing the youth data, it is important to include a flag for whether the child was 6 to 17 at baseline (x_f_ch_bl_age617) because some of the baseline covariates apply to children who were 0 to 5 at baseline and other questions apply to children who were older.

Estimation of Control and Treatment Means

In Stata, the weighted mean of a baseline characteristic such as "never married" can be calculated by using the weight variable (*f_wt_totsvy*) and restricting to either the control group (*ra_grp_control == 1*), one of the treatment groups (*ra_grp_s8 ==1* or *ra_grp_exp == 1*), or the pooled treatment groups (*ra_poolgrp_exps8 = 1*):

```
summarize x_f_ad_nevmarr [aw=f_wt_totsvy] if ra_grp_control == 1
summarize x_f_ad_nevmarr [aw=f_wt_totsvy] if ra_poolgrp_exps8  ==1
```

To test the significance of the difference in means, we use a weighted regression of the treatment group dummy on the baseline characteristic. We use the t-statistic on the treatment group coefficient to calculate the p-value for a two-tailed t-test of two samples with equal variance:

```
regress x_f_ad_nevmarr ra_poolgrp_exps8 [pw=f_wt_totsvy]
scalar sc_diff_pv = (ttail(e(N) - e(df_m), _b[ra_poolgrp_exps8] /
_se[ra_poolgrp_exps8])) * 2
```

where *e(N)* is the regression sample size, *e(df_m)* is the regression degrees of freedom, *_b[ra_poolgrp_exps8]* is the coefficient on the treatment dummy variable (for the pooled LPV/TV treatment group), and *_se[ra_poolgrp_exps8]* is the standard error of the treatment variable.

Estimation of Intention-to-Treat (ITT) Effects

Intent to treat effects (ITTs) can be estimated using a linear regression in which the dependent variable is the outcome and the key independent variables are dummy variables for the low poverty (*ra_grp_exp*) and traditional voucher group (*ra_grp_s8*). In addition, the regression controls for randomization site (using the four *x_f_site_** indicators, with New York City as the omitted category) and other baseline measures that include demographic information such as age, race/ethnicity, and education status as well as housing and neighborhood quality and satisfaction indicators. The regression applies a probability weight (*f_wt_totsvy*) and generates Huber-White robust standard errors. In Stata, the command line to estimate the impact on adult subjective well-being (as of the final evaluation) of being offered an MTO housing voucher is as follows:

```
regress happy_scale123_z_ad ra_poolgrp_exps8 ${xcovs} if f_svy_iwcompl_ad==1
    [pw=f_wt_totsvy]
```

for which the coefficient `ra_poolgrp_exps8` is the estimated effect of offering either type of voucher. The global "xcovs" is the list of all relevant covariates. The sample is limited to adults who completed the final survey evaluation (*f_svy_iwcompl_ad==1*).

To estimate the effects for each treatment group separately, one could include one treatment in the model and exclude the other group:

```
regress happy_scale123_z_ad ra_grp_exp ${xcovs} if f_svy_iwcompl_ad==1 &
    ra_group ~= 2 [pw=f_wt_totsvy]

regress happy_scale123_z_ad ra_grp_s8 ${xcovs} if f_svy_iwcompl_ad==1 &
    ra_group ~= 1 [pw=f_wt_totsvy]
```

Estimation of Treated-on-Treated (TOT) Effects

The TOT estimate and standard error can be calculated by dividing the ITT estimate and standard error by the weighted compliance rate (the fraction of the treatment group(s) who moved using their MTO vouchers). Alternatively, the TOT can be estimated using two-stage least squares.

Estimation of the Relationship Between Outcomes and Specific Neighborhood Conditions Using Site Interactions with Treatment Group as Instruments

In some of the MTO academic articles, a two-stage least squares approach (2SLS) was used to estimate the relationship between an outcome and neighborhood poverty (see Kling, Liebman & Katz, 2007). In the first stage indicators for randomization site interacted with treatment assignment are used to predict census tract share poor with additional controls for randomization site alone and applying probability weights. In the second stage, the instrumented neighborhood measure (share poor) is used to predict the outcome, with additional controls for randomization site as above. In Stata, the command to run a 2SLS IV regression to estimate the relationship between say subjective well-being and share poor (as reported in Ludwig et al., 2012) is:

```
ivreg2 happy_scale123_z_ad ${site_covs} (f_c9010t_perpov_dw_z =
      ${instruments}) [pw=f_wt_totsvy], first small
```

where the globals are defined as follows:

```
* set global "site_covs" with the four site covariates with New York as
the omitted category (exogenous vars)

global site_covs x_f_site_balt x_f_site_bos x_f_site_chi x_f_site_la

* set global "xcovs" with covariate variables (exogenous covariates)

global cov_hh x_f_hh_afdc x_f_hh_car x_f_hh_disabl x_f_hh_noteens
x_f_hh_size2 x_f_hh_size3 x_f_hh_size4 x_f_hh_victim

global cov_hous x_f_hous_fndapt x_f_hous_mov3tm x_f_hous_movdrgs
x_f_hous_movschl x_f_hous_sec8bef

global cov_hood x_f_hood_5y x_f_hood_chat x_f_hood_nbrkid
x_f_hood_nofamily x_f_hood_nofriend x_f_hood_unsafenit
x_f_hood_verydissat

global cov_ad x_rad_ad_le_35 x_rad_ad_36_40 x_rad_ad_41_45 x_rad_ad_46_50
x_f_ad_edged x_f_ad_edgradhs x_f_ad_edinsch x_rad_ad_male x_f_ad_nevmarr
x_f_ad_parentu18 x_f_ad_working x_f_ad_edgradhs_miss
x_rad_ad_ethrace_hisp x_rad_ad_ethrace_black_nh

global xcovs $cov_ad $cov_hood $cov_hous $cov_hh x_f_release1



* set global "instruments" to be site-group interacted variables
(endogenous covariates/instruments):

global lpv_insts sgx_rasite_ex_all_bal sgx_rasite_ex_all_bos
sgx_rasite_ex_all_chi sgx_rasite_ex_all_la sgx_rasite_ex_all_nyc
```

```
    global trv_insts sgx_rasite_s8_all_bal sgx_rasite_s8_all_bos
    sgx_rasite_s8_all_chi sgx_rasite_s8_all_la sgx_rasite_s8_all_nyc
```

or including a full set of covariates:

```
ivreg2 happy_scale123_z_ad $xcovs $site_covs (f_c9010t_pminorty_dw_z =
$instruments) [pw pw=f_wt_totsvy], first small
```

References

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (4th ed.).Washington, DC.

Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz (2016). The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment. *American Economic Review*, 106(4): 855-902.

Groves, Robert M., Floyd J. Fowler, Mick P. Couper, James M. Lepkowski, Eleanor Singer, and Roger Tourangeau. (2004). Survey Methodology. New York: John Wiley & Sons.

Haro, Josep M., Saena Arbabzadeh-Bouchez, Traolach S. Brugha, Giovanni De Girolamo, Margaret E. Guyer, Robert Jin, Jean Pierre Lepine, Fausto Mazzi, Blanca Reneses, Gemma Vilagut, Nancy A. Sampson, and Ronald C. Kessler. (2006). Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health Surveys. *International Journal of Methods in Psychiatric Research* 15(4): 167-80.

Kessler, Ronald C., Greg J. Duncan, Lisa A. Gennetian, Lawrence F. Katz, Jeffrey R. Kling, Nancy A. Sampson, Lisa Sanbonmatsu, Alan M. Zaslavsky, and Jens Ludwig (2014) *Journal of the American Medical Association*, 311(9): 937-948.

Kessler Ronald C. & TB Ustün. (2004) The World Mental Health (WMH) survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research*. 13(2):93-121.

Kling, Jeffrey R., Jeffrey B. Liebman, and Lawrence F. Katz (2007) Experimental Analysis of Neighborhood Effects. *Econometrica*, 75(1): 83-119.

Ludwig, Jens, Greg J. Duncan, Lisa A. Gennetian, Lawrence F. Katz, Ronald C. Kessler, Jeffrey R. Kling, and Lisa Sanbonmatsu (2012) Neighborhood Effects on the Long-Term Well-Being of Low-Income Adults. *Science*, 337(6101): 1505–1510.

Ludwig, Jens, Greg J. Duncan, Lisa A. Gennetian, Lawrence F. Katz, Ronald C. Kessler, Jeffrey R. Kling, and Lisa Sanbonmatsu (2013) Long-Term Neighborhood Effects on Low-Income Families: Evidence from Moving to Opportunity. *American Economic Review Papers & Proceedings*, 103(3): 226-231.

Ludwig, Jens, Lisa Sanbonmatsu, Lisa Gennetian, Emma Adam, Greg J. Duncan, Lawrence Katz, Ronald Kessler, Jeffrey Kling, Stacy Tessler Lindau, Robert Whitaker, and Thomas McDade (2011) New England Journal of Medicine. 365(16): 1509-1519.

Orr, Larry, Judith D. Feins, Robin Jacob, Erik Beecroft, Lisa Sanbonmatsu, Lawrence F. Katz, Jeffrey B. Liebman, and Jeffrey R. Kling (2003) *Moving to Opportunity for Fair Housing Demonstration Program: Interim Impacts Evaluation*. (U.S. Department of Housing and Urban Development, Office of Policy Development and Research, Washington, DC); available at www.huduser.org/Publications/pdf/MTOFullReport.pdf.

Rickford, John R., Greg J. Duncan, Lisa A. Gennetian, Ray Yun Gou, Rebecca Greene, Lawrence F. Katz, Ronald C. Kessler, Jeffrey R. Kling, Lisa Sanbonmatsu, Andres E. Sanchez-Ordoñez, Matthew Sciandra, Ewart Thomas, and Jens Ludwig (2015) Neighborhood Effects on Use of African-American Vernacular English. *Proceedings of the National Academy of Sciences*, 112(38): 11817-11822.

Sanbonmatsu, Lisa, Jeffrey R. Kling, Greg J. Duncan, and Jeanne Brooks-Gunn. (2006). Neighborhoods and academic achievement: Results from the Moving to Opportunity experiment. *Journal of Human Resources* 41(4): 649-91.

Sanbonmatsu, Lisa, Jens Ludwig, Lawrence F. Katz, Lisa A. Gennetian, Greg J. Duncan, Ronald C. Kessler, Emma Adam, Thomas W. McDade, and Stacy Tessler Lindau (2011) *Moving to Opportunity for Fair Housing Demonstration Program: Final Impacts Evaluation*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research. available at www.huduser.org/portal/publications/pubasst/MTOFHD.html.

Sciandra, Matthew Lisa Sanbonmatsu, Greg J. Duncan, Lisa A. Gennetian, Lawrence F. Katz, Ronald C. Kessler, Jeffrey R. Kling, and Jens Ludwig (2013) Long-Term Effects of the Moving to Opportunity Residential Mobility Experiment on Crime and Delinquency. *Journal of Experimental Criminology*, 9(4): 451-489.

WHO World Mental Health Survey Consortium. (2004). Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization world mental health surveys. *Journal of the American Medical Association* 291(21): 2581-90.