Mental Health Benefits Through Neighborhood Effects

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Abstract—This paper looks at the Neighborhood Effects of living in low-income neighborhoods on residents' mental health. Past research has examined the effect of moving from low-income neighborhoods to low-poverty neighborhoods through Section 8 housing; specifically the average effects on mental health. Rather than using traditional Ordinary Least Squares based methods, this analysis will use non-parametric quantile regression to observe effects across the whole distribution. Contrary to past research, this paper finds statistically positive effects on mental health caused by moving from low-income neighborhoods. Statistically positive results are observed at the middle quantiles of the population, specifically at the median. These findings suggest the benefits of government relocation programs, like Section 8 Housing, are stronger than initially reported, specifically related to mental health.

I. Introduction

The causal effects of environment have been a focus of study within the economic community since the popularization of the socio-economic segregated communities. These segregated communities led to sub-cultures developing within urban environments. The effects of these phenomena are often referred to as neighborhood effects.

Neighborhood effects can be classified as a form of externalities. Certain results occur from those that surround us. On a personal level, surrounding one's self with a group of individuals who enjoy exercising will eventually lead to more exercise in one's life. Following this simple example, the neighborhood effect can be applied to entire neighborhoods and communities.

This idea has become popular in better understanding the effects of low-income areas on the development of residents. A major issue in analyzing these effects is differentiating between the influence of the individual and family as opposed to the neighborhood itself, especially in urban communities. Estimates show urban residents have a 21% increased risk of developing anxiety and 39% increased risk in mood disorders compared to residents of rural areas (Peen et al. 2010). In addition, the U.S. Census Bureau reported poverty was twice as prevalent in urban areas compared to suburban locations. The Bureau also reported that urban schools had larger enrollments, on average, than suburban and rural schools in both elementary and secondary schools. The teachers also had fewer resources at their disposal and less control over the curriculum. In contrast, community norms in low-poverty areas tend to encourage stronger work ethics and are less accepting of welfare than high-poverty urban areas.

Many factors affect the neighborhood individuals grow up in (e.g. parent's education, family income, race, immigration status) that confound with overall development later in life. If

one were to observe the residents in high-poverty neighborhoods later in life, it would be impossible to separate the effects of the neighborhood from that of other confounders. To isolate the neighborhood effects, the gold standard is to eliminate confounding variables through a randomized experiment. With this in mind, the Department of Housing and Urban Development (HUD) began a social experiment to test this hypothesis: Moving to Opportunity (MTO).

The purpose of this research is to test the neighborhood effects on mental health using data collected from MTO. This paper will attempt to reject the null hypothesis that neighborhood effects associated with living in low-income neighborhoods have no effects on the mental health of residents and conclude a causal effect between neighborhood effects and mental health. This will be done by analyzing a mental health index. It will further contribute to the current body of knowledge by analyzing quantile effects, a method not previously used in this body of literature.

The rest of the paper is organized as follows. Section 2 briefly covers past literature related to MTO and mental health. Section 3 discusses the data and methodology used in the study, including the components of the variable of interest. Section 4 establishes the model and tests the assumptions. Section 5 analyzes the effects of exposure to the treatment group across various subgroups. Section 6 concludes with a summary of the results, discussion of possible study design issues, and implications of the paper.

II. Literature Review

The goal of MTO was to evaluate the neighborhood effects on the economic and social outcomes of disadvantaged families in the United States. From 1994-1998, housing authorities in 5 cities (New York, Boston, Baltimore, Los Angeles, and Chicago) worked with local nonprofit counseling organizations to recruit approximately 4,500 low-income families. The families were

then randomly placed into one of three groups: control, Section 8, and Low Poverty Voucher (L.P.V.) Group. Families within the control group were not offered any assistance to relocate to a low-poverty neighborhood. Families placed within the Section 8 group were offered traditional Section 8 financial assistance without mobility counseling. Families placed in L.P.V. Group were offered additional services in finding housing in low-poverty neighborhoods, supplementing the traditional financial assistance. The additional services included mobility counseling and help in the leasing process. In addition, the families were allowed to move again after the first month of the experiment. The control and Section 8 groups were used as counterfactuals for the L.P.V. Group.

The program then followed the families over the course of 10 years. It collected various data about the participants lives, including financial standing, educational attainment, family status, living situation, and overall health in an attempt to understand the neighborhood effects of poverty-ridden neighborhoods.

Short-term benefits of MTO were found to be most prevalent in children (Chetty et al. 2015). A negative association was observed between the benefits of the program and the age of the participants. Children who were under the age of 13 at the beginning of the experiment experienced increasing economic benefits at an accelerated rate from moving to low-poverty neighborhoods. The benefits of moving became negative for children who were over the age of 16 at the beginning of the experiment. Moving to lower-poverty neighborhoods also resulted in fewer behavioral issues, with children in the experimental group experiencing less injuries and personal crimes. Behavior problems with boys decreased 42% in the experimental group as compared to the control, and 24% for girls. In addition, asthma attacks decreased by 64% as compared to the control group, suggesting a possible relationship between neighborhoods and

health (Katz et al. 2000).

The short-term benefits for adults were far less promising. There were no statistically significant effects on employment rates, earnings, or welfare usage by household heads (Katz et al. 2000; Orr et al. 2003; Pinto 2015). In addition, there were no detectable effects on economic outcomes, youth schoolings or youth physical health within the MTO program, although the program did significantly improve adult subjective well being (Ludwig et al 2013).

The most promising data related to the effects of neighborhoods is on obesity. The results showed the prevalence of a BMI of 35 or more were slightly higher in the control group suggesting a causal effect between neighborhoods and obesity. The opportunity to move to a lower-poverty neighborhood was associated with potentially important reduction in the presence of extreme obesity and diabetes (Ludwig et al. 2011). Ten to 15 years after baseline, MTO was found to improve adult health by decreasing the prevalence of obesity[1] by nearly 40% compared to the control group (Ludwig et al. 2013).

While this study failed to find statistically significant differences between the control and experimental groups' obesity rates, the presence of diabetes -- as defined as glycated hemoglobin levels over 6.5% -- approached statistical significance. The lack of statistically significant findings is partly attributed to the many issues that affected the studies. These include issues accounting for participants for whom outcomes were not available, using a very constrained definition of diabetes that did not take into account individuals who had recovered, limited information from the baseline survey, and participation being voluntary.

To further analyze the neighborhood effects associated with living in low-income areas on health, this paper will focus on the effects captured through a mental health index. The

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[1] Obesity is defined as individuals with body mass indexes of or above 40.

National Institute of Mental Health reported 36.2 million Americans paid for mental health services, totally $57.7 million in 2006. This equates to an average expenditure per individual of $1,591.

Overall, approximately 1 in 5 Americans are diagnosed with non-severe mental health problem (SAMSHA, 2016). Past literature has also found suffering from non-severe mental health problems is associated with a decrease in income of 6.7% (Hill, 2016). Specifically, the relationship between mental health and various aspects of poverty has been studied extensively, beginning in 1939 (Lund 2014). The current body of literature further investigated this subject invoking various statistical methods including cross-sectional, longitudinal and intervention studies. Past literature focusing on MTO's effect on mental health have studied effects at the mean exclusively. While the sample mean is an efficient estimator for the normal distribution, the estimator lacks robustness and resistance. This is seen by the sample mean's sensitivity to outliers. The sample median is more robust than the sample mean and less sensitive to outliers. Thus, when dealing with a non-normal distribution, the sample median will yield stronger results.

III. Data and Methodology

The data used in this research comes from the MTO experiment; in particular a survey conducted at the end. Final survey data was collected between June 2008 and April 2010 by the Survey Research Center at the University of Michigan. This occurred approximately 15 years after assignment. The study surveyed 3,273 heads of households. 1,456 heads of households were placed into the L.P.V. Group, 678 were placed into traditional Section 8 Housing, and the remaining 1,139 heads of households were placed in the control. Of those, 3,157 were female, 43

were male, and 73 were unknown. The unknown values were imputed with averages from the control group. Nearly two-thirds of the families were African-American with the majority of the remaining families being Hispanic (Sanbonmatsu, 2011). The control group and L.P.V. Group were fully sampled at the end of the experiment. Two-thirds of the Section 8 group was randomly surveyed (due to budgetary constraints). The response rates for each group was approximately 90%.

The survey encompassed current economic conditions, current residency, and health outcomes. While health outcomes were characterized by two indices, physical health and mental health, this paper focuses only on mental health. The mental health index was a culmination of five separate variables: psychological distress index, lifetime depression, general anxiety, calm and peaceful during the past month, and normal hours of sleep per night. Each of the variables are briefly explained below (Sanbonmatsu, 2011):

Psychological Distress Index- The 6 item Distress Index, or Kessler 6, ask respondents how often in the past month they felt sad, nervous, or helpless. The Kessler 6 was developed by and has been used by the U.S. government since 2003 to track mental heath in America. The responses were scored 1 to 4, with 4 indicating high levels of distress. The Index was scored 0 to 24, with 24 indicating highest distress.

Lifetime Depression- An indicator that an adult had major depressive disorder in the past year. The study defined major depression as a two-week period of depression, loss of interest or pleasure in addition to other depressive symptoms. The other depressive symptoms required five of the nine: depressed mood, markedly diminished interest or

pleasure, significant weight loss or gain (unrelated to dieting), insomnia, psychomotor agitation (for example, physical restlessness, pacing) or retardation (for example, being physically slowed down), fatigue or loss of energy, feelings of worthlessness or excessive or inappropriate guilt, diminished ability to think or concentrate or indecisiveness, and recurrent thoughts of death.

Normal Hours of Sleep per Night- A binary variable labeled 1 if the respondent slept 7-8 hours last night and 0 else.

General Anxiety-Indicator if an adult has had Generalized Anxiety Disorder (GAD) in the past year. GAD is defined as "excessive anxiety about multiple events or activities that the respondent finds difficult to control on more days than not over the course of at least six months." (Sanbonmatsu, 2011)

Calm and Peaceful During the Past Month- A binary variable labeled 1 if the respondent felt calm and peaceful most of the time in the past month and 0 otherwise.

The average Kessler 6 score was 6.61 on the 24-point scale, with 24 indicating extreme mental distress. 12% of the sample reported having lifetime depression in past year and 7% reported suffering from general anxiety. 50% reported calm and peacefulness during the past month and 30% indicated sleeping between 7-8 hours in the previous night.

MTO then adjusted the variables such that a higher score represented better mental health. For example, Lifetime Depression was flipped such that a 1 meant that an individual had

not experienced lifetime depression. Every component was individually standardized using the MTO control group mean and standard deviation. Then, the z-scored components were averaged and restandardized using the mean and standard deviation for the index creating the mental health index variable. MTO performed this standardization to allow for equal weighting among all variables in the index.

IV. Data Analysis

This study utilizes a quantile regression model to analyze the effectiveness of the Low Poverty Voucher Group (L.P.V.) using the control group as the baseline. Rather than focusing on the effects of the program on the average outcomes of the participants similar to the existing body of literature, quantile regression estimates the effects of the program at other places in the distribution of outcomes. This is used most commonly to estimate the effects at the conditional median, but can be expanded to any quantile of interest. The only assumption for this method is a proper randomization in the treatment variable, which holds by design in this application. The Moving to Opportunity program randomized between three groups: control, Section 8, and L.P.V. Group. This paper only analyzes the differences between the control and L.P.V. Group. Due to budget constraints, MTO performed the randomization as a ratio, which is accounted for by a weighted adjustment applied in the analysis. To test the effectiveness of the randomization, control variables were tested at the 5% significance level (Table 1).

Table 1 shows the effectiveness of the randomization between the control and L.P.V. group. The table shows, out of the 22 covariates tested, only one was statistically different between the two groups (General Education Development). Even though there is an imbalance between the two groups, there does not seem to be a systemic difference between the groups'

covariates. The high p-values associated with "Completed High School" and "Adult Enrolled in High School" suggests that the statistical significance associated with the General Education Development is due to an "unlucky draw", rather than a systematic difference. In general, it is not uncommon for experiments to reject the null hypothesis of equal means for a few covariates. In addition, each of the variables was tested at the 5% significance level, so we expect approximately 1 out of 20 tests to return false positive results. Because the majority of covariates fail to find significantly different means, we fail to conclude that the randomization failed and move forward assuming the randomization was successful.

Table 1 is used to check that potential confounder variables are balanced between the control and Low Poverty Group. By demonstrating that the confounders are balanced, this paper can attribute any differences in mental health to the treatment effect. The use of an experiment created balanced covariates among groups. Because of these balanced covariates, this paper is able to distinctly identify a causal relationship between mental health and being offered to be part of the L.P.V. group. This is one of the many benefits of working directly with experiments.

TABLE 1: AVERAGE PRE-TREATMENT CHARACTERISTICS AT BASELINE

Variable	Control Mean (N=1139)	Treatment Mean (N=1456)	Difference	P-Value
Age (as of December 2007 in whole years)				
<35	0.143	0.145	0.002	0.897
36-40	0.227	0.213	-0.014	0.442
41-45	0.235	0.236	0.001	0.938
46-50	0.174	0.184	0.010	0.526
Race or Ethnicity^				
Black	0.635	0.632	-0.003	0.873
Hispanic	0.303	0.311	0.008	0.702
Sites^^				
Baltimore	0.135	0.134	-0.001	0.953
Boston	0.205	0.201	-0.004	0.814
Chicago	0.205	0.205	0.000	0.984
Los Angeles	0.226	0.233	0.008	0.678
Education				
General Education Development (GED)	0.199	0.159	-0.039	0.021**
Completed High School	0.361	0.381	0.021	0.325
Adult Enrolled in School	0.167	0.161	-0.005	0.747
Living Situation				
Pregnant before turning 18	0.246	0.249	0.003	0.864
Working for Pay	0.245	0.271	0.025	0.172
Ownership of Vehicle	0.170	0.190	0.020	0.241
Living with Someone with a Disability	0.148	0.145	-0.003	0.848
Victim of Violent Attack in Past 6 Months^^^	0.416	0.434	0.018	0.408
Reason for Leaving				
Streets Very Unsafe at Night	0.512	0.493	-0.019	0.390
No Family in the Neighborhood	0.639	0.640	0.001	0.966
Very Dissatisfied with Neighborhood	0.467	0.478	0.011	0.601
Applied for Secion 8 Housing before	0.426	0.400	-0.026	0.217

Notes: *p<0.1,**p<0.05,***p<0.001.

^ non-hispanic White omitted variable

^^New York omitted variable

^^^Violent Attacks defined as been threatened with a knife or gun, had been beaten or assaulted or had their purse, wallet or jewelry snatched.

Prior to the quantile analysis, we recreated a simple linear regression (Table 2) to test the intention-to-treat effects of being offered L.P.V. on mental health from past literature. Exposure to the L.P.V. group causes an increase in the average mental health index Score of 0.066 standard deviations as compared to that of the control group. Although the results were approaching statistically significant levels, no effects could be confirmed (Ludwig et al, 2013).

Table 2: Mental Health Problems Regression Analysis

Variable	Coefficient	P-Value
Treatment: Low Poverty Voucher Group	0.066	0.130
	(0.044)	
Constant	2.32E-09	1.000
	(0.031)	

Notes: *p<0.1, **p<0.05, ***p<0.001.
Standard Errors in parentheses

Focusing solely on mean effects can mask heterogeneous effects along the outcome distribution (Blanco et al. 2013). Analysis along the entirety of the distribution can lead to new insights previously overlooked. For example, it may be the case that the effects of MTO on mental health are large for individuals who experience many mental health problems and small with individuals with no, or very few mental health problems. Chart 1 shows the distributions of the mental health index for the control and treatment groups. While the Central Limit Theorem guarantees an approximately normal mean and standard deviation, the abnormality of this data brings into question the validity of applying a Normal Distribution. Because of this, non-parametric quantile analysis will present a clearer picture of the effects.

Chart 1: Mental Health Problems Index
Probability Density Function

Chart 2: Mental Health Problems Quantile Analysis
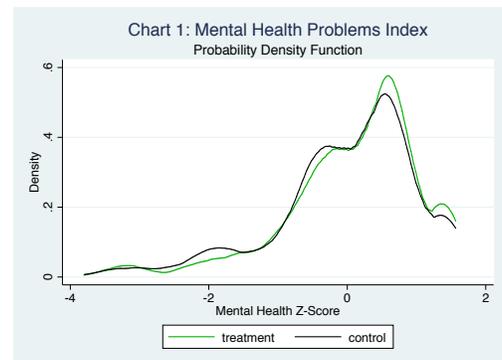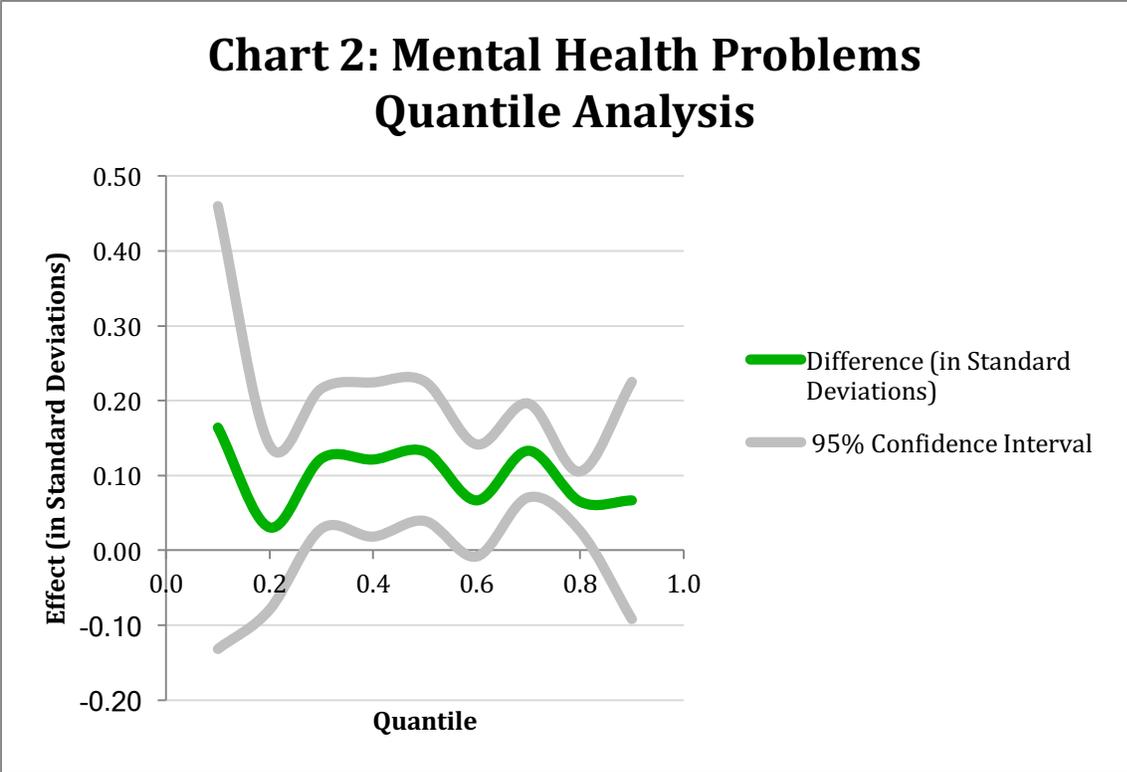
V. Results

The index is organized such that a higher score indicates better mental health, thus any positive results reported below indicate benefits to the mental health of the participants. All percentiles found positive differences between the treatment and control groups, signifying positive effect on mental health through the L.P.V. Group housing program (Chart 2) at different points of the entire conditional outcome distribution. The quantile regression returned statistically significant results between the 30th and 80th percentiles. The 70th and 80th percentiles were statistically significant at the 1% level while the 30th and 40th were at the 5% level. The 60th percentile was significant at a 10% level[2]. The median was found to be statistically significant at the 5% level. Being offered the L.P.V. program caused a 0.132 standard deviation increase in the

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[2] See Table 1 in Appendix

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median mental health index score. The effect at the median is twice as large as the effect reported at the mean. The effect across quantiles remains stable with statistical significance seen at the middle and upper quantiles. This greatly differs from the regression analysis discussed earlier, and can likely be attributed to the skewedness of the distribution.

To further understand the effects of moving from low-income neighborhoods, we look at the effects of the program by age (Chart 3). Past research studies have found decreasing effects as participants age, with no economic effect appearing for youth 18 years or older (Chetty et al. 2015). The ages were recorded between approximately June 2008 and April 2010, 15 years after the beginning of the program. For example, those who were recorded as 35 and under were 20 years old or younger at the beginning of the experiment. For the remainder of the study, all ages will be reported as of the final survey. For the participants 35 years or under at the end of the survey, being offered the L.P.V. program caused a 0.2 standard deviation increase in the median of the mental health index score. Individuals who were under 35 experienced statistically positive results around the median, while no statistically significant effects at the median are found for all other age groups[3].

Sporadic significance is seen in the other age groups. These values were marginally significant and can be attributed to the data collection methodology, which will be discussed later. Differences between the experimental and control groups rarely deviate far from any effect, sometimes dropping below zero. While nothing is statistically relevant, these results are consistent with Chetty et al. (2015), who found no or decreasing effects after adolescence.

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[3] See Table 2 in Appendix

Chart 3: Mental Health Problems
## Quantile Age Analysis
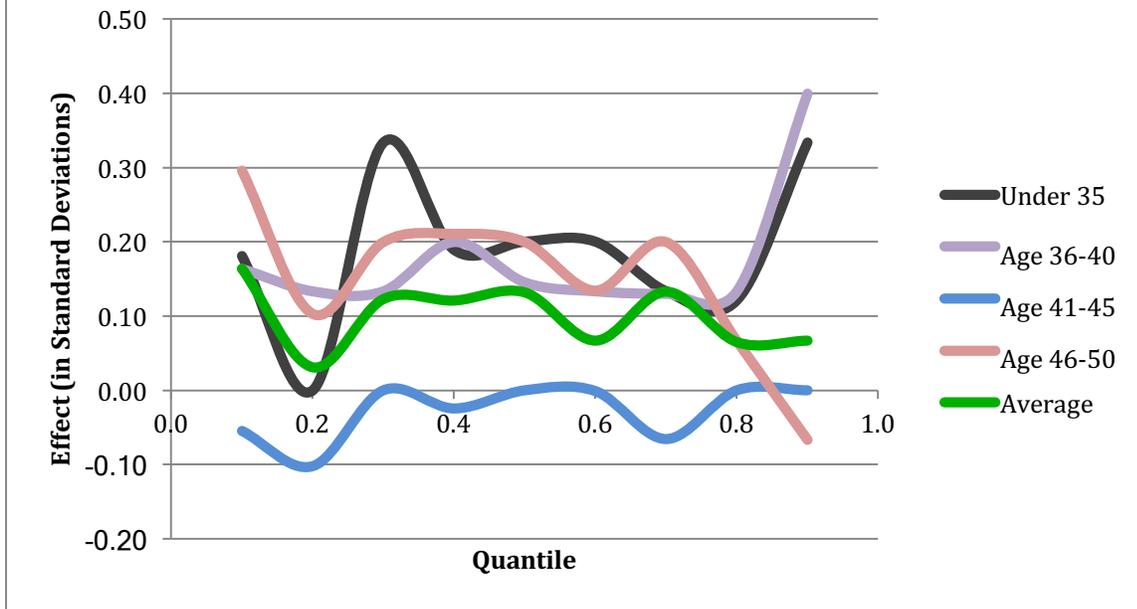
Moving from low-income neighborhoods on race found very little evidence of effects (Chart 4). Participants in the study reported their race as Black, Hispanic, or Other. Sporadic significance can be seen in the upper quantiles of Black and Other while lower quantiles approached significance[4]. The Black cohort showed positive statistical differences in the 80th and 90th percentile, while the Other cohort showed positive statistical differences in the 70th and 90th percentile. Like the analysis on age, these sporadic results can likely be attributed to the data collection methodology.

When the Black cohort was partitioned by age, significant results were found in the 36-40 year old age group within the 30th to 70th percentiles[5]. Sporadic significance was seen in the under 35-age group and 46-50 age group. This can likely be attributed to the use of standardized

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[4] See Table 4 in Appendix
[5] See Table 4 in Appendix

survey data and study design. The Hispanic cohort was also partitioned by age. Like the average, no statistical evidence was found in support of the program at any quantile/age combination.[6]

Chart 4: Absence of Mental Health Problems Quantile Race Analysis
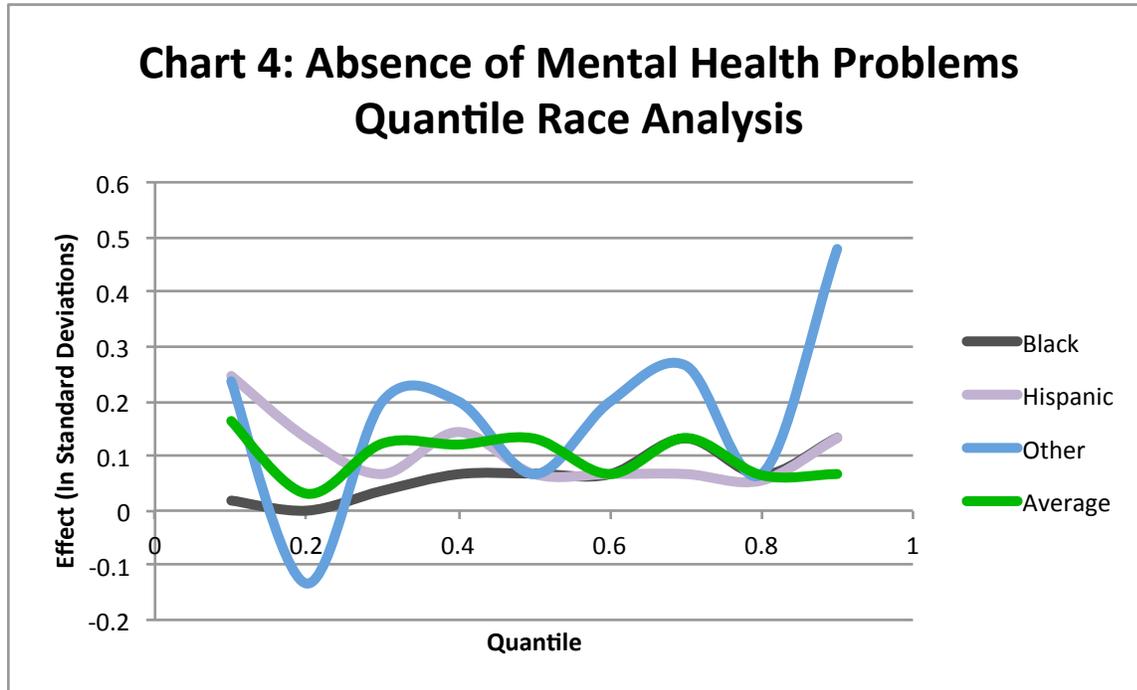
VI. Conclusion

Overall, the paper finds a statistically positive effect on mental health issues along the distribution of the outcome. Effects were seen within the middle quantiles of the total population, a major development from the inconclusive results found examining the mean in past literature. Effects were strongest with individuals under the age of 20 at the beginning of the study. In general, there was no statistical evidence when the study population was examined by race, with sporadic significance when partitioned by age. The pattern of stronger effects occurring at younger ages is consistent with past literature (Chetty et al. 2015). While these sub-populations provided limited insight, the overall population showed evidence of a statistically positive causal effect between neighborhood effects and mental health among middle quantiles. Specifically,

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[6] See Table 5 in Appendix

being offered the L.P.V. program caused a 0.132 standard deviation increase in the median of the mental health index score. This effect is twice as large as the effects found at the mean.

Due to the scope of the experiment, the study design could lead to many potential biases. First, the data collected for this analysis was survey data. It included subjects who could be found and willing to meet 15 years after the study. Candidates were offered $50 to complete the survey in 2007 (Ludwig et al. 2013). This can lead to voluntary response bias, skewing the sample to be misrepresentative of the population. Even though $50 was offered, 90% of the original participants completed the follow-up survey. This implies any voluntary response bias effects would likely be small.

In addition, the accumulation of the data hinged upon the surveyors and the understanding of the questions by the subjects. With any survey data, a certain level of inconsistency may occur when the survey is administered resulting in surveyor bias[7]. The variation in location and neighborhoods could lead to surveyor bias. Many times, surveyor bias happens without the surveyor being aware. For example, a surveyor interviewing an individual in a low-income neighborhood may project their opinions on the neighborhood and influence the participant's answers. Likewise, a surveyor who admires a participant's neighborhood may present the survey in a positive manner influencing their answers. If this bias were to take place, it would lead to exaggerated results and an inflated Type I error. While there is no empirical evidence of surveyor bias occurring, it is important to be vigilante of the possible study design issue. This limits the amount of insight available, but does not render the research moot.

The findings in this paper have been consistent with past papers (Ludwig et al. 2011, Ludwig et al. 2013) and expound upon prior analysis. Mean effects masked much of the results

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[7] Surveyor bias is when the surveyor is aware of the group the participant is in and presents the questions in different manners.

in the middle quantiles. This paper also provides further insight into mental health at the lower tail of the distribution. In every age category, the bottom 20 percent showed no statistical difference in the absence of mental health problems. One possibility for these results is another determinant of mental health different from the neighborhood affecting the bottom quantiles, namely genetic mental health issues. However, further research is necessary to move past speculation.

This in no way ends the discussion on the neighborhood effects associated with high poverty areas, nor does it fully answer the effectiveness of government programs specific to neighborhood effects.

This research can easily be expanded to include traditional Section 8 housing compared to the control and Low Poverty Voucher Group. Past research has found marginal significance between the Section 8 and L.P.V. Group. However, none have taken a quantile regression approach.

Focusing solely on the mean masked many of the effects of the program on mental health for those who scored in the middle quantiles of the index. Contrary to past literature, this research found a causal effect between exposure to L.P.V. group and the mental health index scores, signifying a causal relationship between neighborhood effects and mental health for the middle quantiles of the mental health index. From a policy perspective, this signifies that there may be additional benefits to government programs like Section 8 Housing previously overlooked.

The results of this study, combined with past literature, raise the possibility that governmental programs directed towards alleviating the effects of low income neighborhoods

could lead to increased social benefits, namely those involving mental health, previously overlooked.

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Appendix Table 1: Mental Health Index Quantile Analysis

Quantile	Difference (in Standard Deviations)	P-Value	95% Lower C.I,	95% Upper C.I.
0.1	0.164	0.277	-0.132	0.460
0.2	0.031	0.585	-0.079	0.140
0.3	0.123	0.011**	0.029	0.216
0.4	0.121	0.021**	0.018	0.225
0.5	0.132	0.006**	0.039	0.226
0.6	0.067	0.082*	-0.008	0.142
0.7	0.133	0.00***	0.070	0.196
0.8	0.065	0.001***	0.025	0.106
0.9	0.067	0.410	-0.092	0.225

Notes: *p<0.1, **p<0.05, ***p<0.001.

Appendix Table 2: Mental Health Index Quantile Age Analysis

Quantile	Under 35 N=359	Age 36-40 N=550	Age 41-45 N=598	Age 46-50 N=461
0.1	0.181	0.164	-0.055	0.296
0.2	0.000	0.133	-0.102	0.103
0.3	0.333**	0.133	0.000	0.203**
0.4	0.189	0.201**	-0.024	0.211
0.5	0.200*	0.145	0.000	0.200
0.6	0.200**	0.133	-0.001	0.135
0.7	0.133**	0.130**	-0.066	0.205**
0.8	0.121	0.133	0.000	0.067
0.9	0.334**	0.404**	0.000	-0.067

Notes: *p<0.1, **p<0.05, ***p<0.001.

Age as of December, 2007

Appendix Table 3: Mental Health Index Quantile African American
Analysis

Quantile	Difference (in Standard Deviations)	P-Value
0.1	0.019	0.895
0.2	0.000	1.000
0.3	0.036	0.378
0.4	0.067	0.290
0.5	0.068	0.270
0.6	0.067	0.109
0.7	0.132	0***
0.8	0.066	0.003**
0.9	0.133	0.276

Notes: *p<0.1, **p<0.05,***p<0.001.

Sample consists of 1,660 African American individuals

Appendix Table 4: Mental Health Index Quantile African American Age Analysis

Quantile	Under 35 N=275	Age 36-40 N=395	Age 41-45 N=405	Age 46-50 N=298	Population N=1660
0.1	0.182	0.000	-0.183	0.096	0.019
0.2	0.067	0.133	-0.133	0.133	0.000
0.3	0.267*	0.189**	-0.133	0.200**	0.036
0.4	0.144	0.212*	-0.078	0.079	0.067
0.5	0.067	0.266**	-0.048	0.212	0.068
0.6	0.132	0.200***	-0.067	0.200	0.067
0.7	0.133*	0.164**	-0.068	0.200	0.132
0.8	0.121	0.133	0.000	0.067	0.066
0.9	0.344**	0.479***	-0.133	-0.067	0.133

Notes: *p<0.1,**p<0.05,***p<0.001.

Age as of December, 2007

Due to imputed age values, the number of respondents for the population will not equal the summation of the partitioned age groups

Appendix Table 5: Mental Health Index Quantile Hispanic Age Analysis

Quantile	Under 35 N=74	Age 36-40 N=134	Age 41-45 N=174	Age 46-50 N=461	Population N=739
0.1	-0.079	0.285	0.067	0.697	0.248
0.2	-0.200	0.400	-0.302	0.285	0.133
0.3	0.400	0.133	0.067	0.267	0.067
0.4	0.334	-0.067	0.200	0.079	0.144
0.5	0.335	0.267	0.067	0.133	0.067
0.6	0.267	-0.066	-0.001	0.068	0.067
0.7	0.067	-0.067	0.133	0.133	0.067
0.8	0.478	-0.011	0.145	0.068	0.055
0.9	0.200	0.067	0.334	0.067	0.133

Notes: *p<0.1,A**p<0.05,A***p<0.001.

Age as of December, 2007

Due to imputed age values, the number of respondents for the population will not equal the summation of the partitioned age groups

Appendix Table 6: Mental Health Index Quantile Race Analysis

Quantile	Black N=1660	Hispanic N=739	Other N=107
0.1	0.019	0.248	0.237
0.2	0.000	0.133	-0.133
0.3	0.036	0.067	0.200
0.4	0.067	0.144	0.200
0.5	0.068	0.067	0.067
0.6	0.067	0.067	0.199
0.7	0.132***	0.067	0.266*
0.8	0.066***	0.055	0.067
0.9	0.133	0.133	0.479*

Notes: *p<0.1, **p<0.05, ***p<0.001.