

Preliminary Report on Impacts from Residential Rehabilitation Programs in Cuyahoga County, OH

July 1st, 2016

Background

The Hardest Hit Fund is part of the response of Congress to the foreclosure crisis of the Great Recession. Congress identified prevention of foreclosures and preservation of homeowner value as key priorities. Administered by U.S. Treasury, Hardest Hit Fund has allowed housing authorities in selected states to develop programs to help struggling homeowners. These state-developed programs have included mortgage payment assistance, property tax payment assistance, money for relocation, and counseling, among others.

More recently, several states have convinced U.S. Treasury to allow them to use Hardest Hit Fund resources to eliminate blighted housing through demolition. Research by Dynamo Metrics¹ showed that demolishing blighted housing preserves homeowner value, and is associated with lowering foreclosure rates. Such demolition programs are now underway in several states. A new Dynamo Metrics study commissioned by the Ohio Housing Finance Agency reiterates that blight elimination through demolition, particularly when properly targeted, preserves the value of surrounding homes, and is associated with lowering mortgage foreclosure rates.²

Blight can be eliminated through demolition of abandoned houses. Blight can also be eliminated through programmatic rehabilitation (“rehab”) of such houses. Cleveland Neighborhood Progress (CNP) asked Dynamo Metrics to investigate whether or not rehab of blighted housing protects the value of surrounding homes, and is associated with a lowering of local mortgage foreclosure rates. What follows are the initial findings of this research.

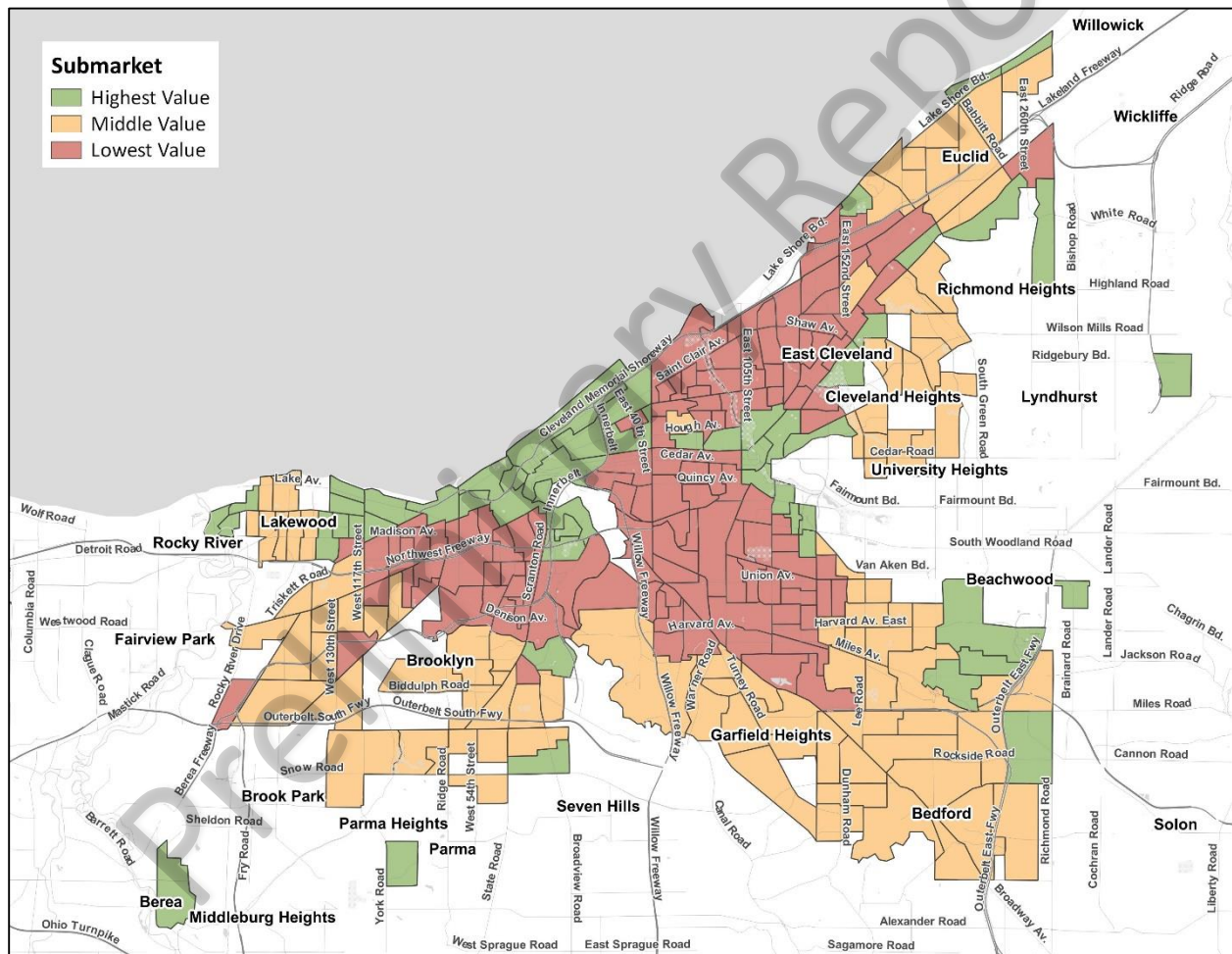
¹ See Griswold, et al. (2014)

² See Dynamo Metrics (2016).

Sample Study Area

The sample study area used for the preliminary analysis to test the home value and mortgage foreclosure impacts of rehab includes 271 Census Tracts in Cuyahoga County, Ohio. The sample study area, as shown in Figure 1 below, is divided into three unique housing submarkets named based on relative housing values. Submarket divisions are used in the preliminary analysis because it is shown in previous research that demolition intervention has varying magnitudes of impact in different submarkets, and it is hypothesized that rehab will similarly have varying impacts in different submarkets. The submarkets used here were identified in a recent study with an in-depth two-stage multivariate clustering exercise that groups like census tracts based on various socio-economic and demographic factors.³

Figure 1: Programmatic Rehabilitation Preliminary Sample Study Area by Submarket in Cuyahoga County



As shown in Figure 2 below, not all rehabs fall within the sample study area. Specifically, 1,310 rehab observations fall inside the sample study area for the preliminary analysis while 82 rehab observations fall outside the preliminary sample study area. The final analysis and report requires a new two-stage multivariate clustering exercise to be performed to fully include the respective housing submarkets and associated sales activity where these rehab observations occurred such that a comprehensive analysis of

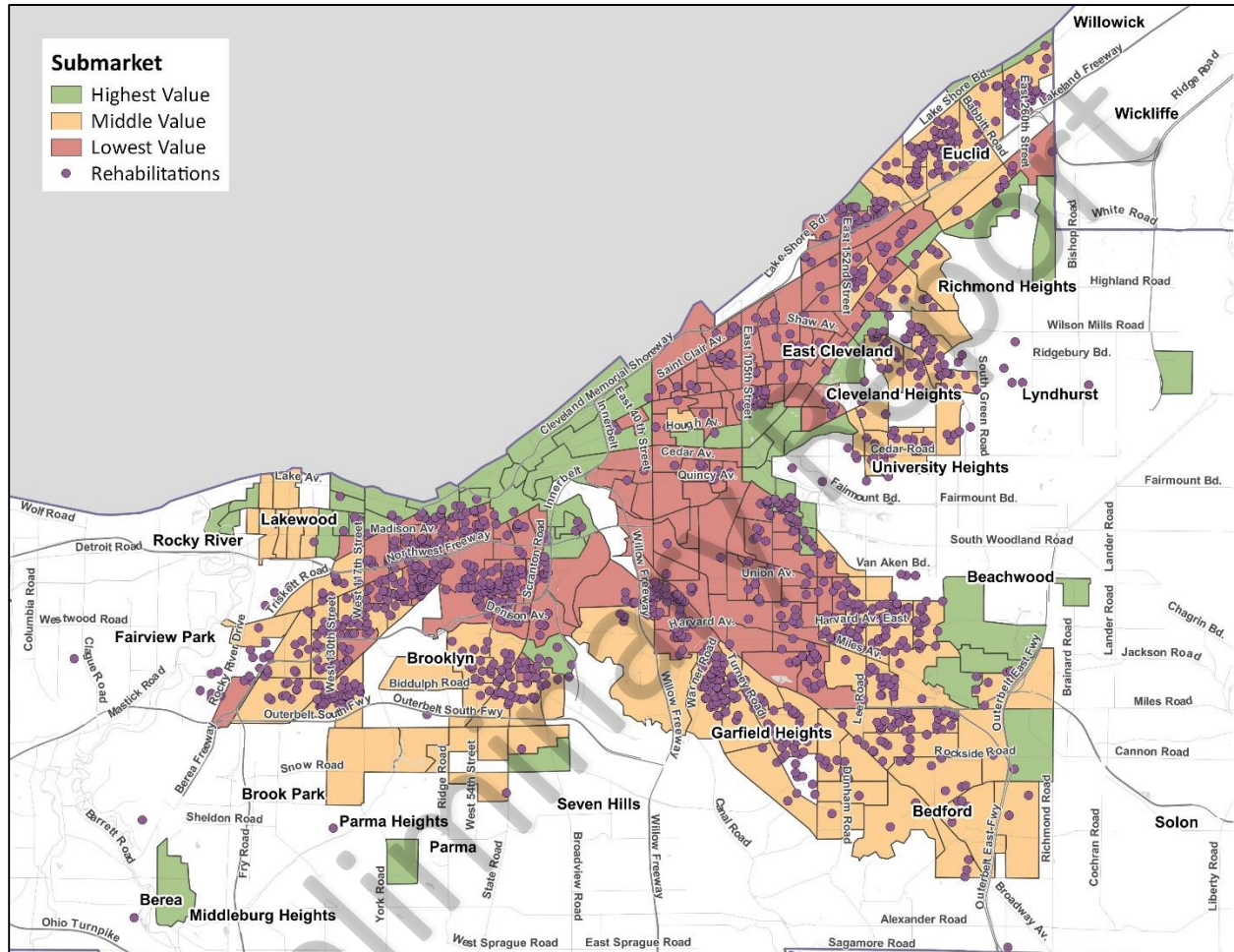
³ See page 23 of Dynamo Metrics (2016): <http://ohiohome.org/savethedream/documents/BlightReport-NIP.pdf>

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the impact that rehab has on housing values and mortgage foreclosure rates can be estimated. With that said, utilizing the pre-defined sample study for the preliminary study and results provides robust estimates of the home value and mortgage foreclosure impacts associated with rehab in Cuyahoga County given that nearly 95% of rehab observations are accounted for within the sample study area.

Figure 2: Location of All Programmatic Rehabilitation Observations, Cuyahoga County



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Results: Home Value Impacts Caused by Programmatic Rehabilitation

Approach

Preliminary analysis and results of home value impacts caused by rehab in the sample study area focus on the central hypothesis that rehab has a positive impact on nearby home values in all submarkets. The spatial regimes hedonic price function⁴ was used to investigate the property value impacts of rehab. This modeling approach is the tool of choice in estimating the relative values of housing components in the total price of a home in a given housing market. This tool is heavily relied upon in the distressed property academic research space in identifying the negative spillover effects of nearby blighted properties.⁵ This study is an innovation on that approach as it provides both the negative spillover effects of distressed properties as well as the positive spillover effects from the outcome of rehab – namely, the creation of tax-current occupied homes. Results yield conclusive evidence that a strong positive effect on nearby home values is present from rehab across all submarkets.

A key conceptual framework to understanding the results in this analysis is that the housing market modeling tool provides estimates of the “marginal effect” that one additional distressed or occupied structure has on the value of a home, while all other aspects of a home are held constant. In other words, the home value impact of an additional blighted structure or occupied structure near a given home becomes explicitly known. Our base assumption associated with rehab in this analysis is that the rehabbed structure had some level of distress before it was programmatically rehabbed – i.e. the home was tax delinquent, mortgage foreclosed, tax foreclosed, land bank owned, or some mix of these distress tags available within the observational dataset. Upon completion of the programmatic rehabilitation, it is assumed the home transforms from distressed into a tax current and occupied home.⁶ Basic statistics of the occupancy and tax delinquency status of rehabbed properties after a rehab is complete are provided in Appendix 3 to provide evidence of this assumption that rehab program outcomes are associated with tax-currency and occupancy.

Similar to recent demolition research that Dynamo Metrics has performed,⁷ a “proxy”⁸ approach of the before and after status of a programmatic rehabilitation is used to estimate the home value impact rate⁹ that can be captured by performing a programmatic rehabilitation. Four models were run to estimate the home value impact rate available to nearby homes in all submarkets within the Cuyahoga County sample study area.

⁴ See Griswold et al. (2014), Dynamo Metrics (2015) and Dynamo Metrics (2016).

⁵ See Simons, Quercia and Maric, 1998; Immergluck and Smith, 2006; Griswold, 2006; Griswold and Norris, 2007; Schuetz, et al., 2008; Mikelbank, 2008; Leonard and Murdoch, 2009; Harding, et al., 2009; Rogers and Winter, 2009; Lin, Rosenblatt and Yao, 2009; Kobie 2009; Rogers, 2010; Hartley, 2010; Campbell et al., 2011; Groves and Rogers, 2011; Whitaker and Fitzpatrick, 2013; Griswold et al., 2014; Dynamo Metrics, 2015; Immergluck, 2015.

⁶ Preliminary analysis uses straight occupancy as the base indicator of a completed rehab. Final analysis and results will further dissect occupancy to identify owner or renter occupied, as well as tax-current or tax-delinquent occupied.

⁷ See Dynamo Metrics (2016).

⁸ A “proxy” approach focuses on the known before and after status a home has when certain event takes place. For example, a safe proxy for a programmatic rehabilitation candidate BEFORE it is rehabbed is a tax- or mortgage-foreclosed structure, while a safe proxy for a programmatic rehab AFTER it is rehabbed is tax-current and occupied. See Appendix 3 for summary statistics associated with programmatic rehabilitation observations AFTER they are rehabbed.

⁹ The “home value impact rate” is the value impact spread estimated in the proxy model. It considers the difference between the “before” and “after” value effects. See Dynamo Metrics (2016) for further discussion.

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Findings

The initial model ran in this analysis is a “global model” which considers the entire sample study area as a single housing submarket. The global model consists of 30,634 arms-length sales observations that occurred in the sample study area between second quarter (Q2) 2009 and Q4 2015. The other three models slice out the number of observations in each respective submarket to test the differing magnitude of impacts of the relevant variables on home values there.

Table 1 provides the specific magnitude and significance that key variables have on home values in each housing submarket. These “coefficients” and “p-values” from each of the four models provide the incremental value impact that occupied structures, multiple types of distressed structures and vacant lots have on homes in each submarket.¹⁰

Reading Table 1

- P-Value
 - If the p-value is 0.05 or less, then the coefficient is considered to have a statistically significant impact on home property value.
- Coefficient
 - If coefficient is statistically significant (i.e. the p-value is 0.05 or less), then it has an impact on property value.
 - Coefficients read as a percent impact on property value from a marginal change in that variable. For example, a coefficient of -0.025 for a distressed property variable that is statistically significant suggests an additional distressed property within 500 feet of a given home will have a -2.5% impact on its property value, all else held constant.

Table 1: Preliminary Model Estimates of Home Value Impacts from Programmatic Rehabilitation¹¹

	Global		Lowest Value Submarket		Middle Value Submarket		Highest Value Submarket	
Observations	30,634		10,957		17,013		2,664	
R-Squared	0.5144		0.2369		0.4813		0.5135	
Model Variables	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Residential Occupied Homes Within 500 Feet	0.0014	0.000	0.0017	0.000	0.0010	0.000	0.0027	0.000
Tax-Foreclosed Vacant Homes Within 500 Feet	-0.0507	0.000	-0.0438	0.000	-0.1056	0.000	-0.1560	0.020
Mortgage-Foreclosed Vacant Homes Within 500 Feet	-0.0159	0.002	-0.0049	0.631	-0.0097	0.089	-0.0369	0.130
Land Bank Owned Vacant Homes Within 500 Feet	-0.0765	0.000	-0.0610	0.000	-0.0891	0.000	-0.2768	0.000
Vacant Homes Within 500 Feet	-0.0155	0.000	-0.0092	0.001	-0.0162	0.000	-0.0237	0.000
Residential Vacant Lots Within 500 Feet	-0.0059	0.000	-0.0051	0.000	-0.0090	0.000	-0.0036	0.168

As explained above, “home value impact rates” – i.e. the available value change from turning a distressed structure into an occupied structure from rehab - can be quantified in each submarket from Table 1 because we know the significant negative impact from a distressed structure (pre-rehab) and the significant positive impact from an occupied structure (post-rehab). Again, this difference the available spread from performing rehab, and is provided in Table 2 below.

¹⁰ See Appendix 1 for full data specification and Appendix 2 for full model specifications.

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Table 2: Home Value Impact Rates Available from Turning Multiple Distress Types into Occupied Homes

Distress Type	Global	Lowest	Middle	Highest
Tax-Foreclosed Vacant Homes Within 500 Feet	5.21%	4.55%	10.65%	15.87%
Mortgage-Foreclosed Vacant Homes Within 500 Feet	1.73%		1.06%	
Land Bank Owned Vacant Homes Within 500 Feet	7.79%	6.27%	9.00%	27.95%
Vacant Homes Within 500 Feet	1.69%	1.09%	1.71%	2.64%

Interpreting Table 2 in the context of turning tax-foreclosed homes into occupied homes has a 4.55% impact on all home values within 500 feet of it in the lowest value submarket, 10.65% impact on all home values within 500 feet in the middle value market, and 15.87% impact on all homes values within 500 feet in the highest value market, and so on. Programmatic rehabilitation transforms distressed structures into occupied structures. Table 2 provides insight into the home value impacts that this property transition brought upon by rehab provides to all nearby homes. The actual post-programmatic rehabilitation statistics for specific sample study area programs can be found in Appendix 3. As you can see in Appendix 3, properties tend to become tax-current immediately after rehab, while they tend to become occupied over time.

Next Steps in Calculating Home Value Impact Caused by Programmatic Rehabilitation

Upon proper refinement of occupancy variables and reclassification of submarkets to include all rehab observation areas for final analysis, the total costs, benefits and “benefit cost ratio”¹² (BCR) will be estimated by: 1) identifying the geo-location of each rehab performed; 2) multiplying the respective submarket home value impact rate and the median home value of the Census Tract that the rehab fall in; 2) counting the number of homes within 500 feet of each rehab; and, 3) multiplying the number of homes impacted by the median dollar amount the home value impact rate estimates in the respective submarket and Census Tract; 4) divide total home value impact benefits identified from rehab activity in each submarket by the total cost of all rehabs in each submarket. This estimation of the BCR will provide a “bang for your buck” estimate of expected return from each dollar put into rehab in each submarket.

¹² As (BCR) as standardly defined: <http://web.stanford.edu/group/FRI/indonesia/newregional/lectures/lecture7/lecture7BW.pdf>

Results: Assessing Mortgage Foreclosure Rate Impacts from Programmatic Rehabilitation

Approach & Findings

As performed in Griswold et al. (2014) and Dynamo Metrics (2016) and used as evidence by the U.S. Treasury to exemplify the impact of demolition on mortgage foreclosure rates, a comparative trends analysis was utilized to assess the strength of the relationship between rehab and lowering mortgage foreclosure rates in the sample study area. As shown in Figure 3 below, average mortgage foreclosure rates in areas that received rehab were compared to the average mortgage foreclosure rates in areas that did not receive rehab activity between Q1 2010 – Q4 2015. This comparative was completed for the aggregate housing market of the sample study area as well as within each housing submarket. Across all comparative trend graphs, visual analysis suggests that areas which received rehab started with relatively higher mortgage foreclosure rates than areas that did not receive rehab, but the rate of mortgage foreclosure decline is clearly higher in all areas where rehab occurred. This evidence suggests that the presence of rehab activity is a driver of lowering mortgage foreclosure faster than when rehab is not present.

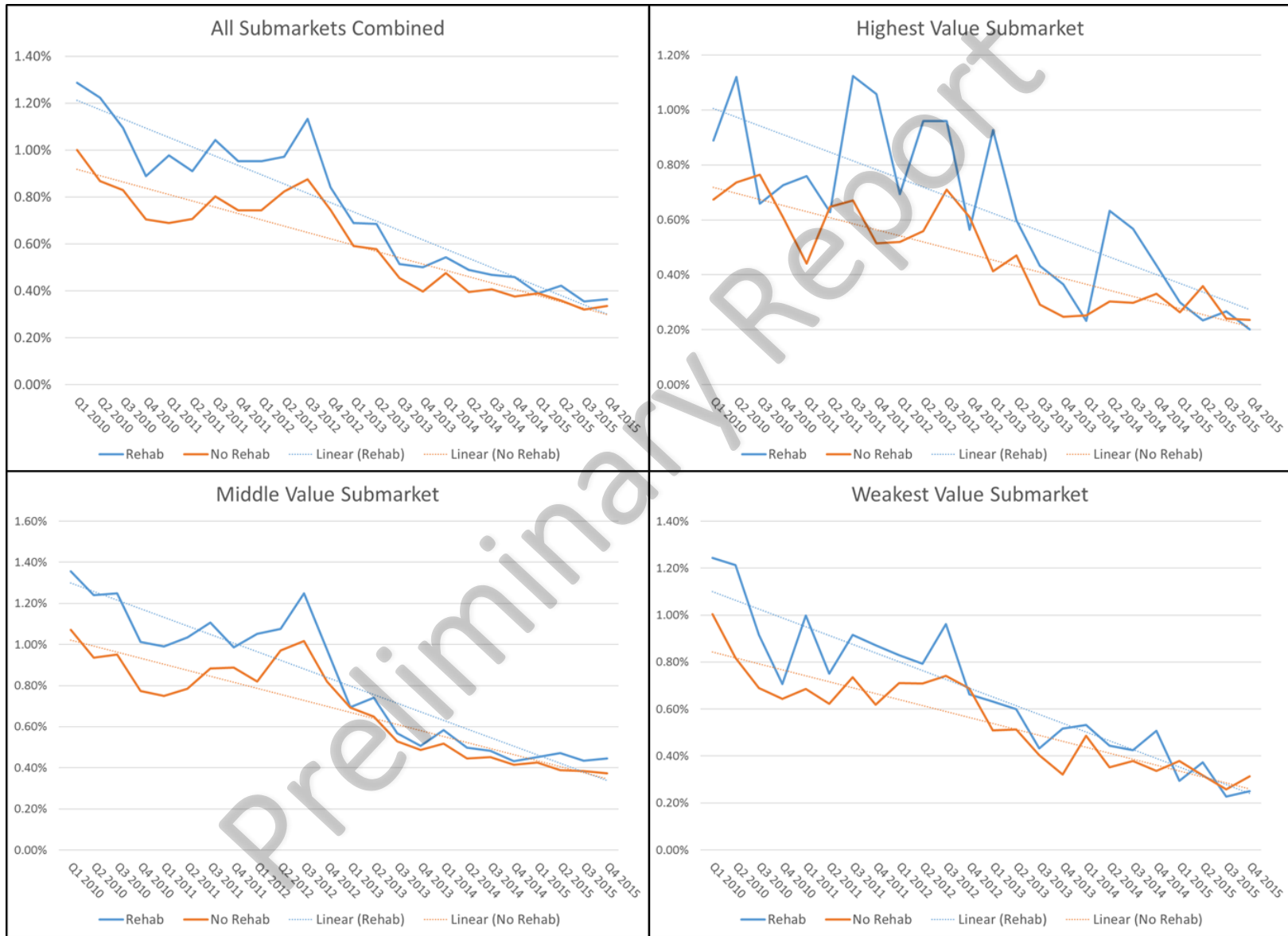
The visual evidence of rehab increasing the decline of mortgage foreclosure rates is further supported by paired difference-in-means t-tests¹³ that were run on the comparative mortgage foreclosure rates over the 24 quarterly time-periods across the aggregate and alike area (i.e. submarket comparatives). These tests looked at whether the mortgage foreclosure rates were significantly different than one another when the presence of rehab is the specific control variable. All paired difference-in-means t-tests suggest that the means of the mortgage foreclosure rates in each comparative are statistically significantly different than one another. This finding is translated as evidence that the presence of rehab provides a faster declining mortgage foreclosure rate when the submarket of an areas is held equal

¹³ See page 2 of the linked PDF for explanation of difference in means t-test performed:
<http://www.stata.com/manuals13/rttest.pdf>

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Figure 3: Comparative Trends of Mortgage Foreclosure Rates in Sample Study Area Submarkets



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Next Steps in Assessing Mortgage Foreclosure Rate Impacts of Programmatic Rehabilitation

Upon proper reclassification of submarkets to include all rehab observation areas for final analysis, the comparative trends analysis will be run again for each identified submarket and the aggregate and final sample study area.

Preliminary Report

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Appendix

Appendix 1: Data

NEOCANDO Raw Data Captured

Cuyahoga County Parcel GIS File

This raw data is the most contemporary version of all parcel-level boundaries and centroids for each of the 502,638 properties located in Cuyahoga County, OH.

Cuyahoga Land Bank Related Rehabilitations

This data includes the property level rehabilitations performed by the CLB and the properties transferred to other entities, such as community development corporations and new home owners and investors through the CLB DEED in Escrow program for rehabilitation.

Cuyahoga County Postal Data File

Proprietary raw data files from a USPS vendor are available between 3rd Quarter (Q3) 2008 and Q3 2015 for each quarter. The product is designed to process bulk mailing lists to get bulk mailing discounts to indicate parcel-level vacancy and “no stat”. All addresses in the county are run and then vacant and no stat are kept. Data provides vacancy dynamics. If there are multiple addresses for a parcel, all addresses have to be vacant to receive a “Y”. Partial vacancy is coded as an “M”. Data is likely an undercount based on windshield surveys conducted and or delay between transfer of property or re-renting.

Cuyahoga County Residential Characteristics

This data contains several datasets from Cuyahoga County that explain parcel-level characteristics of residential properties in the County. Some processing of the raw data sets from the County are organized and processed by Cleveland State University and they are then passed on to NEOCANDO at the Case Western Reserve University (CWRU) Center on Urban Poverty. The data set is updated annually.

Cuyahoga County Tax Billing

This data file contains parcel-level snapshots of tax payments at the moment the extract is made between 2000 up through the most recent tax payment period (2015). File names correspond with month of extract.

Cuyahoga County Arms-Length Sales

Raw data file holds all parcel-level “arms-length sales” in Cuyahoga County between 2006 through 2015. All arms-length sales are defined by methodology of Whitaker and Fitzpatrick (2013). Data is processed at CWRU Center on Urban Poverty annually.

Cuyahoga County Land Bank Activity

Raw data file holds all major activities of the Cuyahoga Land Bank at the parcel level from June 2009 – November 2015. Activities include acquisitions, dispositions, renovations and demolitions. This dataset is updated weekly and is directly extracted from the Cuyahoga Land Bank’s administrative database from the CWRU Center on Urban Poverty NEO CANDO.

Cuyahoga County Demolition Activity

Raw data file holds the parcel-level location of all Cleveland administered demolitions between 2004 to November 2015 as well as all demolition permits issued by parcel between 2005 to present. All Cuyahoga

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Land Bank demolitions are also included (2009-Present) along with a mix bag of parcel-level demolitions from beyond Cleveland's boundaries over time.

Cuyahoga County Foreclosure Filing Activity

Raw data file holds weekly snapshots from 2006 to November 2015 of all countywide foreclosure filing activity pulled directly from the clerk of the court website.

Cuyahoga County Geographical-Key to Connect Parcels and Pre-Determined Boundaries

Raw data file is an intermediate file that relates parcel numbers and centroids ("gisdata" file folder) to latitude/longitude and other geographies (census 2000 and census 2010 boundaries, local geographies (Cleveland wards and neighborhood), as well as various target areas.

Cuyahoga County Parcel Characteristics

Raw data file holds multiple property characteristics from 2000 to 2014 for every parcel in Cuyahoga County. Data is updated annually and is received by the CWRU Center on Urban Poverty NEO CANDO after direct transfer of several datasets from Cuyahoga County to Cleveland State University(CSU). CSU does some organizing and processing and then passes it onto the Center on Urban Poverty.

Cuyahoga County Mortgage Foreclosure Data

Raw data file is a weekly snapshot of parcel level Sherriff Sales pulled down from the County Sherriff website. Data is available from March 2000 through November 2015 as is used as representation of mortgage foreclosure.

Cuyahoga County Comprehensive Deed Transfer

Raw data file is all parcel-level deed transfers with relevant details appended each week in Cuyahoga County from 2000 to November 2015.

U.S. Census Bureau Raw Data Captured

ACS 5-Year Survey (2009-2013) Block Group and Census Tract Geo-Databases for Ohio

Data file contains raw files with geodatabases and corresponding shapefiles that provide every Block Group and Census Tract in Ohio with corresponding ACS 5-Year Survey (2009-2013) social and economic variables.

ACS 5-Year Survey (2009-2013) Block Group and Census Tract Raw Data Tables for Ohio

Data file contains raw data files with tables that provide every Block Group and Census Tract in Ohio with corresponding ACS 5-Year Survey (2009-2013) social and economic variables.

ACS 5-Year Survey (2009-2013) Block Group and Census Tract Raw Data Table Scripts, Table Shells and

Data file contains all necessary scripts, table shells and appendices to properly process "Ohio_Tracts_Block_Groups_Only.zip" files.

Cleveland Neighborhood Progress Captured Data

Slavic Village Recovery Project and Opportunity Homes Rehabilitations

This data includes records of property rehabilitations performed through these two programs.

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Appendix 2: Full Spatial Regimes and Global Model Specifications

	Global		Lowest Value Submarket		Middle Value Submarket		Highest Value Submarket	
Observations	30,634		10,957		17,013		2,664	
R-Squared	0.5144		0.2369		0.4813		0.5135	
Model Variables	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Residential Occupied Homes Within 500 Feet	0.0014	0.000	0.0017	0.000	0.0010	0.000	0.0027	0.000
Tax-Foreclosed Vacant Homes Within 500 Feet	-0.0507	0.000	-0.0438	0.000	-0.1056	0.000	-0.1560	0.020
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Land Bank Owned Vacant Homes Within 500 Feet	-0.0765	0.000	-0.0610	0.000	-0.0891	0.000	-0.2768	0.000
Vacant Homes Within 500 Feet	-0.0155	0.000	-0.0092	0.001	-0.0162	0.000	-0.0237	0.000
Residential Vacant Lots Within 500 Feet	-0.0059	0.000	-0.0051	0.000	-0.0090	0.000	-0.0036	0.168
Avg Sale \$ of Six Nearest Homes Previous Qtr	0.0088	0.000	0.0099	0.000	0.0093	0.000	0.0050	0.000
Sold as Residential Vacant	-0.1335	0.000	-0.2449	0.000	-0.0775	0.000	-0.1305	0.001
Sold as Land bank Owned	-1.1985	0.000	-1.0392	0.000	-1.5404	0.000	-1.5268	0.000
Sold as Tax Delinquent	-0.2091	0.000	-0.1687	0.000	-0.2628	0.000	-0.4141	0.000
Sold as Mortgage Foreclosed	-0.2306	0.000	-0.2088	0.000	-0.2153	0.000	-0.3637	0.000
Sold as Tax Foreclosed	-0.1548	0.085	0.0533	0.620	-0.5149	0.000	-0.8119	0.028
Sold While Exiting REO	-0.5140	0.000	-0.5021	0.000	-0.5086	0.000	-0.5303	0.000
Sold from LLC Grantor to Grantee	-0.3139	0.000	-0.2281	0.000	-0.3370	0.000	-0.4465	0.000
Sold as Limited Warranty Deed	-0.2428	0.000	-0.2683	0.000	-0.2239	0.000	-0.2646	0.000
Sold as Quit Claim Deed	-0.4527	0.000	-0.3811	0.000	-0.5458	0.000	-0.7336	0.000
Age of Home	-0.0035	0.000	-0.0026	0.005	-0.0057	0.000	-0.0022	0.001
Presence of Air Conditioning	0.2037	0.000	0.5795	0.000	0.1156	0.000	0.2057	0.000
Brick Exterior	0.0864	0.000	0.0178	0.715	0.0998	0.000	-0.0057	0.892
Number Full + Half Baths	0.1034	0.000	0.0452	0.007	0.1284	0.000	0.1622	0.000
Number Fireplaces	0.1045	0.000	0.0206	0.407	0.1093	0.000	0.1576	0.000
Lotsize/1000	0.0108	0.000	0.0310	0.000	0.0084	0.000	0.0071	0.001
Presence of Finished Basement	0.0492	0.000	0.0420	0.519	0.0393	0.004	0.0016	0.968
Presence of Finished Attic	0.0418	0.036	-0.0192	0.541	0.1136	0.000	0.2008	0.000
Presence of Garage	0.1450	0.000	0.0930	0.000	0.2113	0.000	0.1475	0.000
Presence of Terrace	0.1130	0.000	0.1148	0.032	0.0926	0.000	0.1199	0.001
Presence of Porch	0.0066	0.652	-0.0441	0.130	0.0519	0.000	-0.0443	0.172
Sold in Q3, 2009	0.0272	0.393	0.1110	0.068	-0.0427	0.219	0.0052	0.956
Sold in Q4, 2009	0.0305	0.336	0.2026	0.001	-0.0807	0.020	-0.1182	0.223
Sold in Q1, 2010	-0.0104	0.766	0.1202	0.064	-0.0738	0.050	-0.0606	0.600
Sold in Q2, 2010	0.1625	0.000	0.2263	0.000	0.0977	0.002	0.0913	0.358
Sold in Q3, 2010	-0.0289	0.394	0.1522	0.014	-0.1664	0.000	-0.1032	0.339
Sold in Q4, 2010	0.1146	0.001	0.2985	0.000	-0.0100	0.800	0.0161	0.896
Sold in Q1, 2011	0.0434	0.227	0.2665	0.000	-0.1229	0.004	0.0953	0.381
Sold in Q2, 2011	0.0996	0.003	0.3140	0.000	-0.0584	0.118	0.0120	0.916
Sold in Q3, 2011	0.0480	0.162	0.2729	0.000	-0.1190	0.002	0.1041	0.292
Sold in Q4, 2011	0.0139	0.683	0.2470	0.000	-0.1373	0.000	-0.1209	0.278
Sold in Q1, 2012	0.0359	0.288	0.2325	0.000	-0.0876	0.016	0.0361	0.733
Sold in Q2, 2012	0.0698	0.032	0.2444	0.000	-0.0479	0.180	0.0420	0.684
Sold in Q3, 2012	0.0535	0.087	0.2767	0.000	-0.0823	0.016	0.0914	0.389
Sold in Q4, 2012	0.0338	0.302	0.2518	0.000	-0.0784	0.030	-0.1676	0.111
Sold in Q1, 2013	0.0352	0.370	0.2669	0.000	-0.1229	0.006	0.2410	0.032
Sold in Q2, 2013	0.1868	0.000	0.3411	0.000	0.0699	0.083	0.2531	0.029
Sold in Q3, 2013	0.1729	0.000	0.3187	0.000	0.0813	0.046	0.1511	0.187
Sold in Q4, 2013	0.1442	0.000	0.3877	0.000	-0.0064	0.879	0.0888	0.448
Sold in Q1, 2014	0.1465	0.000	0.4883	0.000	-0.0483	0.273	-0.0036	0.976
Sold in Q2, 2014	0.2195	0.000	0.4357	0.000	0.0799	0.062	0.2106	0.067
Sold in Q3, 2014	0.1616	0.000	0.4931	0.000	-0.0351	0.400	0.1767	0.112
Sold in Q4, 2014	0.1884	0.000	0.4593	0.000	0.0227	0.583	0.1815	0.112
Sold in Q1, 2015	0.1371	0.001	0.3774	0.000	-0.0314	0.469	0.2973	0.014
Sold in Q2, 2015	0.2386	0.000	0.5292	0.000	0.0858	0.041	0.1225	0.292
Sold in Q3, 2015	0.1566	0.000	0.4329	0.000	-0.0153	0.710	0.1702	0.118
Sold in Q4, 2015	0.1570	0.000	0.3611	0.000	0.0272	0.494	0.2348	0.042
Sold in Highest Value Submarket	0.1078	0.000						
Sold in Lowest Value Submarket	-0.4099	0.000						
Model Constant	10.1740	0.000	9.3972	0.000	10.3888	0.000	10.4843	0.000

dynamo metrics

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Appendix 3: Quarterly Property Status of Programmatic Rehabilitation Observations AFTER Completion of Rehab

Rehab Program	Average Sale Price	Rehab. Count (Q4 - 2009 - Q4 2013)	Tax Delinquent							
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Cuyahoga Land Bank - in house	\$58,307	8	0	0	0	0	0	0	0	0
Deed in Escrow	N/A	368	0.3%	0.8%	0.3%	1.6%	3.5%	5.4%	6.8%	8.4%
NSP 1 and 2	\$93,341	29	0	0	0	0	0	0	0	0
Opportunity homes	\$98,669	62	0	0	0	0	0	0	0	0
Slavic Village Recovery Project	\$63,900	1	0	0	0	0	0	0	0	0

Rehab Program	Average Sale Price	Rehab. Count (Q4 - 2009 - Q4 2013)	Postal Vacant							
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Cuyahoga Land Bank - in house	\$58,307	8	37.5%	12.5%	12.5%	12.5%	12.5%	25.0%	25.0%	25.0%
Deed in Escrow	N/A	368	57.3%	40.2%	28.3%	19.8%	16.3%	13.0%	12.0%	9.8%
NSP 1 and 2	\$93,341	29	58.6%	17.2%	13.8%	13.8%	6.9%	3.4%	3.4%	3.4%
Opportunity homes	\$98,669	62	41.9%	12.9%	11.3%	9.7%	9.7%	8.1%	9.7%	8.1%
Slavic Village Recovery Project	\$63,900	1	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Rehab Program	Average Sale Price	Rehab. Count (Q4 - 2009 - Q4 2013)	Occupied and Tax Current							
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Cuyahoga Land Bank - in house	\$58,307	8	62.5%	87.5%	87.5%	87.5%	87.5%	75.0%	75.0%	75.0%
Deed in Escrow	N/A	368	42.4%	59.2%	71.5%	78.5%	80.7%	82.6%	82.6%	83.2%
NSP 1 and 2	\$93,341	29	41.4%	82.8%	86.2%	86.2%	93.1%	96.6%	96.6%	96.6%
Opportunity homes	\$98,669	62	58.1%	87.1%	88.7%	90.3%	90.3%	91.9%	90.3%	91.9%
Slavic Village Recovery Project	\$63,900	1	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%