Internet Appendix for "Do Property Rehabs Affect Neighboring Property Prices?"

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This internet appendix is divided into five sections. The first section describes the sample selection procedure. The second section describes details of the empirical derivative method. The third section provides descriptions for the variables used in the ring method. The fourth section briefly describes the theory and implementation associated with the welfare estimation. The fifth section presents supplementary figures and tables.

A. Sample selection

NCST data filters

- Original dataset: 23,710 NCST properties from 2008–2017.
- Keep single-family homes: 3,696 properties dropped.
- Drop properties with missing rehabilitation start and end dates: 10,115 properties dropped.
- Drop properties with rehabilitation end dates before rehabilitation begins: 28 properties dropped.
- Drop properties with rehabilitation start dates before the property sale through the NCST: 274 properties dropped.
- Drop properties with no reliable data on neighboring transactions: 2,745 properties dropped.
- Final NCST properties in the sample: 6,852 NCST properties.

Neighboring transactions filters following Campbell et al. and Adelino et al.

- Drop if the transaction price of the neighboring property is zero or missing.
- Drop if the buyer's or seller's name is missing.
- Drop if the buyer's name matches the seller's name.
- Dropping non-arms-length transactions (e.g., transfer of partial interest, intrafamily transfer, interspousal transfer, transfer on death).
- Drop if the mortgage loan amount is greater than the transaction price.
- Drop non-single-family homes (e.g., mobile homes, condos, townhomes, unclassified).
- Drop if interior area is missing or negative.
- Drop if house age is missing.
- Drop if number of bathrooms is less than 0.5 or missing.
- Drop if number of total bedrooms is zero or missing.
- Drop transactions with extreme (< 0.5 and > 99.5 percentile) house prices or extreme prices per square foot.
- Keep transactions that occur between 1 year before the NCST property rehabilitation and 1 year after the rehabilitation.

Summary statistics

- Homes closer to NCST homes have lower prices and lower prices per square foot.
- All transactions within 0.1 miles have only one NCST property.
- Only two transactions within 0.33 miles have two NCST properties. The remainder have only one NCST property.
- Top 10 states in descending order of NCST transactions: FL (802), CA (801), IL (457), OH (355), TX (266), GA (254), MI (237), MN (177), NV (132), and PA (86).

B. Empirical derivative procedure

We follow the nonparametric estimation procedure of Diamond and McQuade (2019) to estimate the empirical derivative for a property in the neighborhood of a rehabilitated property. The nonparametric method relies on expressing house prices in the neighborhood of a rehabilitated property N using polar coordinates (r, θ) , where r and θ are the distance and direction of the neighboring property, respectively, relative to its nearest rehabilitated property:

$$log(P_{i,t}) = m_N(r_i, \tau_i) + \phi_N(r_i, \theta_i) + \gamma_N(\theta_i, t_i) + \varepsilon_{i,t}, \qquad (IA.1)$$

where $log(P_{i,t})$ is the logarithm of the transaction price of neighboring property *i* at time *t*, and $m_N(r_i, \tau_i)$ is the nonparametric function of interest to be estimated. This function captures the spillover effect of property *N*'s rehabilitation on a nearby property *i* located at a distance of r_i miles, and occurring τ_i months after the rehabilitation. The nonparametric functions $\phi_N(r_i, \theta_i)$ and $\gamma_N(\theta_i, t_i)$ allow for house prices to vary across locations and to trend differently across time in multiple directions from the rehabilitated property, for reasons that are unrelated to the property's rehabilitation.

The idea behind the empirical derivative method is to empirically estimate the derivative of $m_N(r_i, \tau_i)$ with respect to the distance r. Below, we replicate the estimating equations in Diamond and McQuade (2019) for identifying $m_N(r_i, \tau_i)$. This is accomplished in two steps. In the first step, an empirical partial derivative of the house price with respect to r is estimated at each transaction (r_i, θ_i, t_i) in the neighborhood of the rehabilitated property. Equations IA.2– IA.6 below provide the estimating equations for this first step. In the second step, the partial derivative estimates are smoothed using a kernel regression to obtain a smooth surface, namely, the derivative of $m_N(r_i, \tau_i)$. Equations IA.7–IA.9 below provide the estimating equations for this second step.

Let $\tilde{Y}_{i,N}$ be the empirical derivative at (r_i, θ_i, t_i) within the neighborhood of the rehabilitated property N. Then, $\tilde{Y}_{i,N}$ is estimated as:

$$\tilde{Y}_{i,N} = \sum_{k=1}^{k_n} \omega_k \frac{\log p_{a(k,i,r)} - \log p_{b(k,i,r)}}{r_{a(k,i,r)} - r_{b(k,i,r)}}$$
(IA.2)

$$\omega_k = \frac{k}{k_n(k_n+1)/2} \quad , \tag{IA.3}$$

where a(k, i, r) and b(k, i, r) are defined as:

$$a(1,i,r) = \arg\min_{\{d \in L_{r,i}: r_d > r_i + l_n\}} r_d, \qquad b(1,i,r) = \arg\max_{\{d \in L_{r,i}: r_d < r_i - l_n\}} r_d,$$
(IA.4)

$$a(k,i,r) = \arg\min_{\{d \in L_{r,i}: r_d > r_{a(k-1,i,r)}\}} r_d, \qquad b(k,i,r) = \arg\max_{\{d \in L_{r,i}: r_d < r_{b(k-1,i,r)}\}} r_d, \tag{IA.5}$$

where $l_n = 0.01$ miles away from r_i . This ensures the exclusion of extremely close transactions to compute the empirical derivative so that the numerical derivative does not become unbounded due to the denominator in IA.2. The bow tie region, which consists of the above transactions to compute the empirical derivative, is given the set $L_{r,i}$:

$$L_{r,i} = \left\{ z \in 1, \dots, n : \frac{(t_z - t_i)^2}{(r_z - r_i)^2} < v_n^t, \frac{(\theta_z - \theta_i)^2}{(r_z - r_i)^2} < v_n^\theta \right\},$$
(IA.6)

where the bow tie width in years is $v_n^t = 1.6$, and the bow tie width in θ is $v_n^{\theta} = 0.4$.

After computing the house price derivative $Y_{i,N}$ for every neighboring property transaction around the rehabilitated property, we smooth these derivatives using the Nadaraya-Watson kernel to obtain

$$\widehat{\Phi}_N(r,t) = \frac{n^{-1} \sum_{i=1}^n K_{H_n}((r,t) - (r_i, t_i)) \widetilde{Y}_{i,N}}{n^{-1} \sum_{i=1}^n K_{H_n}((r,t) - (r_i, t_i))},$$
(IA.7)

where

$$K_{H_n}((r,t) - (r_i, t_i)) = \frac{1}{h_{r,n}h_{t,n}} K\left(\frac{r - r_i}{h_{r,n}}, \frac{t - t_i}{h_{r,n}}\right),$$
 (IA.8)

where $K(\cdot, \cdot)$ is the two-dimensional Epanechnikov kernel with bandwidths $h_{r,n} = 0.25$ and $h_{t,n} = 1.5$.

Finally, we obtain an estimate of the empirical derivative by averaging across rehabilitated NCST properties:

$$\frac{\partial \widehat{m(r,\tau)}}{\partial r} = \frac{1}{\mathbf{N}} \sum_{N \in \mathbf{N}} \left[\widehat{\Phi}_N(r, T_N + \tau) - \widehat{\Phi}_N(r, T_N - 1) \right],$$
(IA.9)

where \mathbf{N} is the number of rehabilitated NCST properties.

C. Variable description

This section describes the control variables associated with a property transaction in the neighborhood of a rehabilitated property using the ring method estimation described in Section 2.2.

Property controls

- Square footage: The transacted property's interior area in square feet.
- Age: The age of the transacted property in years from its build year to the transaction year.
- *Bedrooms*: Indicator variables for the transacted property's number of bedrooms: 1, 2, 3, 4, or >4 bedrooms.
- *Bathrooms*: Indicator variables for the transacted property's number of bathrooms: a half-bath to 1 bathroom, 1.5, 2, 2.5, and >2.5 bathrooms.
- *Building quality*: Indicator variables for the six categories of the transacted property's building quality: excellent, fair, good, average, poor, or missing/uncategorized.

Neighborhood controls

- *Number of foreclosures* (before, 0.1 mi): The number of foreclosures that occurred within 0.1 miles from the property, six months before the sale of the property.
- Number of foreclosures (after, 0.1 mi): The number of foreclosures that occurred within 0.1 miles from the property, six months after the sale of the property.
- *Number of foreclosures* (before, 0.33 mi): The number of foreclosures that occurred within 0.33 miles from the property, six months before the sale of the property.
- *Number of foreclosures* (after, 0.33 mi): The number of foreclosures that occurred within 0.33 miles from the property, six months after the sale of the property.
- Number of arms-length transactions (before, 0.1 mi): The number of arms-length transactions that occurred within 0.1 miles from the property, six months before the sale of the property.

- Number of arms-length transactions (after, 0.1 mi): The number of arms-length transactions that occurred within 0.1 miles from the property, six months after the sale of the property.
- Number of arms-length transactions (before, 0.33 mi): The number of arms-length transactions that occurred within 0.33 miles from the property, six months before the sale of the property.
- Number of arms-length transactions (after, 0.33 mi): The number of arms-length transactions that occurred within 0.33 miles from the property, six months after the sale of the property.
- Number of other rehabilitations (before, 0.1 mi): The number of other property rehabilitations that occurred within 0.1 miles from the property, six months before the sale of the property. We measure other property rehabilitations using other neighboring NCST transactions, including those that were dropped during our sample selection process due to missing data.
- Number of other rehabilitations (after, 0.1 mi): The number of other property rehabilitations that occurred within 0.1 miles from the property, six months after the sale of the property. We measure other property rehabilitations using other neighboring NCST transactions, including those that were dropped during our sample selection process due to missing data.
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- Number of other rehabilitations (after, 0.33 mi): The number of other property rehabilitations that occurred within 0.33 miles from the property, six months after the sale of the property. We measure other property rehabilitations using other neighboring NCST transactions, including those that were dropped during our sample selection process due to missing data.

D. Welfare analysis

Rosen's (1974) model provides the theoretical underpinnings for hedonic valuation. Let $P = P(\mathbf{H}, r)$ be the price of a house as a function of its characteristics \mathbf{H} and distance r from a rehabilitated property. Let $U = U(c, \mathbf{H}, r)$ be the household's utility, where c is the household's consumption and numeraire with price equal to 1. The household's budget constraint is $P + c \leq I$, where I represents the household's income.

If housing markets are competitive and in equilibrium, maximizing the household's utility with respect to the household's budget constraint equates the household's marginal willingness to pay (MWTP) to live at a distance r from the rehabilitated property with the slope of the house price surface:

$$\frac{\partial U}{\partial r} / \frac{\partial U}{\partial c} = \frac{\partial P}{\partial r}.$$
 (IA.10)

House prices in our setting are defined as

$$log(P) = m(r,\tau) + \phi(r,\theta) + \gamma(\theta,t) + \varepsilon, \qquad (IA.11)$$

where τ is the time that has elapsed since the rehabilitation, θ represents the direction from the rehabilitated property (which along with r defines its location in polar coordinates), and t is time. Thus, the above expression reduces to

$$\frac{\partial U}{\partial r} / \frac{\partial U}{\partial c} = P \times \frac{\partial m_N(r, \tau)}{\partial r}.$$
 (IA.12)

It is important to note that the derivative of the house price surface with respect to the distance from the rehabilitated property (i.e., $\partial P/\partial r$) yields the MWTP for consumers *only* at their optimal choice of house characteristics **H** and consumption *c*. Thus, the derivative of the house price surface yields the MWTP for consumers only for *marginal* changes in *r*.

To conduct welfare analysis for non-marginal changes in r, we follow the generalized hedonic model developed by Diamond and McQuade (2019). The idea of this analysis is to first use the house price gradient, $\partial m_N(r, \tau)/\partial r$, which is estimated using the empirical derivative method (see Section 2.1), to structurally back out household preferences for living close to a rehabilitated property. Next, these household preferences are used to compute the welfare effects associated with property rehabilitations for non-marginal changes in r. We compute the welfare effects associated with owner-occupied and renter-occupied properties separately. We assume a log-linear utility function $U_i(c, \mathbf{H}, r)$ for household *i* as follows:

$$U_i(c, \mathbf{H}, r) = \pi_i \log(1 + R_0 - r) \mathbb{I}[r \le R_0] + u_i(\mathbf{H}) + c, \qquad (IA.13)$$

where π_i captures household *i*'s preference to live close to the rehabilitated property and R_0 is the distance beyond which households no longer derive utility from the rehabilitated property. The indicator function $\mathbb{I}[r \leq R_0]$ ensures that households located at $r \geq R_0$ derive utility only based on house characteristics **H** and consumption *c*.

Given the log-linear form of Equation (IA.13), we can recover household preference parameters, π_i , using the expression for the MWTP in Equation (IA.12):

$$\pi_i = -(1 + R_0 - r) \times P_i(\mathbf{H}, r) \times \frac{\partial m(r, \tau)}{\partial r}.$$
 (IA.14)

Household choice before and after the property rehabilitation

Households in proximity of the rehabilitated property maximize their utility subject to their budget constraints. We assume that households do not anticipate the rehabilitation of the property. That is, house prices in the pre-rehabilitation period reflect only the hedonic preference associated with house characteristics, which include its structural attributes (e.g., number of bedrooms and bathrooms) and the broader neighborhood characteristics (e.g., crime, school district). The relatively flat house price surface in the pre-rehabilitation period in Figure 2 provides support for this assumption. As a result, the proximity to the rehabilitated property does not enter the household's utility function in the pre-rehabilitation period. The household's maximization problem is given by

$$\max u_i(\mathbf{H}) + c$$

s.t. $p_0(\mathbf{H}) + c \le I_i$,

where $p_0(\mathbf{H})$ reflects the value associated with house characteristics \mathbf{H} in the pre-rehabilitation period. In our setting, which defines house prices as in Equation (IA.11), $p_0(\mathbf{H}) = \phi(r, \theta) + \gamma(\theta, t)$ for households located at (r, θ) . Since we do not have property-level data on rents, we assume that the discounted present value of rents is equal to the house price. Thus, a household that rents a property also faces the same utility maximization problem described above.

The household's maximization problem in the post-rehabilitation period accounts for the

household's proximity to the rehabilitated property. After accounting for the rehabilitation of the property and assuming that moving costs are zero, neighboring households will reoptimize based on their hedonic preference to live close to the rehabilitated property. This maximization problem for the owner-occupied household is given by

$$\max \pi_{i} \log(1 + R_{0} - r) \mathbb{I}[r \le R_{0}] + u_{i}(\mathbf{H}) + c$$

s.t. $m(r) + p_{1}(\mathbf{H}) + c \le I_{i} + m(r_{i,pre}),$

where $m(r_{i,pre})$ is the additional proceeds from the sale of the house located at a distance of r_{pre} from the rehabilitated property and $m(r) + p_1(\mathbf{H})$ is the amount spent to purchase the new home located at a distance of r from the rehabilitated property.

Renters have the same objective function as home-owners in their maximization problem in the post-rehabilitation period. However, their budget constraint is different as they cannot obtain proceeds from home sales:

$$\max \pi_i \log(1 + R_0 - r) \mathbb{I}[r \le R_0] + u_i(\mathbf{H}) + c$$

s.t. $m(r) + p_1(\mathbf{H}) + c \le I_i.$

For the tractability of the model, we assume that $p_1(\mathbf{H}) = p_0(\mathbf{H})$. That is, the hedonic price associated with house characteristics \mathbf{H} in the neighborhood of the rehabilitated property remains the same after the rehabilitation. This assumes that household preferences for house characteristics are stable across geographies and do not change with the sorting of households following the rehabilitation.

Given the optimization problems above, the change in household utility for owners, renters, and landlords for different scenarios is presented in the following table. Note that landlords just benefit from rent transfers. The variable r^* is the optimal distance of a household after the rehabilitation.

Scenari	o ΔU_i : Ow	vners
$\overline{r_{i,pre}} > R_0, r_i$	$_{i}^{*} > R_{0}$ 0	
$r_{i,pre} > R_0, r_i$	$_{i}^{*} < R_{0} \qquad \qquad \pi_{i} \log(1 + R_{0} - \epsilon)$	$(r_i^*) - m(r_i^*)$
$r_{i,pre} < R_0, r_i$	$m_i^* > R_0 \qquad m(r_i^*)$)
$r_{i,pre} < R_0, r_i$	$\pi_i^* < R_0 \qquad \pi_i \log(1 + R_0 - r_i^*) + r_i^*$	$m(r_{i,pre}) - m(r_i^*)$
Total:	$\sum_i \pi_i \log(1 + R_0 - $	$r_i^*)\mathbb{I}[r_i^* \le R_0]$
Scenario	ΔU_i : Renters	ΔU_i : Landlords
$r_{i,pre} > R_0, r_i^* > R_0$	0	0
$r_{i,pre} > R_0, r_i^* < R_0$	$\pi_i \log(1 + R_0 - r_i^*) - m(r_i^*)$	0
$r_{i,pre} < R_0, \ r_i^* > R_0$	0	$m(r_i^*)$
$r_{i,pre} < R_0, \ r_i^* < R_0$	$\pi_i \log(1 + R_0 - r_i^*) - m(r_i^*)$	$m(r_i^*)$
Group total:	$\sum_{i} (\pi_{i} \log(1 + R_{0} - r_{i}^{*}) - m(r_{i}^{*}) \mathbb{I}[r_{i}^{*} \le R_{0}]$	$R_0]) \qquad \sum_i m(r_i^*) \mathbb{I}[r_i^* \le R_0]$
Total:	$\sum_{i} \pi_{i} \log(1 + R_{0} - r_{i}^{*})$	$\mathbb{I}[r_i^* \le R_0]$

After summing over all households across the various scenarios, the aggregate utility is given by

Aggregate Utility =
$$\sum_{i} \pi_i \log(1 + R_0 - r_i^*) \mathbb{I}[r_i^* \le R_0].$$

Thus, the aggregate welfare depends only on the utility gained from households that optimally choose to live close to the rehabilitated property. The remaining terms are netted out across households. Consequently, to estimate aggregate welfare effects, one needs to only back out the preference parameters of households that have moved close to the rehabilitated property after the rehabilitation, which is what we observe in the data.

Implementation

We compute the aggregate welfare for homeowners using the preference parameter (π) and the optimal distance from the rehabilitated property (r^*) for each homeowner who chooses to live close to the rehabilitated property. The aggregate welfare for homeowners is computed as

$$\Delta U_{agg}^{H} = N_{H} \int \pi \log(1 + R_{0} - r)q^{H}(\pi, r | r < R_{0}) d\pi dr, \qquad (IA.15)$$

where the integral computes the mean of $\pi \log(1 + R_0 - r)$, with $q(\cdot)$ representing the joint density of π and r. N_H is the mean number of homeowners within R_0 miles from the rehabilitated property. We compute N_H using the 5-year American Community Survey (ACS) focusing on the intersection of census block groups with the R_0 mile ring around the rehabilitated property.

We cannot measure the aggregate welfare for renter-occupied households in the same manner because we do not have property-level data on rents. Instead, we follow Diamond and McQuade (2019) and assume that conditional on income, owners and renters have the same preference to live close to a rehabilitated property. Given this assumption, the aggregate renter-occupied household welfare can be computed as

$$\Delta U_{agg}^{R} = N_{R} \int \pi \log(1 + R_{0} - r) \frac{q^{R}(I|r < R_{0})}{q^{H}(I|r < R_{0})} q^{H}(\pi, r, I|r < R_{0}) d\pi dr, \qquad (IA.16)$$

where $q^{R}(I|r < R_{0})$ and $q^{H}(I|r < R_{0})$ represent the densities of renter income and owner income within the R_{0} ring, respectively. These densities are computed using the 5-year ACS by focusing on the intersection of census tracts with the R_{0} mile ring around the rehabilitated property.¹ As income data are required to compute the welfare for renter-occupied households, we merge our data with HMDA data. We use this merged sample to compute the aggregate welfare associated with both owner-occupied and renter-occupied properties. Moreover, since HMDA data consist only of mortgage transactions, we make one final adjustment to obtain the joint density function $q^{H}(\pi, r, I|r < R_{0})$. We again assume that, conditional on income, homeowners have the same preference to live close to a rehabilitated property, regardless of whether they purchase their homes with mortgages or cash. This assumption results in the re-writing of the joint density function of the owner-occupied households ($q^{H}(\pi, r, I|r < R_{0})$) in terms of the joint density function of owner-occupied households with a mortgage ($q^{MH}(\pi, r, I|r < R_{0})$), which we observe in the HMDA-merged sample:

$$q^{H}(\pi, r, I|r < R_{0}) = q^{MH}(\pi, r, I|r < R_{0}) \left[Q(MH|r < R_{0}) + \frac{q^{NH}(I|r < R_{0})}{q^{MH}(I|r < R_{0})} Q(NH|r < R_{0}) \right],$$

¹Data on the number of owner-occupied and renter-occupied homes is available only at the census-tract level as opposed to the census-block-group level.

where $Q(MH|r < R_0)$ and $Q(NH|r < R_0)$ represent the fraction of mortgaged and nonmortgaged owner-occupied homes within R_0 miles, respectively. The terms $q^{MH}(I|r < R_0)$ and $q^{NH}(I|r < R_0)$ represent the densities of homeowner income for mortgaged and nonmortgaged properties within the R_0 ring, respectively, which are calculated using the 5-year ACS at the census-tract level.

E. Supplementary figures and tables

Figure IA.1: Example of property rehabilitation

This figure shows before-and-after photographs of a property rehabilitation facilitated by the NCST in Pontiac, MI.



Panel A: Before rehabilitation

Panel B: After rehabilitation





Figure IA.2: HUD's risk score

This figure plots the Department of Housing and Urban Development's (HUD's) risk score for all census tracts in the U.S. and for the census tracts that contain the rehabilitated properties in our study. The HUD risk score indicates the risk of foreclosures and abandonment of homes in a neighborhood (e.g., a census tract). The HUD's Risk for a neighborhood is computed based on: (a) the home vacancy rate as of June 2008, (b) the fraction of high-cost mortgages issued between 2004 and 2006, (c) the unemployment rate as of June 2008, and (d) the house price decline as of June 2008 relative to the peak house price since 2000. We obtain the HUD risk scores and the data used to compute those risk scores from HUD. See https://www.huduser.gov/portal/datasets/NSP_target.html.



Figure IA.3: Density plots for components of HUD's risk score

This figure plots individual components of the HUD's risk score for all census tracts in the U.S. and for the census tracts that contain the rehabilitated properties in our study. The HUD risk score indicates the risk of foreclosures and abandonment of homes in a neighborhood (e.g., a census tract). The HUD's risk for a neighborhood is computed based on: (a) the home vacancy rate as of June 2008, (b) the fraction of high-cost mortgages issued between 2004 and 2006, (c) the unemployment rate as of June 2008, and (d) the house price decline as of June 2008 relative to the peak house price since 2000. We obtain the HUD risk scores and the data used to compute those risk scores from HUD. See https://www.huduser.gov/portal/datasets/NSP_target.html.













Panel B: Fraction of low-income households



Panel D: Fraction of high-cost mortgages



Panel F: House price drop



Figure IA.4: Geographic distribution of in-sample NCST transactions



This figure plots the geographic distribution of 6,852 NCST properties in our final sample across the U.S.

Figure IA.5: Bow tie region used in the empirical derivative method

This figure displays a visual representation of the 3-dimensional bow tie region used in the empirical derivative method described in Section 2.1.



Figure IA.6: House price surface before property rehabilitation

This figure plots the house price surface in the neighborhood of a rehabilitated property obtained using the nonparametric empirical derivative method described in Section 2.1. The house price surface is plotted for the 1-year period before the property rehabilitation. Each point on the house price surface represents the logarithm of house prices at a specific distance and time from the rehabilitated property relative to the logarithm of house prices one mile from, and one year before, the property's rehabilitation. Distance is measured in miles and time is measured in years. Time 0 represents the rehabilitation period. The median rehabilitation period in the sample is 70 days.



Figure IA.7: Rehabilitation spillover effects after excluding rehab property clusters

This figure plots house price surface for non-rehabbed properties using the empirical derivative method similar to Figure 2 in the main paper. However, we exclude those NCST properties in our main sample that are located within the same census block (Panel A) and same census tract (Panel B) as other NCST properties.

Panel A: Excluding clusters within same census block



Panel B: Excluding clusters within same census tract



Figure IA.8: House price surface using the empirical derivative method after controlling for property characteristics

This figure plots house price surface for non-rehabbed properties using the empirical derivative method similar to Figure 2 in the main paper. However, we follow a two-step procedure for this plot. We first estimate a hedonic regression of house prices on a broad set of property characteristics. Next, we estimate the empirical derivative method using the residuals from the hedonic regression as the outcome variable.



Figure IA.9: House price surface for non-rehabbed properties using the empirical derivative method

This figure plots house price surface for non-rehabbed properties using the empirical derivative method similar to Figure 2 in the main paper. There are 759 non-rehabbed properties, which are identified as properties that were sold through NCST but were resold subsequently without any rehabilitation.



Figure IA.10: Rehabilitation spillover effect during various stages

This figure re-plots Figure 6 of the main paper by estimating the rehabilitation spillover effect after excluding (i) transactions associated with rehabbed properties that are listed before the rehab completion dates, and (ii) transactions that occur within 60 days after the rehabilitation start date. Panel A plots the estimated coefficients in the inner ring (≤ 0.1 miles) relative to the outer ring (≤ 0.33 miles). Panel B plots the estimated coefficients in the outer ring. The vertical lines represent the corresponding 95% confidence intervals for the estimated coefficients.

Panel A: Close (≤ 0.1 mi) relative to far (≤ 0.33 mi) properties



Panel B: Far (≤ 0.33 mi) properties

Figure IA.11: Example of property rehabilitation work order

This figure shows the work order for the rehabilitation facilitated by the NCST in Pontiac, MI shown in Figure IA.1 $\,$

, Pontiac, MI	
DEMO	\$2,000
DUMPSTERS	\$900
TREE REMOVAL	\$1,350
NEW DRYWALL AND INSULATION	\$1,988
NEW GARAGE BUILD	\$0
PATCH/PRIME/PAINT (INCL EXTERIOR)	\$3,464
ELECTRICAL - PANEL AND FIXTURES	\$2,180
PLUMBING - KITCHEN AND BATHROOMS PLUS MISC	\$1,560
MECHANICAL/HVAC - DUCTWORK/WATER HEATER/AC	\$1,800
CITY FEES - PERMITS AND INSPECTIONS	\$440
BATHROOM SUPPLIES	\$3,211
KITCHEN SUPPLIES/APPLIANCES/COUNTERS - PLUS KITCHEN MOD	\$7,800
BASEMENT SUPPLIES/DRYLOCK WATERPROOFING	\$1,450
FLOORING/TILE	\$2,855
ADDITIONAL MATERIAL COSTS	\$0.00
INTERIOR/EXTERIOR DOORS	\$950
CLEANING	\$450
ROOFING	\$0
CHIMNEY REPAIR - CAP AND TUCKPOINTE	\$0
WINDOW REPAIRS/REPLACEMENT	\$5,850
DRIVEWAY REPAIRS/REPLACEMENT	\$1,350
GUTTERS	\$1,080
SIDING REPLACEMENT	\$2,990
LANDSCAPE/GRADING	\$450
MOLD/WATER/SMOKE REMEDIATION	\$0
POWERWASHING	\$750
FOUNDATION REPAIRS	\$0
NEW GARAGE DOOR	\$1,600
DECK	\$3,150
BASEMOARD/TRIM/MOLDINGS	\$1,880
INSURANCE	\$0
INSPECTION REPAIRS	\$1,551
TOTAL COST FOR LABOR AND MATERIALS	\$53,049

Table IA.1: Summary statistics of neighboring property transactions

This table presents the summary statistics for arms-length single-family property transactions in the neighborhood of the 6,852 properties in our sample which were sold through the NCST for rehabilitation. Neighboring property transactions are transactions that occur either in the same census tract as, or in a tract adjacent to, the rehabilitated property, and between one year prior to the rehabilitation start date and one year after the rehabilitation end date. Data on property transactions are obtained from the Zillow ZTRAX database. We omit properties for which the sales price, buyer or seller names, building area, number of bedrooms, number of bathrooms, or construction year are missing or have impossible values (e.g., zero or negative values). We also omit non-arm's length transactions as identified by Zillow (e.g., interspousal transfer, transfer on death). Summary statistics are presented for three subsamples of neighboring property transactions that are: (1) within 0.1 miles of the rehabilitated property, (2) within 0.1 to 0.33 miles of the rehabilitated property, (3) greater than 0.33 miles, but within the same census tract as, or in a tract adjacent to, the rehabilitated property.

	Within 0.1 mi		With	Within $0.1-0.33$ mi			Greater than 0.33 mi		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Age (years)	53	55	29	53	55	28	42	39	28
Sales price (\$)	136,343	120,000	100,430	144,138	125,000	108,739	166,816	142,000	121,703
$\label{eq:price} \ensuremath{\operatorname{Price}}\xspace{-1mu} \operatorname{int} \ensuremath{\operatorname{sqft}}\xspace{-1mu} s$	95	82	69	98	85	70	97	84	67
Interior area (sqft)	1,474	$1,\!336$	578	1,512	$1,\!355$	626	1,776	1,572	815
Gross area (sqft)	2,699	2,240	$1,\!972$	2,774	2,288	2,006	3,454	2,760	2,935
Total bedrooms	3	3	1	3	3	1	3	3	1
Total bathrooms	2	2	1	2	2	1	2	2	1

Table IA.2: Rehabilitation spillover effect using the ring method: Robustnessusing Rehab-case-by-time fixed effects

This table re-estimates Table 3 of the main paper by replacing $Census-tract \times Year-quarter$ fixed effects with $Rehab-case \times Year-quarter$ fixed effects. Rehab-case refers to each of the 6,852 rehabilitated properties in our sample. By including $Rehab-case \times Year-quarter$ fixed effects, the spillover effect is estimated "within" each rehabilitation and controls for any potentially confounding time-varying house price trends associated with each rehabilitation. Standard errors are clustered at the census-tract level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Depvar: log(Sales price)	(1)	(2)	(3)	(4)
Close×Post	0.040***	0.036***	0.033***	0.031***
	(4.42)	(4.18)	(3.90)	(3.64)
Close	-0.041***	-0.023***	-0.017***	-0.015***
	(-6.39)	(-4.09)	(-2.98)	(-2.59)
Far×Post	0.007	0.005	0.004	0.003
	(1.45)	(1.18)	(0.91)	(0.76)
Far	-0.079***	-0.036***	-0.086***	-0.090***
	(-16.76)	(-10.12)	(-7.98)	(-8.17)
Post	0.019*	0.019*	0.019*	0.019*
	(1.73)	(1.93)	(1.93)	(1.92)
Rehab-case×Year-qtr FE	Yes	Yes	Yes	Yes
Program FE	Yes	Yes	Yes	Yes
Property controls	No	Yes	Yes	Yes
Neighborhood controls (1)	No	No	Yes	Yes
Neighborhood controls (2)	No	No	No	Yes
Ν	927,143	927,143	927,143	927,143
Adj. R^2	0.556	0.642	0.642	0.642
Mean sales price (\$)	$114,\!065$	$114,\!065$	$114,\!065$	$114,\!065$

Table IA.3: Cross-sectional analysis: Rehabilitation characteristics

This table corresponds to the cross-sectional analysis presented in Figure 4. This table presents the average log house prices at various distances over the one year *after* the rehabilitation relative to the one year *before* the rehabilitation. These are computed using the empirical derivative method described in Section 2.1. The average house prices at a given distance from the rehabilitated property are computed by integrating the house price surfaces in Figure 4 over the 1-year period before and after the rehabilitation. Sampling is carried out over neighborhoods corresponding to rehabilitated NCST properties (i.e., blocks). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Pa	anel A: High	rehabilitat	ion intensity	y NCST pro	operties			
Distance from NCST property (mi)	$0.025 \\ (1)$	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	1.0 (9)
House price (log)	0.0500^{*} (1.89)	0.0476^{*} (1.88)	0.0412^{*} (1.75)	0.0380^{*} (1.69)	$\begin{array}{c} 0.0294 \\ (1.38) \end{array}$	0.0245 (1.25)	0.0211 (1.27)	0.0143 (1.26)	0.0015 (0.82)
	Р	anel B: Low	rehabilitati	on intensity	v NCST pro	operties			
Distance from NCST property (mi)	0.025 (1)	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$\begin{array}{c} 0.75 \\ (8) \end{array}$	1.0 (9)
House price (log)	-0.0054 (-0.34)	-0.0054 (-0.34)	-0.0049 (-0.33)	-0.0056 (-0.37)	-0.0062 (-0.43)	-0.0063 (-0.47)	-0.0045 (-0.40)	-0.0035 (-0.51)	-0.0005 (-0.55)
	Pa	anel C: Long	rehabilitat	ion duratio	1 NCST pr	operties			
Distance from NCST property (mi)	0.025 (1)	0.05 (2)	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	0.3 (6)	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	$ \begin{array}{c} 1.0 \\ (9) \end{array} $
House price (log)	$\begin{array}{c} 0.0623^{***} \\ (2.77) \end{array}$	0.0603^{***} (2.75)	0.0528^{**} (2.57)	0.0489^{**} (2.45)	0.0377^{**} (1.99)	0.0259 (1.48)	$\begin{array}{c} 0.0077 \\ (0.54) \end{array}$	-0.0032 (-0.36)	-0.0017 (-1.38)
	Pa	anel D: Short	rehabilitat	ion duratio	n NCST pr	operties			
Distance from NCST property (mi)	$ \begin{array}{c} 0.025 \\ (1) \end{array} $	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	1.0 (9)
House price (log)	-0.0034 (-0.20)	-0.0051 (-0.31)	-0.0066 (-0.41)	-0.0066 (-0.42)	-0.0070 (-0.46)	-0.0053 (-0.37)	-0.0012 (-0.11)	0.0027 (0.38)	0.0013 (1.53)

Table IA.4: Foreclosures around property rehabilitations

This table shows how the foreclosed transactions vary in the neighborhood of the rehabilitated property. The dependent variable is the fraction of foreclosed transactions which is computed as the number of foreclosed transactions relative to total number of transactions in the neighborhood of the rehabilitated property. Total number of transactions equals the sum of arms-length regular transactions and foreclosed transactions in the neighborhood. *Close* is an indicator variable equal to 1 for the neighborhood within 0.1 miles of the rehabilitated property, and equal to 0 for the neighborhood outside of it until 0.33 miles of rehabilitated property. *Post* is an indicator variable equal to 1 for the period one year after the rehabilitation completion date, and equal to 0 for the one year period before the rehabilitation start date. The fraction of foreclosed transactions is computed for each neighborhood–period pair for every rehabilitation event. *Rehab-case FE* refers to a fixed effect for each rehabilitation event. Standard errors are clustered at the census-tract level and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Depvar: fraction of foreclosures	(1)	(2)
Close×Post	-0.059*** (-13.72)	-0.055^{***} (-12.80)
Close	0.014^{***} (5.04)	$\begin{array}{c} 0.011^{***} \\ (4.38) \end{array}$
Post	-0.052*** (-22.62)	-0.055^{***} (-24.41)
Rehab-case FE	No	Yes
N Adj. R^2 Mean fraction of foreclosures	$29,202 \\ 0.031 \\ 0.368$	$29,202 \\ 0.487 \\ 0.368$

Table IA.5: Cross-sectional analysis: Neighborhood characteristics

This table corresponds to the cross-sectional analysis presented in Figure 5. This table presents the average log house prices at various distances over the one year *after* the rehabilitation relative to the one year *before* the rehabilitation. These are computed using the empirical derivative method described in Section 2.1. The average house prices at a given distance from the rehabilitated property are computed by integrating the house price surfaces in Figure 5 over the 1-year period before and after the rehabilitation. Sampling is carried out over neighborhoods corresponding to rehabilitated NCST properties (i.e., blocks). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		Panel A	A: High-dist	ress NCST	neighborhod	ods			
Distance from NCST property (mi)	0.025 (1)	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$0.75 \\ (8)$	1.0 (9)
House price (log)	0.0225 (1.34)	0.0207 (1.27)	$0.0195 \\ (1.29)$	$\begin{array}{c} 0.0198 \\ (1.35) \end{array}$	$\begin{array}{c} 0.0193 \\ (1.40) \end{array}$	$\begin{array}{c} 0.0189\\ (1.51) \end{array}$	$\begin{array}{c} 0.0138\\ (1.36) \end{array}$	0.0082 (1.27)	0.0002 (0.24)
		Panel I	B: Low-dist	ress NCST 1	neighborhoc	ods			
Distance from NCST property (mi)	$0.025 \\ (1)$	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	1.0 (9)
House price (log)	0.0537^{**} (2.32)	0.0536^{**} (2.36)	0.0515^{**} (2.37)	0.0496^{**} (2.33)	0.0432^{**} (2.09)	0.0381^{*} (1.95)	$\begin{array}{c} 0.0255 \\ (1.60) \end{array}$	$\begin{array}{c} 0.0111\\ (1.14) \end{array}$	$\begin{array}{c} 0.0012 \\ (0.94) \end{array}$
		Panel C	: High illiqu	idity NCST	neighborhd	oods			
Distance from NCST property (mi)	$ \begin{array}{c} 0.025 \\ (1) \end{array} $	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	1.0 (9)
House price (log)	$\begin{array}{c} 0.0125 \\ (0.43) \end{array}$	$\begin{array}{c} 0.0130 \\ (0.46) \end{array}$	$\begin{array}{c} 0.0123 \\ (0.45) \end{array}$	$\begin{array}{c} 0.0123 \\ (0.47) \end{array}$	$\begin{array}{c} 0.0093 \\ (0.37) \end{array}$	$\begin{array}{c} 0.0057 \\ (0.24) \end{array}$	-0.0013 (-0.07)	-0.0020 (-0.18)	-0.0006 (-0.41)
	F	Panel D: Lov	v illiquidity	duration N	CST neight	orhoods			
Distance from NCST property (mi)	0.025 (1)	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	1.0 (9)
House price (log)	0.0410^{**} (2.23)	0.0412^{**} (2.31)	0.0391^{**} (2.32)	0.0375^{**} (2.27)	0.0313^{**} (1.99)	0.0248^{*} (1.74)	0.0127 (1.06)	0.0039 (0.49)	0.0007 (0.59)

Table IA.6: Rehabilitation spillover effect heterogeneity

This table shows how the rehabilitation spillover effect varies across different types of rehabilitated properties. The rehabilitation spillover effect (i.e., dependent variable) is computed similarly as in Table 2 of the main paper. However, in contrast to Table 2, this rehabilitation spillover effect is computed separately for each rehabilitated property and then regressed on various characteristics of the rehabilitated property. These characteristics are the same as those in the heterogeneity analysis in Figure 4 and Figure 5, namely: rehabilitation duration, rehabilitation intensity (rehabilitation amount÷property value before rehabilitation), neighborhood distress (number of foreclosures within 0.1 miles of a rehabilitated property during the one-year period before its rehabilitation), neighborhood liquidity (number of arms-length transactions within 0.1 miles of the rehabilitation) spillover effect is estimated at various distances from the rehabilitated property. The regressions are estimated by pooling the spillover effects across all distances and including a "distance" fixed effect. Standard errors are robust and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Depvar: Spillover effect(%)	(1)	(2)	(3)	(4)	(5)
Rehab Duration (months)	$\begin{array}{c} 0.231^{***} \\ (6.01) \end{array}$				$0.128^{***} \\ (3.17)$
Rehab Intensity (% of FMV)		0.011^{***} (7.08)			0.010^{***} (6.08)
Number of Foreclosures in Neighborhood			-0.095*** (-3.72)		-0.131*** (-4.61)
Number of Transactions in Neighborhood				0.059^{*} (1.92)	$\begin{array}{c} 0.134^{***} \\ (3.93) \end{array}$
Distance FE	Yes	Yes	Yes	Yes	Yes
N Adj. R^2 Mean spillover effect (%)	$ \begin{array}{r} 143,616\\ 0.000\\ 0.908 \end{array} $	$143,616 \\ 0.001 \\ 0.908$	$143,\!616\\0.000\\0.908$	$ \begin{array}{r} 143,616\\ 0.000\\ 0.908 \end{array} $	$143,616 \\ 0.001 \\ 0.908$

Table IA.7: Welfare effects of property rehabilitation using alternate definition for the rehabilitated property's neighborhood

This table is identical to Table 4 except that it uses an alternate definition for the neighborhood around the rehabilitated property. The neighborhood around the rehabilitated property is defined based on the maximum distance at which the rehabilitation spillover effect for each subsample gets close to zero. A rehabilitation spillover effect is considered close to zero if it is drops below 1 pp in magnitude.

	Welfare per l	household (\$)	Aggregate welfare (\$)				
Sample	Owner-occupied (1)	Renter-occupied (2)	Owner-occupied (3)	Renter-occupied (4)	Total (5)		
Full sample	1,302.33	950.22	896,256.60	402,164.30	1,298,420.90		
High-distress	1,033.58	727.18	1,910,048.00	877,908.60	2,787,956.60		
Low-distress	4,383.30	3,079.66	10,206,303.00	4,736,814.00	14,943,117.00		
High-Illiquidity	191.57	141.78	28,547.98	12,274.30	40,822.28		
Low-Illiquidity	$3,\!231.57$	2,296.69	4,554,478.00	2,078,658.00	$6,\!633,\!136.00$		

Table IA.8: Welfare effects of property rehabilitations for renter-occupied properties

This table splits the welfare effects for renter-occupied properties presented in Table 4 into welfare effects for landlords and renters. Columns (1) and (2) present the welfare per household for the renter-occupied properties. Columns (3) and (4) present the total welfare by scaling the welfare per household estimates by the corresponding number of rental properties in the neighborhood.

	Welfare per	household (\$)	Total welfare (\$)		
Sample	Landlord (1)	Renter (2)		Renter (4)	
Full	415.95	61.84	36,011.32	5,353.82	
High-distress	92.37	142.63	3,423.95	5,286.60	
Low-distress	1,409.27	297.29	692,856.90	146,159.60	
High-Illiquidity	68.98	-56.38	2,556.82	-2,089.69	
Low-Illiquidity	1,085.51	106.41	269,263.48	26,394.32	

Table IA.9: Cross-sectional analysis: Rehabilitation salience

This table corresponds to the cross-sectional analysis presented in Figure 7. This table presents the average log house prices at various distances over the one year *after* the rehabilitation relative to the one year *before* the rehabilitation. These are computed using the empirical derivative method described in Section 2.1. The average house prices at a given distance from the rehabilitated property are computed by integrating the house price surfaces in Figure 7 over the 1-year period before and after the rehabilitation. Sampling is carried out over neighborhoods corresponding to rehabilitated NCST properties (i.e., blocks). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: High salience									
Distance from NCST property (mi)	$0.025 \\ (1)$	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	1.0 (9)
House price (log)	0.0469^{*} (1.85)	0.0466^{*} (1.87)	0.0448^{*} (1.87)	0.0445^{*} (1.90)	0.0414^{*} (1.85)	0.0374^{*} (1.78)	$\begin{array}{c} 0.0317^{*} \\ (1.82) \end{array}$	$\begin{array}{c} 0.0154 \\ (1.31) \end{array}$	$\begin{array}{c} 0.0014 \\ (0.90) \end{array}$
			Panel	B: Low sal	ience				
Distance from NCST property (mi)	$ \begin{array}{c} 0.025 \\ (1) \end{array} $	$ \begin{array}{c} 0.05 \\ (2) \end{array} $	$ \begin{array}{c} 0.1 \\ (3) \end{array} $	$ \begin{array}{c} 0.15 \\ (4) \end{array} $	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$ \begin{array}{c} 0.75 \\ (8) \end{array} $	$ \begin{array}{c} 1.0 \\ (9) \end{array} $
House price (log)	0.0243 (0.93)	0.0234 (0.92)	$0.0148 \\ (0.62)$	0.0119 (0.52)	0.0051 (0.23)	0.0004 (0.02)	-0.0132 (-0.70)	-0.0130 (-1.05)	-0.0015 (-0.85)

Table IA.10: Rehabilitation salience and rehabilitated property sale price

This table shows the relation between rehabilitation salience and the rehabilitated property's sale price. The dependent variable, *Dollar return*, is the value added to the property through the rehabilitation (i.e., the resale price of the rehabilitated property after its rehabilitation minus its purchase price before its rehabilitation). *High salience* is an indicator for a rehabbed property with an above median external rehabilitation. External rehabilitation is measured by parsing rehabilitation work orders and counting the number of words that are associated with external improvements (e.g., roof, landscape, fence). Property controls include square footage, age, and their squared terms, and indicator variables for the number of bedrooms, bathrooms, and building condition. The number of rehabilitated properties in these tests is smaller than our baseline sample due to incomplete data on work orders that allow distinguishing between internal and external rehabilitation, and due to incomplete data on the rehabilitated property's resale price. Standard errors clustered at the county level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Depvar: Dollar return	(1)	(2)	(3)
Rehabilitation amount	0.684***	0.633***	0.642***
	(12.77)	(11.10)	(11.94)
Rehabilitation amount×High salience	-0.241***	-0.247***	-0.249***
-	(-4.71)	(-4.72)	(-4.11)
High salience	9,547.217***	10,042.521***	11,259.097***
-	(3.09)	(2.94)	(2.66)
Rehabilitation duration	25.712**	25.192***	21.021
	(2.55)	(2.77)	(1.50)
Program FE	Yes	Yes	Yes
County FE	Yes	Yes	No
Year-qtr FE	Yes	Yes	No
Property controls	No	Yes	Yes
$County \times Year-qtr \ FE$	No	No	Yes
Ν	2,013	2,013	$1,\!459$
Adj. R^2	0.506	0.549	0.523
Mean dollar return	87,708	87,708	90,206

Table IA.11: Rehabilitation spillover effect: Robustness using an expansive set of property controls

This table re-estimates Table 3 of the main paper after controlling an expansive set of property characteristics. This expansive set includes the baseline property controls in Table 3, Column (4), namely, square footage, age, and their squared terms, and indicator variables for the number of bedrooms, bathrooms, building condition. The expansive set further includes indicator variables for the existence of a garage, attic, fireplace, heating, and air conditioning, and indicator variables for the type of construction, roof, roof material, architecture, and foundation. Following Campbell et al. (2011) indicator variables are created for each of these additional attributes if they are missing and are included in the regression. Column (1) presents results after including the expansive set of property controls. Column (2) presents results from Table 3, Column (4) for comparison. Standard errors are clustered at the census-tract level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Depvar: log(Sales price)	(1)	(2)		
Close×Post	0.041***	0.040***		
	(4.87)	(4.75)		
Close	-0.017***	-0.017***		
	(-3.05)	(-2.94)		
Far×Post	0.005	0.005		
	(1.17)	(1.10)		
Far	-0.070***	-0.076***		
	(-6.62)	(-6.97)		
Post	0.009**	0.009^{*}		
	(2.01)	(1.87)		
Expansive property controls	Yes	No		
Baseline property controls	No	Yes		
$Census-tract \times Year-qtr \ FE$	Yes	Yes		
Program FE	Yes	Yes		
Neighborhood controls (1)	Yes	Yes		
Neighborhood controls (2)	Yes	Yes		
N	928,440	928,440		
Adj. R^2	0.668	0.663		
Mean sales price (\$)	$113,\!998$	$113,\!998$		

Table IA.12: Income of incoming homebuyers

This table corresponds to the income analysis presented in Figure 8. This table presents the average log income of homebuyers who purchased properties in the neighborhood of rehabilitated properties at various distances over the one year *after* the rehabilitation relative to the one year *before* the rehabilitation. These are computed using the empirical derivative method described in Section 2.1. The average incomes at a given distance from the rehabilitated property are computed by integrating the income surfaces in Figure 8 over the 1-year period before and after the rehabilitation of the NCST property. Standard errors are estimated using the block-bootstrap method with 500 simulations. Sampling is carried out over neighborhoods corresponding to rehabilitated NCST properties (i.e., blocks). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Distance from NCST property (mi)	$0.025 \\ (1)$	$0.05 \\ (2)$	0.1(3)	$0.15 \\ (4)$	$ \begin{array}{c} 0.2 \\ (5) \end{array} $	$ \begin{array}{c} 0.3 \\ (6) \end{array} $	$ \begin{array}{c} 0.5 \\ (7) \end{array} $	$0.75 \\ (8)$	1.0(9)
Income (log)	0.0027 (0.15)	$\begin{array}{c} 0.0035 \\ (0.20) \end{array}$	$\begin{array}{c} 0.0041 \\ (0.25) \end{array}$	$\begin{array}{c} 0.0043 \\ (0.27) \end{array}$	$\begin{array}{c} 0.0045 \\ (0.30) \end{array}$	$\begin{array}{c} 0.0040 \\ (0.30) \end{array}$	$\begin{array}{c} 0.0030 \\ (0.29) \end{array}$	$\begin{array}{c} 0.0010 \\ (0.20) \end{array}$	$\begin{array}{c} 0.0002\\ (0.34) \end{array}$