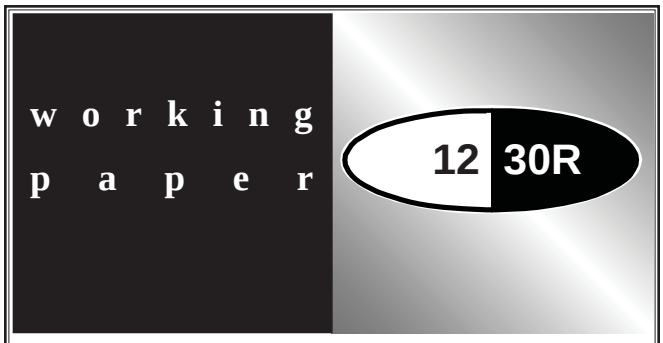

Land Bank 2.0: An Empirical Evaluation

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FEDERAL RESERVE BANK OF CLEVELAND

Working Paper 12-30R September 2014*

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In 2009, Cuyahoga County, Ohio, which contains Cleveland and 58 other municipalities, created the Cuyahoga County Land Reutilization Corporation. This land bank was established to acquire low-value properties, mitigate blighted housing, help stabilize neighborhoods, and slow the decline of property values. As of September 2013, the land bank had acquired 3,405 properties and demolished 1,853 structures. This empirical study evaluates the effectiveness of the land bank by estimating spatially corrected hedonic price models using sales near the land bank homes. In the six months before they are purchased by the land bank, the distressed properties are estimated to lower the sale price of nearby homes (within 500 feet) by 5.2 percent. The negative externality from the distressed properties decreases to 4.4 percent once the land bank takes possession. A vacant lot created by a land-bank house demolition reduces the values of nearby homes by 2.4 percent. By reducing the negative externalities of distressed properties, the land bank has recovered about $3.8 million in value for homes sold during the study period. We estimate that tax collections were $3.2 million higher than they otherwise would have been. The land bank's largest impact takes the form of preserved value for homes that did not sell during the study period, and we estimate this to be approximately $156 million.

Keywords: Land Bank, Distressed Property, Property Values, Spatially Correlated Hedonic Price Models.

JEL Codes: R1 R2 R3.

First version: November 2012.

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1 Introduction

With few exceptions, most large metropolitan areas have experienced decades of declining home values and abandonment of properties in central city neighborhoods and some inner suburbs. The foreclosure crisis and accompanying recession created an unprecedented wave of blighted properties in low-income neighborhoods of older US cities. Foreclosures, abandoned homes, and vacant lots have long been present in these neighborhoods, but the rapid unwinding of subprime mortgages caused a surge in distressed properties.

By 2009, community leaders and elected officials in Cuyahoga County, Ohio, concluded that dozens of neighborhoods would be irreparably damaged if everyone waited for the private market to repurpose the distressed properties. These leaders persuaded the Ohio General Assembly to pass legislation to allow the creation of robust modern land banks. Land banks are non-profit organizations that acquire low-value properties and return them to productive use. When possible, land banks resell homes to trusted partners for rehabilitation. In many cases, they must demolishing unsalvageable homes before reselling the lots. As long as the formerly neglected properties are in the land bank inventory, they are carefully maintained to minimize their negative impact on their neighborhood.

In contrast to the municipal land banks that have existed for decades, the land banks created under the new legislation possess enhanced acquisition powers, operational abilities, and a stable operating budget. Eight other states have passed legislation authorizing land banks, and approximately 50 post-crisis land banks have been established.[1] Evaluations of second generation land banks are needed to inform and guide this ongoing growth.

The Cuyahoga County land bank was one of the earliest post-crisis land banks founded. It has now been in operation long enough to allow for the first attempt to empirically evaluate the effectiveness of a land bank created with enhanced powers and funding. We focus our evaluation on the sale prices of homes nearby the land bank properties because the sale prices

[1]The Center for Community Progress maintains a list of land banks in operation: http://www.communityprogress.net/land-bank-map-pages-447.php (accessed September 17, 2014).

quantify the quality of life in a specific location. Home values are important to homeowners, property investors, mortgage holders, and all local governments that are supported by property taxes. In our literature review, we only identified one previous empirical evaluation of a land bank (Griswold and Norris, 2007).

Using spatially-corrected hedonic price models, we are able to detect statistically significant sales price differences due to nearby land-bank properties. In our preferred specification, we estimate that properties that will enter the land bank inventory within six months have a negative externality of approximately 5.2 percent on the values of nearby homes. The negative externality of homes owned by the land bank is estimated to be 4.4 percent in our preferred model. Vacant lots created by land bank demolitions have negative externalities of 2.4 percent. While the differences are not always statistically significant, the coefficients in a great variety of specifications suggest that a distressed property has less of an externality after the land bank has acquired it, and a land-bank-created vacant lot has an even smaller negative externality. The value preserved for home sellers is estimated to be $3.8 million during our 39-month study period. Additional tax revenue that is collected due to value preservation is estimated at $3.2 million in 2013. The relevant land bank operations have cost between $4.5 and $17.7 million per year. To make the case for the land bank on cost-benefit terms, one must also consider the value preserved for homes that have not sold. We estimate this value at $156 million at the beginning of 2013. All the value recoveries should continue to increase as the number of land-bank treated properties continues to grow.

2 Background

As foreclosures surged in Cuyahoga County in 2007 and 2008, mortgage lenders took possession of thousands of houses. They resold them, often in bulk, to speculators who intended to resell them quickly at a profit (Kotlowitz, 2009). The speculators did little or no maintenance on the properties, especially if they did not reside in the area. When the speculators were

unable to resell the properties, they abandoned them. During months of vacancy, scrappers stripped hundreds of the homes of their valuable copper pipes and wire and damaged them beyond repair. The remaining structures blighted their neighborhoods and harbored criminals. Eventually, tax foreclosures placed many of the properties in the hands of municipalities that did not have the resources to demolish the houses or maintain the lots.

From the perspective of state and local governments, abandoned, low-value housing would be ideally redeveloped by the private sector. But private redevelopment of abandoned property tends to occur only when the price of land exceeds the cost of acquisition and demolition of the structure (Rosenthal and Helsley, 1993). Unfortunately, land values are extremely low in many areas where residential housing abandonment is common, resulting in little or no private redevelopment. This is the case in various neighborhoods in Cuyahoga County, Ohio, where the land bank has been operating.

When land's salvage value is so low as to discourage redevelopment, community development practitioners report that abandonment spreads. The disamenity of an abandoned house encourages existing neighbors to move and discourages potential buyers from purchasing near the abandoned house. This creates a cycle that can be detrimental to neighborhoods: abandonment leads to nearby homes remaining vacant for prolonged periods, which may lead to further abandonment. The absence of private intervention in these markets has encouraged public officials to increase public demolition or rehabilitation of abandoned residential property.

One of the tools being used to mitigate blighted residential properties is modern land banking. Ohio's modern land banks are government-incorporated nonprofit entities with statutorily defined missions to acquire nonproductive real property and return it to productive use (Fitzpatrick IV, 2010). In 2009, Ohio's General Assembly passed modern land bank enabling legislation.[2] This law authorizes some counties to create not-for-profit land reutilization corporations, commonly referred to as land banks. The law originally only allowed

[2]S.B. 353, 127th Gen. Assembly, Reg. Sess. (Ohio 2009) (codified at OHIO REV. CODE ANN. 5722.01 et seq.)

Cuyahoga County, home to Cleveland, to create a land bank, though it was subsequently amended to allow other Ohio counties to create them. Fifteen other land banks have been created in Ohio, covering all its major urban centers.

In contrast to the decades-old municipal land banks, the second generation land banks in Ohio have a permanent source of funding and variety of additional powers. Municipal land banks had to compete with other priorities for annual appropriations from city governments that were struggling to maintain their tax base. To strengthen the fiscal position of the new land banks, the county that establishes them can permanently allocate a portion of the county-wide collections of delinquent property taxes. The new Ohio land banks are also allowed to seek state, federal and philanthropic grants. They can issue bonds and use the proceeds to acquire and demolish properties. The ability to purchase properties is another new power, which supplements the donation and tax-foreclosure acquisition channels. Second generation land banks also have discretion over their inventory. They can decline to take possession of properties. Pre-crisis land banks usually became the owners of all properties that met certain criteria, and this would often overwhelm their resources. Second generation land banks can clear property titles of all outstanding liens. These liens were often placed decades ago by parties who can no longer be contacted, but they can nevertheless "cloud" a property title and discourage any redeveloper from investing in it. The need for an empirical evaluation of a post-crisis land bank is great in part because past experience with pre-crisis land banks is not very informative regarding the new, enhanced land bank organizations.

The Cuyahoga County Land Reutilization Corporation (the Cuyahoga land bank) has been acquiring properties since late 2009. There are two primary ways it acquires properties: property-tax foreclosure and directly from lenders foreclosing on mortgages. When acquiring properties through tax-foreclosure, the Cuyahoga land bank notifies public authorities of its interest in acquiring the property, and if the city in which the property is located allows it, the Cuyahoga land bank receives the property after foreclosure. Most of the properties the land bank acquires come directly from foreclosing lenders, rather than through tax-foreclosure.

Individual lenders have entered agreements with the Cuyahoga land bank such that any property they foreclose upon valued below a certain amount (usually $20,000 to $30,000) is donated or sold to the Cuyahoga land bank for a nominal sum. The lenders frequently include a contribution to cover part of the cost of demolishing the home, when demolition is necessary.

Once the Cuyahoga land bank has the property in inventory, it inspects the property and determines if it is a candidate for rehabilitation or demolition based on the property's condition and the strength of the local housing market. If it is possible to rehabilitate it, the land bank will usually market the property to private rehabbers. If there is no interest in rehabbing the property in the first six or so months, the property will be slated for demolition. Most of the properties acquired by the Cuyahoga land bank will eventually be demolished.

The land bank's annual contract and administrative costs were $4.45 million in 2010, $12.4 million in 2011, $12.8 million in 2012, and $17.7 million in 2013.[3] The amount spent on property acquisition, maintenance, and demolition has risen from $2.3 million in 2010 to $13.3 million in 2013. Administrative spending was near $4.4 million annually in 2010, 2011 and 2012. Part of the administrative expenditure includes applying for and dispersing state and federal grants for other community development programs. The land bank's largest sources of revenue in 2013 were delinquent property tax collections (39 percent) and a grant from the Ohio Attorney General (43 percent).

Land banks will very likely proliferate in the coming years in most cities in the industrial Midwest and Northeast. This is because they are one of the few vehicles for policy makers to address the consequences of excess housing stock. Excess housing arises when the number of households is stagnant or declining, but new housing construction continues. If growth of a region's housing stock exceeds the growth of its population, prices will adjust until the most desirable homes are filled (Bier and Post, 2003; Glaeser and Gyourko, 2005). The oldest,

[3]Land bank budget documents list higher total figures, but these include grants that are passed through to community groups for activities that we are not evaluating here.

lowest quality homes are filtered out of the stock by being left vacant and eventually demolished or abandoned (Lowry, 1960). Most new housing in the US is built on the periphery of urbanized areas, and the oldest homes are concentrated in the center of the central cities. The innermost census tracts often have declining populations even when the metropolitan population is growing (Rappaport, 2003).

Cities across the country have long perceived abandoned residential housing as a problem (Accordino and Johnson, 2000). The problem is particularly acute in older industrial cities that have lost population in and around their urban cores (Mallach, 2012). While excess housing stock grabbed headlines in Florida and California, slow-growing northern states also built housing units faster than they added households. If we calculate the growth of housing units beyond the growth in households between 2000 and 2010, four of the ten worst showings are Michigan (201K), Ohio (175K), Illinois (150K) and New York (145K).[4] These states built more excess housing than Arizona (103K). Wisconsin (85K) and Indiana (84K) built more excess housing units than Nevada (65K), which received substantial domestic migration. It seems likely that many metro areas will be dealing with abandonment for years until the surplus units are absorbed or demolished. This distress, in turn, places downward pressures on the values of nearby homes that remain habitable and occupied.

One of the primary policy reasons for demolishing homes is to remove the disamenity of the abandoned building, thereby raising surrounding property values. If blighted properties lower surrounding home values, removing that blight should increase them. There is some support for this hypothesis in the existing empirical literature on distressed properties.

[4]The figures in the text are calculated for each state as

$$Excess = Housing\ Units_{2010} - (\frac{Households_{2010}}{Households_{2000}} * Housing\ Units_{2000}).$$

The data are from the decennial censuses. The other worst excess figures are Florida (439K), California (324K), Georgia (175K), Texas (132K), and North Carolina (114K). If the excess numbers are calculated as a share of the total housing stock, Michigan, Ohio, Wisconsin, Indiana, and Illinois are again with Nevada, Florida and Arizona among the worst fifteen.

3 Literature

While several descriptive accounts and legal papers have been published on the topic of land banks, to the best of our knowledge, only one empirical evaluation has been completed in the past. In 2007, a study from Michigan State's Land Policy Institute found that residential properties that could be acquired by its land bank had much larger negative impacts on surrounding property values than vacant lots (Griswold and Norris, 2007). Because the residential structures eligible for land bank acquisition (land bank inputs) reduced surrounding property values more than vacant lots (land bank outputs), the authors concluded that the land bank's demolitions increase surrounding property values. In this study, we aim to evaluate the impact of the Cuyahoga land bank's actual properties. Using data from when the land bank began acquiring properties through January of 2013, we determine the impact that properties we know will be acquired by the land bank have on surrounding property values. We also determine the impact that post-demolition properties have on surrounding home values. Additionally, we estimate the negative externality from vacant lots and distressed properties as in Griswold and Norris. Our definition of distressed properties is broader than Griswold and Norris' because the new Ohio land banks can acquire homes from many sources, while the Michigan land banks acquired primarily through tax-foreclosures.

While land bank evaluations are rare, the literature that addresses the externalities of distressed properties is now sizable. The distress represented by a foreclosure is the most thoroughly studied. While the metro areas and time frames differ, each study has applied some form of spatially correct hedonic price model. Each analysis has defined a distance from the observed sales (200 yards, 1/4 mile, etc.) and counted the properties within that buffer that have been foreclosed upon within specified time periods (6 months, 2 years, etc.). Foreclosure is theorized to lower nearby property values by discouraging maintenance by the mortgagee and creating a neglected property on the block. Also, foreclosed home are sold by the repossessing lender at a discount because the lender wants to minimize carrying costs and time on market. Discounted recent foreclosures can lower the perceived and appraised

value of neighboring homes. Most of the results clustered around a one percent lower sale price for each nearby foreclosure (Immergluck and Smith, 2006; Schuetz et al., 2008; Leonard and Murdoch, 2009; Harding et al., 2009; Rogers and Winter, 2009; Hartley, 2010; Rogers, 2010; Campbell et al., 2011; Groves and Rogers, 2011). One study by Lin, Rosenblatt, and Yao (2009) estimated that each foreclosure liquidation can depress short-run property values of homes within a half mile as much as 8.7 percent in down markets and 5 percent in up markets.

A few studies look more broadly at indicators of property distress including vacancy and abandonment. These analyses find that vacant or abandoned homes have disamenity effects larger than 1 percent (Mikelbank, 2008; Whitaker and Fitzpatrick, 2013). Mikelbank demonstrated that there is a negative externality from homes that are identified as abandoned, even if those homes had not been through a recent foreclosure (2008). Likewise, Whitaker and Fitzpatrick found measurable negative externalities from vacant and tax delinquent properties. In this analysis, we will include counts of tax delinquent, vacant and foreclosed homes because some of these homes are potential land bank properties. Observing the impact of these distressed properties, estimated in the same model as the impact of land bank properties, will provide a useful comparison and an additional estimate of the negative externalities the land bank could mitigate.

4 Empirical Methods

The methods we will employ are based in the field of hedonic models of real estate pricing. Origination of these models is generally credited to Rosen (1974). In their simplest application, the sales price of a home is regressed on indicators of the home's characteristics, and the coefficients are interpreted as the marginal prices of those characteristics. Most applications employ a semi-log specification that implicitly interacts all the characteristic measures because a home's value is determined by the features it bundles together. Additional rooms

or fireplaces cannot be sold off at their own prices. In this specification, the coefficients are not interpreted as prices, but rather percentage changes in the price.

Despite including a set of measures of the area surrounding an observed house sale, researchers generally suspect that there are important unobserved location factors. These include amenities and disamenities the researchers have not controlled for. The possibilities are endless, including amenities such as parks, transit stops, or convenient shopping, and disamenities such as heavy industry or traffic noise. The impact of these factors is also thought to vary with distance: a home closer to the amenity or disamenity will have a larger price response. Omitting a distance-weighted indicator of the factor leaves its influence in the error term. Equation 1 is a hedonic price model that gives two options to address this (Anselin, 1988).

$$\mathbf{P} = \lambda \mathbf{W_1} \mathbf{P} + \mathbf{ZB} + \mathbf{e} \quad (1)$$

$$\mathbf{e} = \rho \mathbf{W_2} \mathbf{e} + \mathbf{m} \quad (2)$$

$$\mathbf{m} \sim N(0, \sigma^2 \mathbf{I}) \quad (3)$$

$\mathbf{W_1}$ is a spatial weighting matrix that gives large weight to the prices of nearby homes and small weight to the prices of faraway homes. Multiplying the price vector ($\mathbf{P}$) by $\mathbf{W_1}$ creates a vector of weighted averages of nearby home prices. These nearby home prices contain information about all the local amenities and disamenities that cannot be measured. Including these averages as a control removes the gradient between relatively high-price, high-amenity tracts and low-price, low-amenity tracts. The remaining variation within neighborhoods tells us approximately how much sale prices would change if we could add or remove distressed properties. The parameter λ relates the distance-weighted mean selling price of the other homes to the specific observation. If λ is significant and non-zero, the prices are said to be spatially dependent. $\mathbf{W_2}$ is also a distance weighting, but in this case relating the errors of the observations to one another through ρ. A non-zero ρ indicates spatial error correlation,

which would be caused by unobserved amenities and disamenities contributing to the error terms of nearby homes. The error term $\mathbf{m}$ is the normal error remaining after the spatial error has been modeled. Unfortunately, ρ, λ, $\mathbf{W_1}$, and $\mathbf{W_2}$ cannot all be estimated at once, so researchers usually make some plausible assumption about either the spatial weight matrices or the spatial autocorrelation coefficients, and estimate the other. We will refer to the correction involving $\mathbf{W_1}$ as the spatial-lag correction and the correction employing $\mathbf{W_2}$ as the spatial-error correction.

In specifying the spatial models, we use a weight matrix based on the inverse of the distances to the ten closest sales. Closer sales are given larger weights and further homes are down-weighted. In the robustness checks, several other spatial corrections are attempted. Spatial-error and spatial-lag models are often estimated using maximum likelihood routines. Kalajian and Prucha demonstrated that if there is heteroskedasticity in the data (as is common in regional housing price models), maximum likelihood estimates contain bias (1999). They propose a generalized method of moments estimator for ρ which addresses this bias. The main results we present are estimated with a mixed spatial-lag and spatial-error GMM procedure.[5]

Endogeneity concerns are often addressed in the literature on distressed property externalities. If a housing market is in the self-reinforcing cycle of falling prices and increasing distressed properties, these trends will introduce bias, overstating the estimated externality of distressed homes. In our evaluation of land bank properties, we are less concerned about this because land bank acquisitions should slow the decline of a neighborhood and therefore decrease the need for subsequent land bank acquisitions in the same area. For comparability to other distressed property research, we attempted two specifications that include

[5]If a distressed home decreases the price of a neighboring home, that neighboring home decreases the prices of homes nearby, and the prices of the homes nearby decrease the price of that neighboring home, then the coefficient from the model is understating the impact of an additional distressed home. The average direct treatment impact represents that percentage decrease in home prices if the decline is calculated to impact the neighboring home prices and then fed back into the original home sale observation (Drukker et al., 2011). The change is calculated and averaged over all observations. When we calculate the average direct treatment impact, we found that it differed from the coefficients by one tenth of a percent or less, and it would be lost in rounding. The results we present may be very slightly understating the impacts.

tract price levels and their trend.[6] Over controlling is a concern with these specifications because the tract-specific price levels and trends are being added to a model that already incorporates spatially lagged home prices.

Over the thirty-nine-month study period, home prices in our data showed no statistically significant increase or decrease.[7] We include indicators for the month of sale in all estimates. These indicators are intended to adjust for the strong seasonality in northern real estate markets, but they could also capture a secular trend. From the beginning to the end of the period, the counts of land bank properties near sold homes were increasing simply because the land bank was expanding its operations. If uncorrected, trends of falling prices and rising land bank inventory could bias the externality estimates downward. It is important to remember that increasing land bank inventories is distinct from increasing distressed properties. The county-wide incidence of vacancy and tax delinquency was quite steady, with roughly equal counts of homes moving into and out of these statuses. The count of recent foreclosures in the county declined from a peak of 8,757 in 2008 to a low of 3,838 by January of 2012.

Another estimation issue involves the selection of home sales into our data set. If homes are held off the market by owners hoping for a price recovery, we will not observe their sale prices. If withholding of homes is more frequent near distressed properties, then this could lead to an underestimate of the impact of the distressed properties on neighboring property values. Lin, Rosenblatt, and Yao specified a model that estimates the selection into a sale and the implied change in the coefficient on the foreclosure count (2009). They find evidence that homes near foreclosures are more likely to be held in the shadow inventory, but the effect on estimates of a foreclosure's impact is too small to be of great concern.

[6] We calculate a trimmed (10th percentile through 90th) average sale price in each census tract in 2005-2006 and in the 24 months preceding each sale. We create a trend variable relating these two values: $trend = (avg_{0506} - avg_{24})/avg_{0506}$

[7] The Federal Housing Finance Authority home price index for the Cleveland metropolitan area declined -6.1. percent between the first quarter of 2010 and the first quarter of 2013. The S&P/Case Shiller index for the metro declined -2.1 percent between January 2010 and March 2013. The metro area measures include suburban counties in addition to Cuyahoga County.

5 Data

Our data on the land bank properties is derived directly from the comprehensive administrative database maintained by the Cuyahoga land bank. Every property is tracked by parcel number from its initial review before acquisition through its acquisition and rehabilitation or demolition. This allows us to precisely place the land bank properties of various statuses in the 500 foot buffers around the observed sales. The land bank data cover all properties touched from the inception of the land bank through September 2013. When we estimate models incorporating counts of properties that will be acquired by the land bank, we have to exclude sales within the last six months because they may have future land bank properties nearby that we cannot yet identify.

To supplement our data on land bank activities, we sought data on all other demolitions in the county since the land bank began operations. We contacted all 59 municipalities in the county and requested the parcel number and dates of demolitions since 2009. We also obtained records on demolitions funded by the Neighborhood Stabilization Program and requests for demolition permits. Not surprisingly, there is great variety in the details tracked and the methods used to record demolitions across the county. Unlike the land bank records, which record the specific day a demolition is complete, the city records sometimes do not have the exact date of the demolition. If that date was not available, we used an inspection date, which is the day the city inspector visits the site to confirm the demolition was safely completed (debris is removed, basement is filled, etc.). If an inspection date was not available, we used the date the demolition permit was requested. Our use of a constructed "best demo date available" measure will involve measurement error, but we expect it is still informative about the location of blighted properties and newly-vacated lots. A demolition conducted by the land bank or any other entity will create a vacant residential lot. New construction on these lots is very rare under current market conditions.

Also, it is important to recognize that vacant lots have been accumulating in the county's low-income areas for decades. Of the 484 census tracts covered in our study, 82 tracts were

missing at least 5 percent of their houses at the beginning of the study period. Fifty six of the tracts had already demolished the house or apartment on 10 to 60 percent of their residential lots. To control for the pre-existing amenity or disamenity of these empty lots, we identified them and counted them within the 500 foot buffers in the same way we counted the land bank properties. We created an indicator for the parcel being empty if the tax assessors' record shows that the parcel is zoned residential but has a building value of \$0.[8]

The sales and property characteristic measures are from Cuyahoga County administrative data sets maintained to track property transactions, property-tax delinquency, and assessed values for taxation. The records include a rich set of property characteristics which are used in property tax assessments and are updated triennially and with permit data.[9] We include measures or indicators of the following as controls: bedrooms, bathrooms, vintage (the decade in which it was built), style (Cape Cod, Colonial, etc.), lot size, condition, construction quality, exterior material, heating and cooling systems, garages, attics, porches, and fireplaces. We supplement the house characteristic data with measures of the poverty rate and the college attainment rate for each census tract using estimates from the 2005-2009 American Community Surveys. Sales of properties that will be treated or have been treated by the land bank are excluded because these prices reflect arrangements with lenders and community development groups rather than arms-length market transactions.[10]

The county fiscal officer also maintains records of all sales with the key elements of dollar amount, sale type, date, seller, and purchaser. Using this sales data, we identify the month in which properties sold at a sheriff's sale (occurring at the tail end of the foreclosure process). We count any property that has sold via sheriff's sale in the previous 12 months as foreclosed. The sales data goes back to 2008 and earlier, allowing us to accurately identify foreclosed properties from before this study's time period. We use four tax-delinquency files.

[8]Tax exempt building values are recorded, so these are not misrepresented as empty lots. Cuyahoga County has been built-out for some time, so vacant residential land is usually the result of demolition rather than recent rezoning of agricultural land.

[9]If a property owner requests a permit to add an addition on her house, for example, the assessor will estimate the increase in the home's value and adjust the property tax bill accordingly.

[10]This exclusion involves less than 0.6 percent of all sales.

These list parcels that were delinquent anytime in 2010, 2011, 2012, or 2013. The delinquent amount appears in the record along with any payments that have been made toward it, even complete repayments. The dates when the properties exit delinquency are not available, so these data are static within each year. We identified in the data set the properties that have missed a biennial payment by flagging only observations in which the delinquency amount is at least 40 percent of the annual net tax bill. This eliminates minor accounting errors (there are hundreds of delinquencies of a few dollars or cents) and minor code violations. Housing codes vary widely across jurisdictions in their stringency, enforcement, and recording with the county. The Cuyahoga County fiscal officer, like many county departments nationwide, makes tax delinquency data available for download.[11]

The vacancy data originates with the US Postal Service. When postal carriers observe that a home has been vacant for 90 days, they record it as such in the USPS's main address database (this data does not include short-term or seasonal vacancies). This prevents mail addressed to the vacant home from accumulating at the property or needlessly being carried out and back each day. The address database, including vacancy status, is routinely audited and maintained at an accuracy level above 95 percent. The USPS makes its vacancy data commercially available to direct mailers. The companies can run their mailing lists through a software program that marks each record if the address is vacant. Mailings are not prepared for these addresses, so wasted printing and postage is avoided. The USPS provides this data to private contractors who sell subscription services. We have subscribed to the vacancy data since April 2010. We run our list of Cuyahoga County addresses through the software, and create a panel of vacancy indicators. Because we do not have parcel-level vacancy data from the first quarter of 2010, we only use sales from April and beyond (land bank activities were just beginning at this time).

We have attempted to exclude non-arms-length sales, starting by excluding sales involving personal trusts and spouses. We exclude bulk purchases, where the price paid for a bundle of

[11]Cuyahoga County makes its data available via Northeast Ohio Community and Neighborhood Data for Organizing (NEO CANDO). http://neocando.case.edu/cando/index.jsp

properties is recorded for each property in the transaction. In these cases, it is not clear what portion of the total prices should be related to the individual properties. We exclude sheriff sales in which a bank or federal agency repurchases a home on which it holds the mortgage. These prices reflect the lender's auction reserve rather than the market value of the home. The sales data are limited to single family homes. Multifamily buildings are counted in all the distressed property counts. Buildings add zero or one to the counts, regardless of how many units they have. A multi-family building is considered vacant if less than 25 percent of its units are occupied. For tax-delinquency, apartments generally pay taxes via one parcel number, and are thus clearly current or delinquent. Condominiums units pay taxes via individual parcels. We have grouped by them by their association address and counted the address tax-delinquent if more than 75 percent of the units are tax-delinquent.

Figure 1 shows the growth in the number of properties that the land bank has acquired and demolished. The categories are exclusive, with the status of demolished being an absorbing state. Figure 2 illustrates the geographic distribution of the properties, with concentrations in urban core neighborhoods and activity extending over five miles in each direction. Table 1 provides a few descriptive statistics for the main outcome and independent variables of interest. The Cleveland metropolitan area is a low-cost housing market, and the land bank operates in the submarkets that have lower demand than the rest of the region. The median sale price was $64,000, and the mean sale price was $99,299. The percent of sales with one or more land bank houses within their buffer is 10.2 and the percent with a land bank demolition in their buffer is 6.6. Eighty six percent of property sales have no land bank properties in their buffer. Out of the 44,375 sales between January 2010 and March 2013, 3,431 are near a pre-land bank property, 4,535 are near acquired land bank properties, and 2,913 are near land bank demolitions.

6 Results

The set of models reported in table 2 estimates the negative externalities of land bank homes using a variety of spatial corrections. The last specification, a GMM estimate with both a spatial lag and spatial error, will be our preferred estimate for several reasons. Given the unobserved amenities and disamenities, some type of spatial correction is needed. This specification delivers a more precise spatial control than fixed effects models. It corrects the bias introduced by heteroskedastic errors. Moran's I and Lagrange Multiplier tests confirm that there is spatial dependence in both the log sale prices and in the error terms of a linear model.[12] Adding the spatial lag to the GMM model with only the spatial error term results in a statistically significant improvement (F=7553.09, p=0.003). The full results of the model can be found in table 6. We see that the controls generally have impacts with intuitive signs and magnitudes. The model coefficients suggest that for each additional pre-land bank property within 500 feet of a sale, the sale price will be 5.2 percent lower. An additional land bank owned house reduces nearby sale prices by 4.4 percent while the vacant lot resulting from a land bank demolition reduces prices by 2.4 percent. The estimates from the zip code fixed effects and spatial error models are similar. The estimates from the model with no spatial correction give us a sense of the upper bound of the bias if the land bank properties are allowed to represent all the nearby disamenities. Using only within tract variation to estimate the model is quite limiting because the within tract variance of prices and counts are all substantially lower than their total variance. When the model is estimated using census tract fixed effects, none of the coefficients are statistically significant, but a difference between demolished and un-demolished land-bank houses is still suggested.

We know from past research, as well as an alternate specification in table 4, that vacant lots have a measurable disamenity effect. Therefore, we should expect land bank demoli-

[12]Our main specification has log home sale prices as the dependent variable and independent variables of land-bank property counts, home characteristics, tract poverty rate and college attainment and month fixed effects. Using this specification, the Moran's I statistic is 86.95 (p <.001). The robust Lagrange multiplier statistic for lagged spatial dependence is 1027.76 (df=1, p <.001). The robust Lagrange multiplier statistic for spatially dependent errors is 1027.76 (df=1, p <.001).

tions to also have a disamenity effect. The land bank's contribution in many cases will be decreasing the negative externality from a blighted property not to zero, but to that of a vacant lot. In the zip code fixed effects and GMM spatial error models the gaps between the pre-land-bank properties and the demolitions are 2.9 percent and 4.1 percent. These differences are marginally statistically significant (p=0.074 and p=0.097). The GMM model that incorporates spatial lags arrives at a higher estimate of the impact of land bank demolitions (-2.4 percent) and lower estimate of the impact of pre-land bank properties (-5.2 percent). The difference between the coefficients (2.8) does not reach statistical significance (p=0.18).

In table 4, results are presented from seven alternate specifications of the model. Four of the specifications include other measures of distressed properties. As we would expect all measures of distressed properties are positively correlated with land bank properties, and they have their own negative externalities. Including the measures of non-land bank demolitions and vacant lots or recent foreclosures causes modest changes in the coefficients on the land bank counts. Including tax delinquent property counts, vacant property counts, price trends or price levels reduces the magnitude of the coefficients on all the land bank properties. However, in each case, the negative externality from a pre-land bank property or a land-bank owned structure appears to be greater than that of a land bank demolition. The final model drops the one fifth of the tracts that have no observed land bank activity. With these observations excluded, all the coefficients decline, but the difference between the impacts of pre-land bank properties and land bank demolitions remains substantial at 2.5 percentage points.

7 Value Recovery Estimates

As mentioned above, the value recovered by land bank activity is reflected in the difference between the externalities of pre-land bank properties, land bank acquired houses, and land bank demolitions. The differences between the former two range from -0.8 to 4.5 percent-

age points. The difference between soon-to-be treated properties and land bank demolitions ranges from 1.4 to 4.1 percentage points. The gap between the negative externalities of pre-land-bank properties and vacant lots is 4.1 percentage points according to the first specification in table 4. We estimate the value preserved by land bank activity using the results of our preferred model, the GMM mixed model, as well as the least favorable estimates, the tract fixed effects model, and the most favorable estimates, the GMM spatial error model.[13] The preferred model suggests that a land bank acquisition reduces the distressed property's negative externality by 0.8 percentage points from 5.2 percent to 4.4 percent. By demolishing a distressed property the Land Bank reduces its impact 2.8 percentage points from 5.2 to 2.4. The tract fixed effect model suggests no value is recovered by acquisition and 1.4 percentage points is recovered by demolition. The GMM spatial model suggests 1.4 percentage points are recovered when a distressed property becomes land bank owned and 4.1 percentage points are recovered by a demolition.

To estimate the value recovered, we multiply the percentage differences by the actual count of acquired and demolished land bank properties observed either at the time of sale or as of December 2012. The cumulative percentage change is then multiplied by the observed sale price, tax-assessors' market value, or tax assessment, and summed. The final estimate of tax collections adds the assumption that the percentage of the assessed tax that is actually collected for each property remains the same. This is important because tax delinquency is very high in some of the neighborhoods where the land bank is most active.

In terms of recovered value for property owners that have sold homes near land bank properties, the benefit of the land bank is quite modest. Even if we assume the highest estimates of the land bank impacts are correct, we can only attribute an additional $6 million of sales values. The sales prices of homes in neighborhoods where the land bank operates extensively are often very low. Summing up gains in the range of $200 to $800 per

[13]We opted not to use the estimate from the models with no spatial correction and city fixed effects. Both returned estimates that were implausibly large, such as negative externalities from demolitions that are ten times as large as the precisely estimated externalities of vacant lots. The city fixed effect model also implies a greater reduction in the externality from acquisition than from demolition.

sale for a few thousand sales is only going to imply a few million dollars of value recovered. Land bank operations should have increased property taxes indirectly by raising the value of the property tax base. The net increase in revenue, however, may also be quite small. Assuming the percentage increases in property values pass through directly to higher tax assessments, tax assessments are increased by between $1.5 million and $6.7 million.[14] This is only 0.10 to 0.46 percent of the total residential tax assessment. About five percent of the $1.451 billion of assessed taxes are not collected, and the delinquency is concentrated in the areas where the land bank is very active. If we discount the tax assessment on each property by the share of the current assessment that is actually collected, this implies between 73 and 75 percent of the additional tax assessments are collected.

The economic justification for the land bank acquisitions and demolitions has to come from the increases in property values for all the neighboring homes. These increases are the same fractions of a percent, 0.10 to 0.46, but they are changes in the $54.8 billion estimated market value of all residential properties in the county. This recovered value of $156 million represents equity that homeowners and investors can realize when they sell or can borrow against at any time. These economic gains reflect intangibles and at least partially quantify the reduction of disamenities in the neighborhoods where the land bank has operated. They suggest the land bank has improved the quality of life for most of the county's residents.

8 Conclusions

The Cuyahoga Land Bank appears to be making a positive impact on the neighborhoods in which it is operating. Using spatial hedonic price models with a wide variety of specifications, we are able to estimate negative externalities for the properties the land bank treats, and these are significantly different from zero. The properties that will enter the land bank in the next six months have a significant negative externality on home values in the range of

[14]Our estimation also assumes the recovered property values are realized immediately. In reality, tax assessments always lag market changes by a few years because they are updated on a three year cycle.

4 to 5 percent per distressed property. Once the properties are acquired by the land bank, our estimates of their externalities are consistently lower than those of the pre-land bank properties. The negative externalities from vacant lots resulting from land bank demolitions are smaller yet, at 2.4 percent or less. However, our estimates are not precise enough to distinguish them statistically.

Using our preferred estimates of negative externalities, we calculate that had the land bank not been operating, total home sale prices in our study period could have been 0.09 percent or $3.8 million lower. Tax collections could have been 0.23 percent or $3.2 million lower. The greatest advantage of the land bank's operations comes in the form of preserved home values for the vast majority of the houses that do not transact in any given year. The value preserved, according to our best estimates, is approximately $156 million, and this could increase with additional land bank activity.

References

Accordino, J. and G. T. Johnson (2000). Addressing the vacant and abandoned property problem. *Journal of Urban Affairs 22*(3), 301–315.

Anselin, L. (1988). *Spatial econometrics: methods and models*. Studies in operational regional science, 4. Dordrecht: Kluwer Academic Publishers.

Bier, T. and C. Post (2003). Vacating the city: An analysis of new homes vs. household growth. Technical report, Brookings Institution Center on Urban and Metropolitan Policy.

Campbell, J. Y., S. Giglio, and P. Pathak (2011). Forced sales and house prices. *American Economic Review 101*, 2108–2132.

Drukker, D. M., I. R. Prucha, and R. Raciborski (2011). Maximum-likelihood and generalized spatial two-stage least-squares estimators for a spatial-autoregressive model with spatial-autoregressive disturbances. Technical report, StataCorp.

Fitzpatrick IV, T. (2010). Ohio's land bank legislation: Modernizing an aged model. *Journal on Affordable Housing and Community Development Law 19*(3), 127–147.

Glaeser, E. L. and J. Gyourko (2005). Urban decline and durable housing. *Journal of Political Economy 113*(2), 345–375.

Griswold, N. and P. Norris (2007). Economic impacts of residential property abandonment and the Genesee County Land Bank in Flint, Michigan. *Land Policy Institute Report No. 2007-5*.

Groves, J. R. and W. H. Rogers (2011). Effectiveness of RCA institutions to limit local externalities: Using foreclosure data to test covenant effectiveness. *Land Economics 87*(4), 559–581.

Harding, J. P., E. Rosenblatt, and V. W. Yao (2009). The contagion effect of foreclosed properties. *Journal of Urban Economics 66*(3), 164–178.

Hartley, D. (2010). The effect of foreclosures on nearby housing prices: Supply or disamenity? *Federal Reserve Bank of Cleveland Working Paper* (10-11).

Immergluck, D. and G. Smith (2006). The external costs of foreclosure: The impact of single-family mortgage foreclosures on property values. *Housing Policy Debate 17*(1), 57–79.

Kelejian, H. H. and I. R. Prucha (1999). A generalized moments estimator for the autoregressive parameter in a spatial model. *International Economic Review 40*, pp. 509–533.

Kotlowitz, A. (2009, 4 March). All boarded up. *The New York Times Magazine*.

Leonard, T. and J. C. Murdoch (2009). The neighborhood effects of foreclosure. *Journal of Geographic Systems 11*, pp. 317–332.

Lin, Z., E. Rosenblatt, and V. W. Yao (2009). Spillover effects of foreclosures on neighborhood property values. *Journal of Real Estate Finance and Economics 38*, 387–407.

Lowry, I. (1960). Filtering and housing standards: A conceptual analysis. *Land Economics 36*(4), 362–370.

Mallach, A. (2012). Laying the groundwork for change: Demolition, urban strategy, and policy reform. Technical report, Brookings Metropolitan Policy Program Paper.

Mikelbank, B. A. (2008, November). Spatial analysis of the impact of vacant, abandoned and foreclosed properties. http://www.clevelandfed.org/Community_Development/publications/ Spatial_Analysis_Impact_Vacant_Abandoned_Foreclosed_Properties.pdf.

Rappaport, J. (2003). U.S. urban decline and growth, 1950 to 2000. *Federal Reserve Bank of Kansas City Economic Review 88*(3), 15 – 44.

Rogers, W. H. (2010). Declining foreclosure neighborhood effects over time. *Housing Policy Debate 20*(4), 687–706.

Rogers, W. H. and W. Winter (2009). The impact of foreclosures on neighboring housing sales. *Journal of Real Estate Research 31*(4), 455–479.

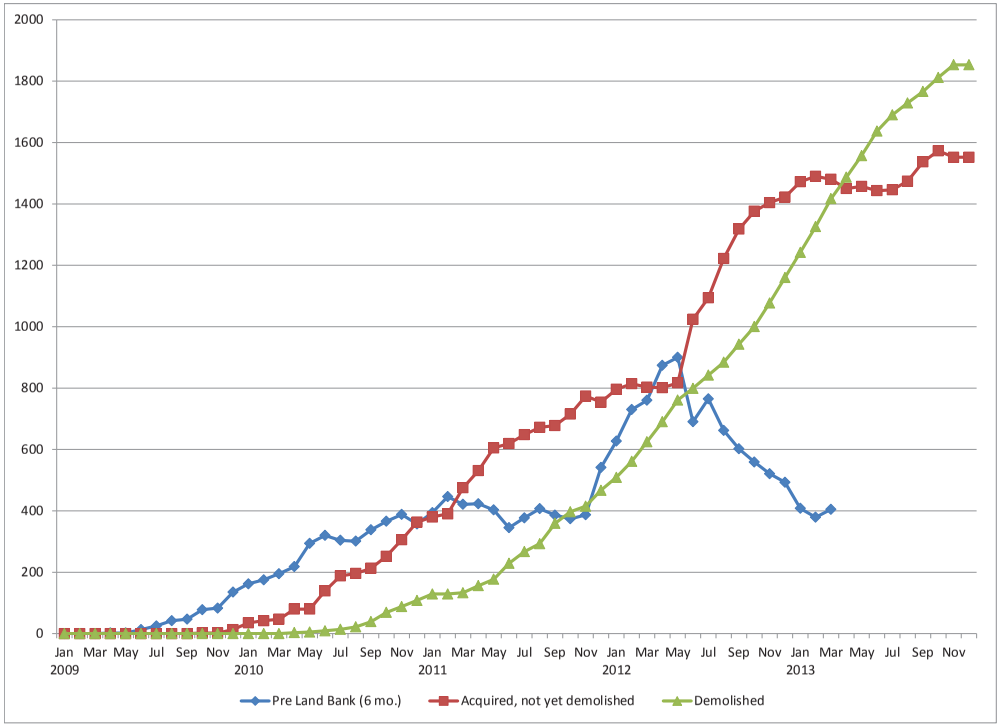
Rosen, S. (1974). Hedonic prices and implicit markets: Product differentiation in pure competition. *The Journal of Political Economy 82*(1), pp. 34–55.

Rosenthal, S. S. and R. W. Helsley (1993). Redevelopment and the urban land price gradient. *Journal of Urban Economics 35*(2), 182–200.

Schuetz, J., V. Been, and I. G. Ellen (2008). Neighboring effects of concentrated mortgage foreclosures. *Journal of Housing Economics 17*(4), 306–319.

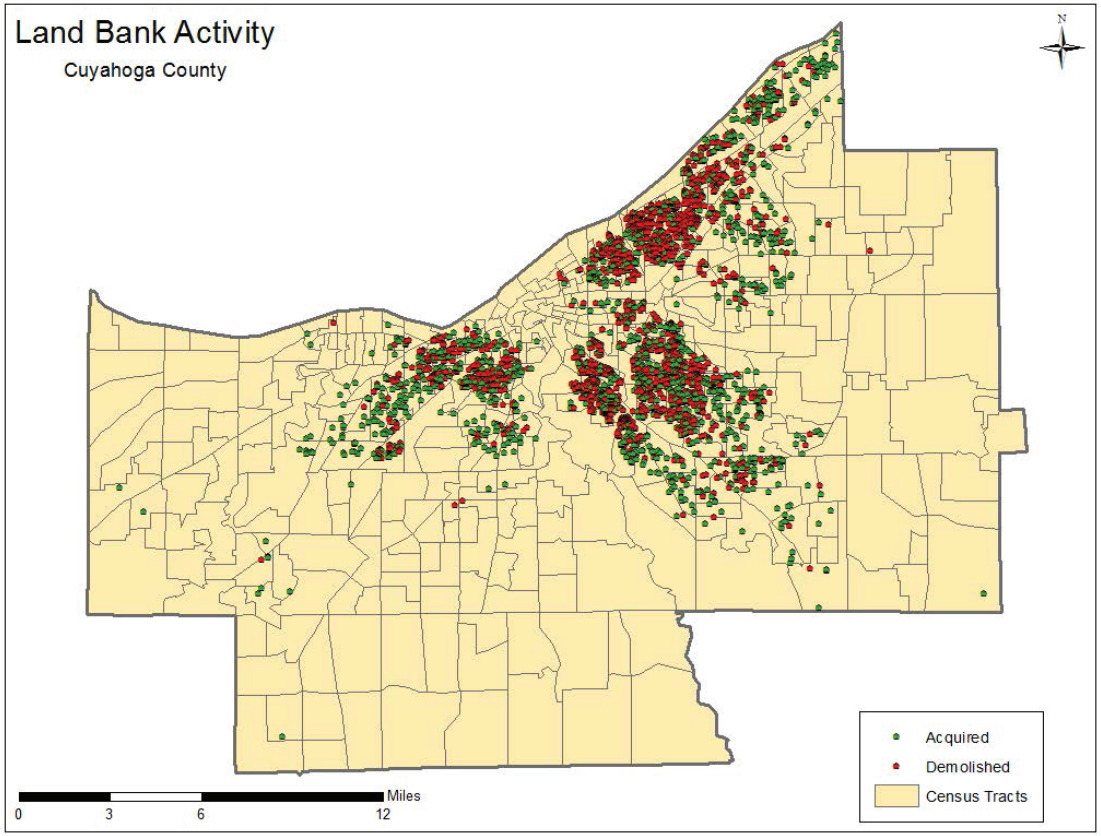
Whitaker, S. and I. Fitzpatrick, Thomas J. (2013). Deconstructing distressed-property spillovers: The effects of vacant, tax-delinquent, and foreclosed properties in housing submarkets. *Journal of Housing Economics 22*(2), 79 – 91.

Figure 1: Land bank properties time trend.



Data source: Cuyahoga County Land Reutilization Corporation administrative records.

Figure 2: Land bank properties as of December 2012.



Data source: Cuyahoga County Land Reutilization Corporation administrative database.

Table 1: Descriptive Statistics - Prices, counts in 500-foot buffers around sales, and number of treated sales.

	Median	Mean	SD	Min	Max
Log Sale Price	11.06	10.86	1.33	0	15.21
Sale Price	$64,000	$99,299	$125,895	$1	$4,041,400

Counts in 500-foot buffers	Mean	SD	Min	Max
Pre Land Bank	0.09	0.36	0	6
Acquired Land Bank	0.13	0.44	0	6
Demolished Land Bank	0.09	0.40	0	7
Pre Other Demolition	0.07	0.37	0	22
Other Demolition & Vacant Lots	1.29	3.88	0	77
Recent Foreclosures	0.41	0.76	0	17
Property Tax Delinquent	8.31	10.48	0	95
Vacant	3.31	4.54	0	64

Treated Sales (counts >0 in buffer)	Sales
Pre-Land Bank	3,431
Acquired Land Bank	4,535
Demolished Land Bank	2,913
All (Treated and Untreated)	44,375

The counts are the number of properties within 500 feet of a sold home that have the row-labeled status. All data represent Cuyahoga County properties between January 2010 and March 2013. Data are from Cuyahoga County Fiscal Officer and Cuyahoga County Land Reutilization Corporation administrative databases.

Table 2: Hedonic price models with spatial corrections.

Specification	Neighbor Count	Coef	SE
No Spatial Correction	Pre Land Bank	−0.139***	0.012
Adj R^2=0.60	Land Bank Acquired	−0.112***	0.010
	Land Bank Demolished	−0.096***	0.011
City FE	Pre Land Bank	−0.102***	0.012
Adj R^2=0.63	Land Bank Acquired	−0.057***	0.009
	Land Bank Demolished	−0.083***	0.011
Zip FE	Pre Land Bank	−0.049***	0.012
Adj R^2=0.65	Land Bank Acquired	−0.046***	0.010
	Land Bank Demolished	−0.020+	0.011
Tract FE	Pre Land Bank	−0.004	0.011
Adj R^2=0.67	Land Bank Acquired	−0.005	0.010
	Land Bank Demolished	0.010	0.011
ML Spatial Lag	Pre Land Bank	−0.064***	0.011
λ= 0.48***	Land Bank Acquired	−0.051***	0.009
	Land Bank Demolished	−0.028***	0.010
ML Spatial Error	Pre Land Bank	−0.050***	0.012
ρ=0.52***	Land Bank Acquired	−0.037***	0.010
	Land Bank Demolished	−0.009	0.011
GMM Spatial Error	Pre Land Bank	−0.056 * *	0.017
ρ= 0.52***	Land Bank Acquired	−0.042 * *	0.014
	Land Bank Demolished	−0.015	0.018
GMM Mixed Model			
Spatial Lag and Error	Pre Land Bank	−0.052***	0.015
λ= 0.66***	Land Bank Acquired	−0.044***	0.011
ρ= -0.55***	Land Bank Demolished	−0.024+	0.014

This table reports coefficients and standard errors from regressions of logged home sale prices on counts of land bank properties within 500 feet. N=44,375, except for "Zip FE" (42,729). All models include controls for property characteristics, census tract poverty rate and college attainment, and the month of sale. Data sources: Cuyahoga County Fiscal Officer, Cuyahoga County Land Reutilization Corporation, American Community Survey. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.

Table 3: Alternate Specifications.

Specification	Neighbor Count	Coef	SE
Other Demolitions	Pre Land Bank	−0.049 ∗ ∗	0.015
λ= 0.64***	Land Bank Acquired	−0.045∗∗∗	0.013
ρ= -0.54***	Land Bank Demolished	−0.016	0.014
	Pre Other Demolition	−0.026+	0.015
	Other Demolitions and Vacant Lots	−0.008∗∗∗	0.002
Other Demolitions Alone	Pre Other Demolition	−0.037∗	0.015
λ= 0.61*** ρ= -0.47***	Other Demolitions and Vacant Lots	−0.009∗∗∗	0.002
Foreclosure	Pre Land Bank	−0.050∗∗∗	0.015
λ= 0.67***	Land Bank Acquired	−0.040∗∗∗	0.011
ρ= -0.58***	Land Bank Demolished	−0.022	0.014
	Foreclosure, preceding 12 months	−0.024∗∗∗	0.006
Tax Delinquency	Pre Land Bank	−0.022	0.015
λ= 0.56***	Land Bank Acquired	−0.029∗	0.012
ρ= -0.40***	Land Bank Demolished	0.017	0.015
	Property Tax Delinquent	−0.010∗∗∗	0.001
Vacancy	Pre Land Bank	−0.035∗	0.016
λ= 0.61***	Land Bank Acquired	−0.043 ∗ ∗	0.012
ρ= -0.45***	Land Bank Demolished	−0.014	0.014
	Vacant Property	−0.013∗∗∗	0.002
Price Trend	Pre Land Bank	−0.029+	0.015
λ= 0.62***	Land Bank Acquired	−0.027∗	0.011
ρ= -0.56***	Land Bank Demolished	−0.012	0.014
	Price Trend	0.693∗∗∗	0.046
Price Levels	Pre Land Bank	−0.027	0.018
λ= 0.47***	Land Bank Acquired	−0.027∗	0.013
ρ= -0.31***	Land Bank Demolished	−0.004	0.017
	Tract Trimmed Mean Price, 2005-2006	−0.057	0.044
	Tract Trimmed Mean Price, preceding 24 months	0.410∗∗∗	0.036
Tracts with	Pre Land Bank	−0.045 ∗ ∗	0.015
Land Bank Activity	Land Bank Acquired	−0.037∗∗∗	0.011
λ= 0.68*** ρ= -0.65***	Land Bank Demolished	−0.020	0.013

Table 4: Alternate Specifications. This table reports coefficients and standard errors from GMM mixed models of logged home sale prices on counts of land bank properties within 500 feet. All models include controls for the sold property's distress status, property characteristics, census tract poverty rate and college attainment, and the month of sale. N=44,375 in all models except "Vacancy" (40,859), "Price Levels" (40,120), and "Tracts with Land Bank Activity" (37,991). Data sources: Cuyahoga County Fiscal Officer, Cuyahoga County Land Reutilization Corporation, American Community Survey, United States Postal Service. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.

Table 5: Value Recovery Estimates.

	Sales	Total Value (millions)	Estimated Value Recovered (millions) Tract Fixed Effects	GMM Mixed	GMM Spatial Error
2010	14,182	$ 1,412.2	$ 0.0	$ 0.2	$ 0.3
2011	12,280	$ 1,235.5	$ 0.2	$ 0.7	$ 1.2
2012	14,440	$ 1,457.2	$ 0.7	$ 2.1	$ 3.3
2013 (Jan.-Mar.)	3,473	$ 301.5	$ 0.3	$ 0.8	$ 1.3
Total	44,375	$ 4,406.4	$ 1.3	$ 3.8	$ 6.0
	Parcels	Total Value (millions)	Estimated Value Recovered (millions) Tract Fixed Effects	GMM Mixed	GMM Spatial Error
Market Value	464,526	$ 54,826.7	$ 54.2	$ 155.9	$ 241.9
Taxes Assessed		$ 1,451.5	$ 1.5	$ 4.3	$ 6.7
Taxes Collected		$ 1,373.9	$ 1.1	$ 3.2	$ 5.0

Estimates are calculated as $Value\ Recovered = ((\beta_{Acq} - \beta_{PreLB}) * Acquired + (\beta_{Demo} - \beta_{PreLB}) * Demolished) * Value$ using the coefficients from the tract fixed effect, GMM mixed and GMM spatial error models in table 2. Sales, market value and tax data are from the Cuyahoga County Fiscal Officer. The market values, taxes assessed, and taxes collected are calculated using 2013 tax data and counts of land bank properties in 500-foot buffers around every parcel as of December 2012.

Table 6: GMM mixed model - all coefficients.

Property Characteristic	Coef	SE	t-value	Pr(>‖t‖)
Intercept	3.373	0.133	25.393	.000***
Pre Land Bank	−0.052	0.015	−3.459	.001***
Land Bank Acquired	−0.044	0.011	−3.938	.000***
Land Bank Demolished	−0.024	0.014	−1.736	.082+
Pre-1910	−0.028	0.021	−1.313	.189
1910-1919	−0.063	0.018	−3.395	.001***
1920-1929	−0.089	0.014	−6.347	.000***
1930-1939	−0.052	0.016	−3.234	.001 **
1940-1949	−0.050	0.011	−4.668	.000***
1960-1969	0.066	0.011	6.231	.000***
1970-1979	0.014	0.013	1.108	.268
1980-1989	0.093	0.015	6.231	.000***
1990-1999	0.181	0.015	12.350	.000***
Post-2000	0.247	0.016	15.325	.000***
Condition very good	0.103	0.015	6.791	.000***
Condition good	0.045	0.008	5.962	.000***
Condition fair	−0.294	0.019	−15.666	.000***
Condition poor	−0.479	0.041	−11.671	.000***
Construction A	0.095	0.019	5.030	.000***
Construction A+	0.153	0.023	6.743	.000***
Construction AA	0.352	0.031	11.186	.000***
Construction B	0.004	0.010	0.397	.692
Construction B+	0.021	0.011	1.833	.067+
Construction C	0.004	0.008	0.511	.609
Exterior brick	0.077	0.009	8.620	.000***
Exterior wood	−0.032	0.010	−3.126	.002 **
Exterior other	0.050	0.017	2.937	.003 **
Deck	0.067	0.007	9.439	.000***
Open porch	0.043	0.007	5.795	.000***
Enclosed Porch	0.007	0.010	0.683	.495
Fireplace	0.061	0.009	6.802	.000***
Radiator heat	0.035	0.014	2.451	.014*
Other heat	0.044	0.022	1.991	.046*
Rooms four	−0.092	0.020	−4.723	.000***
Rooms five	−0.015	0.010	−1.516	.129
Rooms seven	0.009	0.011	0.877	.381
Rooms eight	0.031	0.016	2.018	.044*
Rooms nine+	0.029	0.019	1.528	.126
Baths two	0.015	0.011	1.380	.167
Baths three+	0.105	0.022	4.752	.000***

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Table 6 – continued from previous page				
Bedrooms two	−0.058	0.013	−4.587	.000***
Bedrooms four	0.004	0.012	0.307	.759
Bedrooms five+	−0.027	0.025	−1.110	.267
Central Air	0.092	0.008	12.287	.000***
Half bath one	0.036	0.009	4.045	.000***
Half bath two+	0.131	0.019	6.948	.000***
Garage 1 attached	0.140	0.022	6.468	.000***
Garage 2 attached	0.224	0.021	10.931	.000***
Garage 3+ attached	0.259	0.027	9.686	.000***
Garage 1 detached	0.118	0.020	5.904	.000***
Garage 2 detached	0.198	0.019	10.501	.000***
Attic finished	0.003	0.020	0.176	.860
Attic unfinished	0.009	0.013	0.660	.509
Style cape cod	0.038	0.012	3.226	.001**
Style other	0.001	0.012	0.090	.928
Style ranch	0.015	0.012	1.194	.232
Lot small	−0.052	0.009	−5.868	.000***
Lot large	−0.006	0.008	−0.759	.448
Poverty (% in tract)	−0.003	0.000	−7.006	.000***
College Degree (% in tract)	0.004	0.000	10.859	.000***
10-Feb	0.052	0.037	1.425	.154
10-Mar	0.048	0.036	1.321	.187
10-Apr	0.118	0.036	3.326	.001***
10-May	0.136	0.037	3.701	.000***
10-Jun	0.164	0.034	4.878	.000***
10-Jul	0.143	0.036	4.010	.000***
10-Aug	0.107	0.038	2.791	.005**
10-Sep	0.111	0.037	2.984	.003**
10-Oct	0.119	0.038	3.154	.002**
10-Nov	0.157	0.037	4.236	.000***
10-Dec	0.102	0.038	2.705	.007**
11-Jan	−0.025	0.042	−0.588	.557
11-Feb	0.001	0.038	0.038	.970
11-Mar	0.022	0.037	0.607	.544
11-Apr	0.048	0.036	1.347	.178
11-May	0.125	0.037	3.357	.001***
11-Jun	0.125	0.034	3.660	.000***
11-Jul	0.122	0.034	3.531	.000***
11-Aug	0.103	0.034	3.008	.003**
11-Sep	0.073	0.035	2.123	.034*
11-Oct	0.088	0.036	2.484	.013*
11-Nov	0.040	0.040	0.998	.318

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Table 6 – continued from previous page				
11-Dec	0.051	0.036	1.419	.156
12-Jan	−0.008	0.036	−0.211	.833
12-Feb	−0.029	0.037	−0.779	.436
12-Mar	−0.012	0.034	−0.367	.714
12-Apr	−0.001	0.034	−0.038	.970
12-May	0.071	0.032	2.182	.029∗
12-Jun	0.082	0.032	2.577	.010 ∗ ∗
12-Jul	0.128	0.033	3.854	.000∗∗∗
12-Aug	0.095	0.032	2.973	.003 ∗ ∗
12-Sep	0.059	0.034	1.756	.079+
12-Oct	0.067	0.034	1.959	.050+
12-Nov	0.009	0.034	0.260	.795
12-Dec	0.068	0.034	1.987	.047∗
13-Jan	−0.032	0.034	−0.945	.345
13-Feb	−0.032	0.035	−0.900	.368
13-Mar	−0.005	0.034	−0.150	.881
λ	0.657	0.013	52.155	.000∗∗∗
ρ	−0.554	0.031	−18.077	.000∗∗∗

This table reports coefficients and standard errors from the GMM mixed model of log sale prices on counts of land bank properties within 500 feet. N=44,375. Data represent sales of single family homes in Cuyahoga County from January 2010 through March 2013. Data sources: Cuyahoga County Fiscal Officer, Cuyahoga County Land Reutilization Corporation, American Community Survey. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.