

# Can Local Housing Ordinances Prevent Neighborhood Destabilization?

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## Abstract

This paper assesses the ability of local housing ordinances to prevent neighborhood destabilization, specifically that arising as a consequence of the housing crisis of 2007. We evaluate the degree to which vacancy registrations and point-of-sale inspection requirements influenced housing market outcomes following the housing crisis. With comprehensive real property data from Cuyahoga County, Ohio, we measure outcomes that characterize housing market distress including foreclosures, sales below the tax-assessed value, bulk sales, flipping, and property tax delinquency. We compare outcomes across properties in regulated and unregulated municipalities using matching procedures on linked data containing property, neighborhood, loan, and transaction characteristics. We find evidence that vacancy registrations substantially reduce foreclosures. Registrations are also negatively associated with tax delinquency and sales below a property's tax-assessed value in some specifications. In contrast, we find little evidence that point-of-sale inspections reduce undesirable transactions. Rather, properties in cities with inspection requirements displayed higher levels of foreclosure and tax delinquency relative to the control group during the study period.

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# 1 Introduction

In recent years, hundreds of local jurisdictions across the country have passed foreclosure and vacancy registration ordinances to mitigate neighborhood destabilization. Before the housing crisis, 87 ordinances were in force. The number burgeoned to 538 by 2012 (Lee et al., 2013). These local housing ordinances are being enacted despite the fact that their effectiveness has not been empirically validated. This study seeks to inform these policy decisions by evaluating the performance of local ordinances that were in place before the housing crisis. Cuyahoga County, Ohio, contains the city of Cleveland and 57 of its suburbs. Sixteen of the county’s suburban municipalities enacted housing ordinances prior to 2004. By comparing matched properties in cities with and without the ordinances, we are able to estimate the extent to which the ordinance protected neighborhoods from housing distress.

In this analysis, we estimate the impact of three types of housing ordinances - vacancy registrations, point-of-sale inspections, and point-of-sale inspections with escrow requirements - on five measures related to housing market stability: foreclosures, selling below tax-assessed value, bulk sales, flipping, and tax delinquency. Vacancy registrations enable cities to monitor vacancy and impose a cost on owners who fail to keep homes occupied. The point-of-sale inspection ordinances require that a licensed inspector report a home’s defects to potential buyers. Inspection ordinances are intended to maintain the quality of the housing stock. We expect these ordinances to discourage unhealthy housing market transactions because they reduce the value of selling a home in poor condition “as is.” Vacancy registrations increase carrying costs and should discourage property speculators who are trying to profit from short-term appreciation rather than through holding and managing rental properties. As the foreclosure crisis unfolded, these ordinances passed years earlier might have protected some municipalities from additional housing distress and neighborhood destabilization.

Using comprehensive real property data from Cuyahoga County, we match homes in cities with an ordinance in place prior to the housing crisis to homes in cities with no ordinance in place prior to the crisis. After controlling for a rich set of observables, we find

that vacancy registrations do seem to reduce foreclosure rates. The registrations are also consistently associated with a lower incidence of sales below the tax-assessed value, bulk sales, and tax delinquency, and these relationships are significant in some specifications. On the other hand, we find evidence that point-of-sale inspections are associated with higher incidence of foreclosures and tax delinquency. There is some evidence that point-of-sale inspections appear to discourage flipping. While point-of-sale inspections may be beneficial to housing market stability during non-crisis times, we find that they did not contain the distress resulting from the past housing crisis. It appears that vacancy registrations are better at improving the indicators of neighborhood stability that we are able to measure in this analysis.

The rest of the paper proceeds as follows. Section 2 describes the intent and function of the ordinances. Section 3 specifies the hypotheses and estimation methods. Section 4 describes the data and linking process, section 5 presents results, and the last section concludes.

## 2 Background and Literature

As in other northern industrial cities, decades of population decline have generated a growing stock of vacant and abandoned properties in Cleveland and some of its inner-ring suburbs (Simons et al., 1998; Glaeser and Gyourko, 2005). Cuyahoga County, like similar urban centers, experienced a sharp increase in real estate speculation during the foreclosure crisis (Lind, 2008; Coulton et al., 008a). In some cases, lenders amassed thousands of real-estate-owned (REO) properties (Immergluck, 2011) and later sold them in bulk at steep discounts to speculators who resold them to other investors (Coulton et al., 008b). This “flipping” activity was usually accompanied by extended periods of vacancy, which allowed the housing stock to deteriorate and be vandalized (Fitzpatrick IV and Whitaker, 2012; Whitaker, 2011; Ford et al., 2013). Upon discovering the extent of the repairs the homes

needed, many investors sold the properties for less than their tax-assessed value (Coulton et al., 008c). In other cases, investors stopped paying the property taxes and abandoned the homes (Ergungor and Fitzpatrick IV, 2011).

Destabilizing neighborhoods have been characterized as places experiencing declining home prices, property neglect, increasing foreclosures, vacancy, and crime. Neighborhoods are destabilized when they experience a cycle of discounted foreclosed homes lowering property values, and falling property values forcing underwater borrowers into foreclosure (Schuetz et al., 2008; Harding et al., 2009). Foreclosed homes are more likely to become vacant, abandoned, and blighted properties, which can drive away a neighborhoods current residents and potential buyers. Furthermore, vacancies increase the supply of housing in local markets. If not absorbed, these properties lower surrounding property values which, in turn, can inhibit a household's ability to sell or refinance their home and raise the possibility of foreclosure (Immergluck, 2011). Similarly, tax delinquent properties, a sign of property disinvestment, have also been associated with declines in neighboring home values (Whitaker and Fitzpatrick IV, 2013). The local ordinances studied here are considered neighborhood-stabilization policies because they aim to prevent, slow, or stop these downward spirals.

The most common ordinances require registration of foreclosed or vacant property or require pre-sale inspections and an escrow account.<sup>1</sup> The specifics of each ordinance vary, but, generally, a corporation or individual that owns a vacant property in a city with a registry must repeatedly (semi-annually, annually, etc) complete registration paperwork and pay registration fees. Complying with these ordinances can result in a significant cost, especially in terms of staff time for managers of large REO portfolios. Registered properties are often subject to additional periodic inspections for code violations. While not recurring, point-of-sale inspections require additional time, expense and effort when undertaking a property transaction. These ordinances require that a home be inspected before it can be

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<sup>1</sup>Some municipal foreclosure registries were implemented in our study area after the foreclosure crisis. We only attempt to evaluate ordinances that were enacted pre-crisis. Equivalent ordinances have never been enacted by the county government itself.

sold. Where escrow accounts are required, the seller or buyer must deposit sufficient funds to make needed repairs before the transfer of title is allowed. In either case, the buyer receives the most recent inspection report. While buyers in any city can (and often do) voluntarily pay for an inspection, inspections are not normally required by law or by lenders. Lenders do require appraisals based on comparable sales, but appraisers do not look for maintenance problems as inspectors do (Fannie Mae, 2015). Inspection ordinances should provide an incentive for property owners to keep up with preventative maintenance. If they do not, they may face large repair expenses when they attempt to sell their house.

The main features of the ordinances in this study's treated cities are summarized in table 1. Other than the distinction of requiring or not requiring an escrow account, most of the inspection ordinances are fairly similar. The vacancy registration in Garfield Heights is more nuisance based than the other vacancy registrations. A vacant property's addition to the registry can be prompted by events such as complaints from neighbors or an overgrown lawn (which city workers will mow).

Despite the existence of several extensive related literatures, evaluations of local policies in light of the housing crisis are still rare. In the urban, real estate, and housing economics literatures, there are many evaluations of longstanding federal housing programs. For instance, the Experimental Housing Allowance Program examined the impact of a wide expansion of housing choice vouchers on local rental housing markets (Frieden, 1980). There is substantial literature on local land use laws that can impact housing markets by allowing or restricting supply growth (Glaeser and Gyourko, 2003; Speyner, 1989). The capitalization of local property taxes into home prices has been documented (Oates, 1969). There have been estimates of the capitalization of other local public policies, such as school quality (Downes and Zabel, 2002; Nguyen-Hoang and Yinger, 2011) and hurricane-resistance building codes (Dumm et al., 2011).

A few studies have looked at the interaction of local policies and the housing crisis. Glasgow, Lewis, and Neiman present evidence that California cities with more restrictive

development policies experienced less housing distress following the housing bust (2012). Johnson and Turcotte developed a model that determines which foreclosed properties a municipality should purchase to minimize the social costs caused by the distressed properties (2010). Our analysis is like Glasgow, Lewis and Neiman’s work in that we are interested in policies that were in place before the crisis, not enacted as a response. We share with Johnson and Turcotte a focus on distressed properties. Preventing properties from becoming distressed, or mitigating that distress, can help maintain the values of neighboring homes according to the now numerous estimates of a distressed property’s externalities (Immergluck and Smith, 2006; Schuetz et al., 2008; Mikelbank, 2008; Rogers and Winter, 2009; Lin et al., 2009; Harding et al., 2009; Rogers, 2010; Campbell et al., 2011; Leonard and Murdoch, 2009; Whitaker and Fitzpatrick IV, 2013; Hartley, 2014). Our contribution to this literature is in evaluating the post-bust performance of local policies that were aimed at supporting neighborhood stability before the housing crisis. This analysis is quite relevant currently, given the recent growth in enacted ordinances in localities across the United States.

### **3 Hypotheses and Methods**

We hypothesize that Point-of-sale inspections may influence neighborhood stability to the extent that they diminish information asymmetries during the transaction and motivate home maintenance. The value of a home in an inspection-ordinance city is net of needed repairs, so homeowners maximize their value by doing repairs before they become more extensive and costly. Each home under the ordinance benefits from the positive externality of being surrounded by well-maintained homes. Inspections discourage investors from purchasing low-quality homes with the intention of reselling them at elevated prices to naive buyers. Vacancy registrations impose an additional carrying cost on property owners and may also discourage flipping transactions.

If Point-of-sale inspections and vacancy registrations promote stable property values, this

will affect each of the measured outcomes. If real home values remain steady, owners can sell their homes and repay their mortgages even if they receive a negative income shock. Bulk sales and flipping are less likely if home prices are beyond the reach of amateur speculators. Stable home values will motivate lenders and investors to continue paying property taxes to protect their asset from tax foreclosure.

However, there are numerous channels by which each of these two ordinances can affect neighborhood stability, and they could have unintended consequences. For instance, while Point-of-sale inspections may encourage home maintenance, they may also reveal the need for costly repairs. When home owners are facing financial hardship, the need for such repairs may reduce the chance of selling and thus, increase the likelihood of foreclosure.<sup>2</sup> In the absence of the inspections, the cost will probably be borne by the buyer, but this could be delayed by years. If inspections are accompanied by an escrow requirement, we assume the deficiencies identified by the inspector are repaired before or soon after the transaction. Without the escrow requirement, the buyer may opt to ignore the suggested repairs, but we assume they will have to be compensated by a lower sale price. These lowered prices could dip below the tax-assessed value. It is also possible that the marginal effect of Point-of-sale inspection ordinances is reduced by the fact that some buyers in non-ordinance cites will voluntarily pay for an equivalent inspection when making an offer.

The housing ordinances may have had unintended impacts on foreclosures and subsequent transactions. There is a general concern expressed by the lending and servicing community that vacancy registrations and point-of-sale inspection ordinances, among others, will “create impediments to smooth foreclosures” (Pollard, 2012). Anti-vacancy and anti-blight ordinances may provide an incentive for banks to foreclose less or less quickly on

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<sup>2</sup>In thinking about the point-of-sale inspections, we had in mind the following example. A borrower purchases a home in 2004 for \$120,000 with 20 percent down and a \$96,000 mortgage. By 2008, the home has depreciated 10 percent to \$108,000, and the outstanding balance on the loan is \$91,000. The borrower needs to sell the house to relocate. She believes she has \$17,000 in equity to use toward her next down payment. A buyer offers \$108,000, but the point-of-sale inspection reveals that a \$20,000 repair is needed. Now the seller is underwater. If she can, she must borrow or take funds out of savings to cover the repair. She may decide that letting the home go into foreclosure is her best or only option. If scenarios like this are common enough, they could cause point-of-sale inspections to have a net positive impact on foreclosures.



low-value property. Fees associated with the registrations are small relative to the property taxes, but the value of time needed to comply with the regulation could be higher, especially for an investor or lender with a large portfolio. Because the ordinances would increase the probability of being caught violating housing codes, lenders may be wary to take ownership of property that is already in violation of housing codes. Registration should motivate institutional owners to divest of their properties faster than they otherwise would, by lowering prices if necessary. Registry compliance costs could eat into a lender’s expected recovery value and cause additional “bank walk-aways” in marginal cases (Schramm et al., 2011).<sup>3</sup> These incentives could contribute to the stability of a neighborhood by decreasing foreclosures. However, borrowers who are in default due to financial hardship may also stop maintaining the home or leave the home vacant if they assume a foreclosure will be initiated soon. When the banks do foreclose on low-value properties, the laws could also encourage them to surrender the REO inventory to land banks or similar entities that can demolish or rehabilitate the homes (Fitzpatrick IV, 2010). Thus, these ordinances could have both positive and negative channels of influence, and our estimates will reflect the net impact of the treatments.

To test the overall effect of ordinances derived from these hypotheses, we match 2004-2006 transactions (home and sale characteristics) treated by pre-housing boom ordinances with transactions untreated by ordinances. We then compare their corresponding housing outcomes. Our approach attempts to address two important identification issues: (1) the confounding of city and ordinance effects and (2) selection into treatment by individuals. Let  $Y_{1i}$  and  $Y_{0i}$  be outcomes for property  $i$  when the property/sale is subject ( $T = 1$ ) and not subject ( $T = 0$ ) to the ordinance, respectively. We want to estimate the average

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<sup>3</sup>The term “bank walk-aways” refers to situations where a mortgage holder abandons the collateral property because it determines that the expected recovery value would not cover the costs of pursuing a foreclosure, carrying the property, and marketing it. Banks can make this decision before the initial foreclosure filing, between the filing and sheriff’s sale, or even after the property is in REO. The lender stops paying the property taxes and does not pay a servicing company to board up the property, winterize it, or mow the lawn. If not already evicted, borrowers usually vacate the property because they are expecting to be evicted. Bank walk-aways are highly susceptible to theft (especially metal scrapping), vandalism, and blight because no party is securing them or reporting the crimes.

treatment effect on the treated:  $E(Y_1 - Y_0|T = 1)$ . We do not observe realizations for the counterfactual  $Y_0|T = 1$ , but we do observe realizations of  $Y_0|T = 0$ . Strong ignorability implies that the control variables in  $X$  are rich enough to eliminate the bias originated when using estimated parameters from the observed variable ( $Y_0|T = 0, X$ ) to proxy for the unobserved ( $Y_0|T = 1, X$ ).

We use Pearl’s Causal Framework (Pearl, 2009) to clarify the assumptions made to ensure ignorability. Directed Acyclical Graphs (DAGs) are increasingly being used in the social sciences to determine the identifiability of causal effects and derive the testable implications of a causal model (Elwert, 2013). Figure 1 specifies a DAG modeling housing outcomes. Here, individual characteristics  $u$  influence selection into city  $C$ , property and sale characteristics, which we denote as  $H = (P, S)$ , and housing outcome  $Y$ . Local ordinances  $R$  have been previously determined by the city and will have an effect on 2004-2006 transaction characteristics  $H$  and posterior housing outcomes  $Y$ .

We are interested in the direct effect of  $R$  on  $Y$ , after the 2004-2006 sale has occurred. Figure 1 shows that  $C$  is a confounder in the relation between  $R$  and  $Y$ . However, controlling for  $C$  leaves little variation in  $R$  to estimate the effect of  $R$  on  $Y$  as the ordinance applies to all properties in a city. Thus, we estimate a model that, instead of city fixed effects, includes neighborhood characteristics, and we assume that individuals select on these underlying characteristics when thinking about purchasing a home. We also impose a stronger assumption that allows us to sever the direct causal link between individual characteristics  $u$  and outcomes  $Y$ . We assume that most of the information in  $u$  influencing  $Y$  is already accounted for through the selection of neighborhood, property and sales characteristics. Thus, the resulting model is depicted in figure 2 (left). Finally, figure 2 (right) represents the model when neighborhood, property, and sales characteristics are all represented by an index  $H'$ . With the model thus specified, controlling for  $H'$  allows us to estimate the direct effect of ordinances  $R$  on outcomes  $Y$ . The index  $H'$  results from estimating a score for the propensity of transactions to belong to the treated group.

In the estimated propensity score equation, the coefficients serve as weights that reflect the relative strength of the correlations between the covariates and the treated status. These weights should create a close alignment of the distributions of the observables in the treated and untreated samples.

Propensity score matching techniques are usually applied in situations where individual units of observation are selected into treatment (Rosenbaum and Rubin, 1983). However, in this analysis, properties are selected into treatment in groups defined by their municipality. All homes in a municipality are either treated or untreated. So while it is not possible to interpret the propensity score as the probability that a property/transaction selects into treatment (the ordinance), we can say that estimates of probability of treatment ( $P(T = 1|X)$ ) from a logistic regression provide a score of the likelihood that the property belongs to a distribution that is observationally similar to the distribution of properties subject to ordinances.

A sold home is considered treated if it is in a city that has enacted any one or more of these ordinances before 2004. After 2004 some cities enacted rules as a direct response to the foreclosure crisis, which makes the treatment endogenous. In this later period, we would expect to find higher levels of housing distress in places with recently instituted ordinances. We restrict our definition of treatment to earlier ordinances that were a response to the long-term problems of vacancy and abandonment in the region. While treatment assignment is not random, we believe that selection into treatment at the city level does not convey knowledge of the future housing market collapse.

Of the 58 municipalities in Cuyahoga County, 28 of them have at least one of the three ordinances. Nineteen of the municipalities had ordinances in place prior to the housing crisis, which we define as pre-2004. The remaining 9 municipalities enacted ordinances after 2004. We further limit the 19 municipalities to only those that enforced the ordinances. This results in a treatment group of 15 municipalities. Our potential control group is comprised of properties in the 30 municipalities with none of these ordinances in effect during the study

period.

Examining housing market trends in the treatment and control cities reveals that they were similar before the housing crisis. If treatment cities were markedly more distressed, we would be concerned that the distress motivated the passage of the ordinances and continued into the crisis period. As shown in Figure 3, the trends in the sales prices and sheriffs sales are very similar between the ordinance and non-ordinance cities in the years preceding the housing crisis. In the post-crisis period, we see differences between these two groups of cities. When examining the percent of housing units that are vacant, we observe an upward trend over time but the pre-crisis rates are lower in the ordinance cities when compared to the non-ordinance cities. Similarly, the shares of housing units that are renter-occupied are lower in the ordinance cities through 2000 but higher in 2010. Treatment may have been driven by the idiosyncrasies of the elected officials' agendas rather than being driven by specific market conditions.

## 4 Data

We use data from the following sources: Home Mortgage Disclosure Act (HMDA), Cuyahoga County Recorder, Cuyahoga County Auditor, the Decennial Censuses, the American Community Survey, and the Ohio Department of Education.<sup>4</sup> HMDA contains loan level data on loan characteristics such as lending institution, origination date, loan amount, and loan type, as well as borrower characteristics such as income. Linking to HMDA mortgage data allows us to estimate ordinance effects for properties sold via a mortgage or cash transaction. The recorder data contains information on the lending institution, loan amount, parcel, and the date the mortgage deed was recorded. Sales transactions data come from the Cuyahoga County Auditor and include sale date, sale price, deed type, buyer, seller, and parcel. Property characteristics such as year built, square footage, and the number of units

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<sup>4</sup>A reorganization in 2011 has placed the functions of the Auditor and Recorder under the Cuyahoga County Fiscal Officer. Census tract level variables were extracted from the NEO CANDO database at the Center on Urban Poverty and Community Development at Case Western Reserve University.

in the property are also provided by the Auditor.

HMDA and Recorder data are linked based on lending institution, loan/deed amount, origination date, and census tract. Then, Auditor data is linked by parcel number. We use a probabilistic linkage procedure to link the HMDA and Cuyahoga County Recorder data. The linkage software used, *Link Plus*, is made available by the Centers for Disease Control.<sup>5</sup> Census tract is taken to be a blocking variable. Linkages with loan amount differences within \$1,000 and origination date differences within a year are allowed. The data on lender names are cleaned to increase precision. About 75 percent of the sales data are linked.

The American Community Survey provides tract-level measures of home ownership, racial composition, median household income, educational attainment, and unemployment.<sup>6</sup> Given the substantial literature that finds that school performance is capitalized into house prices (see Nguyen-Hoang and Yinger (2011) for a review), we also include the Ohio Department of Education's performance index for each property's school district.<sup>7</sup> The index summarizes the test scores of district's students.

For transactions taking place in the 2004-2005 period, the data is blocked by property type (one or more units), occupancy type (owner or renter), and transaction type (cash, prime mortgage, sub-prime mortgage). Within each block, matching is performed based on the following variables: sale price, square footage, vintage, and neighborhood characteristics such as percent owner occupancy, percent non-high school graduates, percent college graduates, percent black households, median income, unemployment rate, median home value in 2004, percent of non-depository loan originations in 2004, school performance, and property tax rate. Stata's *psmatch2* is used to implement the procedure (Leuven and Sianesi, 2003).

Since properties can transact more than once in the 2004-2005 period, we use the trans-

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<sup>5</sup>The *Link Plus* software is provided free of charge by the National Program of Cancer Registries Division of the Centers for Disease Control and Prevention. It is based on the method developed by Fell and Sunter (1969).

<sup>6</sup>Tracts are generally neighborhoods within municipalities. Ninety-four percent of tracts in Cuyahoga County have ninety percent or more of their residents in a single municipality.

<sup>7</sup>Ohio Department of Education. "Report Card Lists and Rankings." [http://education.ohio.gov/lists\\_and\\_rankings](http://education.ohio.gov/lists_and_rankings). <http://reportcard.education.ohio.gov/Pages/Download-Data.aspx>.

action closest in time to January 1, 2004, and we find a match based on sale, parcel and neighborhood characteristics among properties not subject to the ordinances that transacted in 2004 or 2005. With the parcel number, we can identify all subsequent transactions. The outcome variables are defined as follows:

- **Early Foreclosure:** if the house went into tax or mortgage foreclosure and was sold at sheriff's sale within two years after the first sale.
- **Foreclosure:** if the house went into tax or mortgage foreclosure and was sold at a sheriff's auction any time after the first sale.
- **Sale Below Assessed Value:** if the next sale price was below the most recent assessed value in the property tax records. Tax-assessed values in Cuyahoga County are intended to be below market values, so a sale price that is lower yet indicates a large, recent decline in value.
- **Bulk Sale:** if the next sale is part of a bulk sale. Sales are identified as "bulk" if the sale is one of three or more sales recorded with the same seller and the same buyer on a single day.
- **Flip:** if the house was re-sold within the first two years after the first sale (excluding sheriff's sales and sales out of REO).
- **Tax Delinquency:** if the property was tax current before the first sale and becomes tax delinquent before it resells.

We are also interested in seeing whether there is an impact of the ordinances on outcomes beyond the next sale and outcomes for homes that have not sold recently. Table 3 describes two additional sets of outcomes. The second set of variables are counts summed from 2006 through 2008. The counts measure the number of times the property sold at sheriff's sale (foreclosure), sold within two years of the previous sale (flip), sold below its assessed value, or was tax delinquent.

Summary statistics of the linked and matched data are presented in table 2. Properties sold in the 2004-2005 period in ordinance cities are located in neighborhoods that have higher owner-occupancy, lower unemployment and lower home values. There is much more variation of house prices in the larger, untreated group. After matching by property, we end up with

9,659 sales in the matched treated group out of 11,948 sales in the treated municipalities. The matching technique, by design, results in distributions of the propensity score that are nearly identical. The distributions of the variables that contribute to the score are much more similar after the matching, but some differences persist. We include all the components of the score, such as house price, square footage, and college attainment, in the regressions to account for the remaining differences.

## 5 Results

In table 3, we see that the ordinance cities have significantly lower mean values in only one instance among the seventeen distress measures. Ordinance cities have significantly higher means for twelve of the measures. In a pure matching strategy, the difference between the mean outcomes of the treated and untreated groups serves as the estimate of the treatment effect. The mean differences here contrast treatment with any ordinance versus no ordinance. However, because we are interested in the effects of three distinct ordinances, and some cities require both registrations and inspections, we need to estimate models with indicators of the specific treatments. At the same time, we can control for the property-specific characteristics observable in our data.

Table 4 displays results for a series of regressions on the outcomes of interest related to the subsequent sale. Table 5 presents results for the outcomes measured over a three-year window. Vacancy registrations appear to discourage foreclosures both in the first sale after 2004-2005 and at any time during 2006-08. This could be because the vacancy registration is helping to maintain property values, and preventing borrowers from having negative equity. Alternately, the registration requirement could be discouraging bank foreclosures by raising the expected carrying costs of the properties. The 9,659 treated properties in the matched sample actually experienced 1,298 foreclosures in the study period. The model implies that if the vacancy registration ordinance were not in place, the foreclosure rate would be 16.8

percent, rather than 13.4 percent.

Inspections and inspections with escrow appear to have the net effect of increasing foreclosures and tax delinquency. In the first subsequent sale, inspections display a significant, positive relationship to foreclosure. Despite any success the inspections have in sustaining the level of maintenance in the housing stock, it appears they do not succeed in protecting enough equity to allow distressed homeowners to sell and avoid foreclosure. Inspections with escrow also have a positive relationship, and it is significant when measured over the 2006-2008 window. The matched sale regressions indicate that tax delinquency is significantly higher (by 26 to 42 percent) in municipalities with inspection ordinances. Inspections without escrow even appear to be positively related to bulk sales. This could follow from increased foreclosures creating additional REO inventory.

Tables 6 and 7 display the estimates of alternate specifications of the sales models. The unmatched estimates present the differences without any limitations on the sample. In the unweighted population of all sales, vacancy registrations are negatively correlated with foreclosures, and inspections without escrow are positively associated with foreclosures and tax delinquency. Outside these consistencies, the results without matching are different in sign and significance for several of the coefficients of interest.

We attempted the models separately for homes purchased in 2004-2005 with cash and those purchased with loans. The vacancy registration coefficients are larger in the loan sales models for foreclosures. Likewise the reduction of foreclosures due to vacancy registrations is concentrated in the outcomes of homes with below-median values. This is consistent with carrying costs discouraging foreclosures more when they are relatively large compared to the foreclosure recovery value. The positive association between point of sale inspections and foreclosure is evident in all subcategories of sales. In contrast, the elevated tax delinquency associated with inspections is clearly concentrated in the below-median value homes.

We attempted two additional alternate specifications which speak to the robustness of the main results. The outcome variables are dichotomous in some cases and take the form



of low counts (1, 2, 3, etc.) in others. We attempted logistic and Poisson specifications in place of the linear models. The results were very similar and would support the same policy-relevant conclusions.

## 6 Conclusions

As in most cities across the country, the cities in the study area all had to deal with distress in some fraction of their housing stock during the last decade. Above some threshold, housing problems destabilized neighborhoods. Our goal here was to assess whether, and to what extent, local ordinances protected neighborhoods from housing problems.

Vacancy registrations appear to have more desirable effects on neighborhood stability. Homes under these ordinances are significantly less likely to go through a foreclosure. We may be concerned that the vacancy registration lowers foreclosure by encouraging lenders to walk away from their collateral, rather than by maintaining neighborhood home values. However, if this were the case, we should see elevated tax delinquency among bank walk aways. In our results, the relationship between vacancy registrations and tax delinquency is consistently negative and in some specifications, significantly so. This suggests the vacancy registration ordinances are not encouraging owners to abandon properties.

We do not find evidence that point-of-sale inspections, with or without escrow requirements, reduce foreclosures, bulk sales, or sales of homes below their assessed value. Instead, we find these inspections with and without escrow to be associated with higher levels of foreclosure, and higher incidence of tax delinquency.

Point-of-sale inspections may have a very long run benefit which is not detectable in a study such as this one that focuses on a crisis period. Our identification strategy requires that we match homes of similar value because home values summarize hundreds of unmeasured factors. It is possible that neighborhoods full of homes of similar vintage and quality have seen their values drift downward over the last couple decades, and therefore do not enter

the comparison group for homes whose maintenance has been required by law. Additional research is needed to confirm or refute this hypothesis. In the meantime, municipalities will have to decide if some other justification, such as residents' safety, is sufficient for keeping or adding point-of-sale inspections. Vacancy registrations, although not without cost, do seem to lessen the incidence of foreclosure. Therefore they should be considered by cities that are concerned that a future housing crisis could destabilize their neighborhoods.

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City	Ordinance Type	Fees	Renewal Basis	Compliance Window	Max penalty per initial violation
Bedford	Inspection w/ Escrow	\$50	NA	pre sale	\$500 and 180 days imprisonment
Berea	Inspection	\$75	NA	pre sale	\$250 and 30 days imprisonment
Bratenahl Village	Inspection	\$25	NA	pre sale	\$500 and 180 days imprisonment
Cleveland Heights	Inspection	\$200	NA	pre sale	\$1000 and 180 days imprisonment
East Cleveland	Vacancy Registration	\$500	Annual	45 days of vacancy	\$1000 and 180 days imprisonment
Euclid	Inspection	\$225	Annual	pre sale	\$1000 and 180 days imprisonment
Garfield Heights	Inspection	\$125	Annual	pre sale	\$1000 and 180 days imprisonment
Garfield Heights	Vacancy Registration	None	NA	NA	City's incurred maintenance costs
Gates Mills	Inspection	None	NA	pre sale	\$1000 and 180 days imprisonment
Hunting Valley	Inspection	None	NA	pre sale	\$500
Maple Heights	Inspection w/ Escrow	None	NA	pre sale	\$1000 and 180 days imprisonment
Mayfield Heights	Inspection w/ Escrow	\$50	NA	pre sale	\$1000 and 180 days imprisonment
Parma	Vacancy Registration	\$150	Semi-annual	30 days of vacancy	\$1000 and 180 days imprisonment
Shaker Heights	Inspection w/ Escrow	\$200	NA	pre sale	\$1000 and 180 days imprisonment
University Heights	Inspection w/ Escrow	\$150	NA	pre sale	\$1000 and 180 days imprisonment
Woodmere	Inspection	\$25	NA	pre sale	\$1000 and 180 days imprisonment

Table 1: Treatment city ordinances. Described ordinances were enacted before 2004, not amended before 2009, and actively enforced. The control cities, which had no similar ordinances during the study period, include Bay Village, Beachwood, Brecksville, Broadview Heights, Brook Park, Brooklyn, Chagrin Falls, Cleveland, Fairview Park, Glenwillow, Highland Heights, Highland Hills, Independence, Lakewood, Lyndhurst, Mayfield Village, Middleburg Heights, Moreland Hills, North Olmsted, North Royalton, Olmsted Falls, Olmsted Township, Parma Heights, Richmond Heights, Rocky River, Seven Hills, Solon, Strongsville, Walton Hills, and Westlake. The fees listed are for first-time inspection or registration of single family homes. Multifamily fees are usually higher.

<b>Properties Sold in 2004 or 2005</b>	All observations				Matched observations			
	Ordinance		No Ordinance		Ordinance		No Ordinance	
	N=11,948		N=28,616		N=9,659		N=9,659	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
FHA VA Loan	0.07	0.26	0.04	0.20	0.07	0.26	0.06	0.25
Rental Mortgage	0.08	0.26	0.08	0.28	0.06	0.24	0.06	0.24
High Cost Loan	0.14	0.35	0.12	0.33	0.13	0.34	0.13	0.34
Cash (no loan data)	0.39	0.49	0.43	0.49	0.37	0.48	0.37	0.48
Multifamily	7.57	26.46	14.08	34.79	2.57	15.82	2.57	15.82
Vintage (decade)	194.53	2.04	194.70	3.34	194.68	1.95	194.72	2.53
Square Feet (1000)	1.53	0.61	1.70	0.72	1.48	0.56	1.49	0.56
School Performance	88.47	8.22	89.67	12.78	89.47	7.51	90.84	11.33
% Black	24.73	29.83	22.29	35.5	18.79	24.44	17.52	33.48
% Owner Occupied	72.78	18.39	66.89	21.65	75.45	16.98	74.48	18.97
Median Income	45.21	16.6	44.75	20.15	46.56	16.60	46.43	14.56
% No High Sch. Deg.	14.96	7.34	19.21	13.28	14.48	6.41	14.54	9.45
% College Grad	26.94	19.51	24.57	16.97	26.93	18.99	26.58	14.60
Unemployment	4.97	3.50	6.53	5.55	4.41	2.20	4.50	3.56
04 Median Home Price	130.36	59.6	141.80	82.7	132.95	56.13	134.33	55.97
Price Trend 92/93-02/03	47.96	16.37	78.02	78.9	47.88	13.47	43.76	18.26
Property Tax Rate	2.25	0.39	1.98	0.20	2.17	0.36	2.14	0.26

Table 2: Descriptive Statistics. Data sources include the Cuyahoga County Fiscal Officer (property transactions and characteristics), Home Mortgage Disclosure Act (loan and borrower characteristics), and the American Community Survey (neighborhood characteristics).

Variable	Matched Sales					
	Ordinance		No Ordinance		Mean(t-stat)	Median( $\chi^2$ )
	Mean	SD	Mean	SD		
<u>First Subsequent Sale</u>						
Early Foreclosure	1.08	10.32	0.72	8.48	2.590**	6.316*
Foreclosure	13.44	34.11	13.17	33.82	0.551	0.281
Sale <Assessed	19.32	39.48	18.48	38.82	1.489	2.161
Bulk Sale	0.45	6.66	0.36	6.01	0.908	0.631
Flip	6.54	24.73	7.05	25.60	-1.401	1.883
Become Tax Delinquent	10.39	30.52	7.09	25.67	8.138**	65.608**
<u>Transactions or Status in 2006, 2007 and 2008</u>						
Foreclosed	7.06	25.66	5.82	23.41	3.515**	11.972**
Sold <Assessed	11.12	34.64	10.21	33.77	1.851+	5.722*
Bulk Sales	0.37	6.58	0.21	4.77	2.003*	3.259+
Flips	5.79	25.27	5.80	24.45	-0.029	0.169
Tax Delinquent	30.55	70.20	23.93	61.90	6.958**	38.238**

Table 3: Descriptive Statistics - Outcomes. Data sources include the Cuyahoga County Fiscal Officer (property transactions and characteristics), Home Mortgage Disclosure Act (loan and borrower characteristics), and the American Community Survey (neighborhood characteristics). Significance Key: \*\* p<0.01, \* p<0.05, + p<0.1.



	Early Foreclosure	Foreclosure	Sale Price <Assessed	Bulk	Flip	Tax Delinquent
Vacancy Registration	-0.03 (0.19)	-3.40 ** (1.13)	-2.14 (1.42)	-0.17 (0.15)	0.42 (0.89)	0.27 (0.76)
Inspection	0.51* (0.24)	3.13 ** (1.12)	1.61 (1.63)	0.29* (0.14)	-0.34 (0.70)	3.84 *** (0.87)
Inspection w/ Escrow	-0.04 (0.25)	0.95 (1.13)	0.72 (1.46)	0.31 (0.30)	-0.95 (0.67)	4.36 ** (1.43)
FHA VA Loan	-0.57 *** (0.08)	3.03 ** (0.93)	-2.44 ** (0.73)	-0.08 (0.11)	-0.63 (0.53)	-3.57 *** (0.67)
Rental Mortgage	0.52 (0.45)	-2.16 (2.68)	3.07 (2.22)	-0.00 (0.15)	15.18 *** (2.61)	1.88 (2.00)
High Cost Loan	1.26 ** (0.41)	27.98 *** (3.51)	23.09 *** (2.70)	-0.04 (0.11)	1.71 (1.84)	16.37 *** (1.29)
Cash (no loan data)	1.03 ** (0.31)	-1.82+ (0.96)	12.64 *** (2.60)	0.54 *** (0.14)	6.55 *** (0.58)	7.82 *** (1.24)
Multifamily	-0.01 (0.00)	0.01 (0.03)	-0.04* (0.02)	0.00 (0.00)	-0.09 *** (0.02)	-0.02 (0.01)
Vintage (decade)	-0.11 ** (0.04)	-0.70* (0.27)	-0.37 (0.27)	-0.03 (0.04)	0.44* (0.17)	-0.63 *** (0.13)
Square Feet (1000)	0.33* (0.15)	-1.52* (0.68)	1.52 (1.01)	-0.18 (0.20)	5.16 *** (0.88)	3.34 *** (0.75)
School Performance	-0.01 (0.01)	-0.14* (0.06)	-0.09 (0.10)	0.02 (0.01)	0.09* (0.03)	0.06 (0.07)
% Black	0.02* (0.01)	0.05 ** (0.02)	0.14 *** (0.03)	0.00 (0.00)	0.02 (0.02)	0.11 *** (0.03)
% Owner Occupied	-0.00 (0.01)	0.07 (0.07)	-0.02 (0.07)	-0.00 (0.01)	0.01 (0.03)	0.02 (0.03)
Median Income	0.03* (0.01)	-0.02 (0.08)	0.08 (0.09)	0.00 (0.01)	0.01 (0.05)	-0.02 (0.04)
% No High school	0.01 (0.02)	0.12 (0.11)	0.09 (0.13)	0.03* (0.01)	0.22 *** (0.04)	0.06 (0.07)
% College Grad	-0.04 ** (0.01)	-0.15 ** (0.05)	-0.07 (0.08)	-0.00 (0.01)	0.20 *** (0.04)	-0.09+ (0.05)
Unemployment	0.00 (0.06)	0.45 (0.27)	0.52 (0.33)	-0.02 (0.05)	-0.20 (0.20)	-0.10 (0.20)
Median Home Price 04	0.00 (0.00)	0.00 (0.01)	0.03 (0.02)	-0.00 (0.00)	0.02 (0.02)	0.03+ (0.02)
Price Trend 92/93-02/03	0.01 (0.01)	-0.07* (0.03)	0.02 (0.05)	-0.00 (0.00)	0.01 (0.02)	0.00 (0.01)
Sale Price	-0.01* (0.00)	0.02* (0.01)	-0.06 *** (0.01)	0.00 (0.00)	-0.08 *** (0.01)	-0.04 *** (0.01)
Property Tax Rate	0.27 (0.48)	0.87 (2.64)	-0.11 (4.34)	0.09 (0.28)	-1.90 (1.70)	1.07 (1.44)
2005	0.01 ** (0.00)	-0.04* (0.02)	0.00 (0.01)	0.00 (0.00)	-0.01* (0.01)	0.02+ (0.01)
Constant	21.09* (8.16)	156.96 ** (52.78)	85.82. (53.43)	3.72 (7.93)	-94.13 ** (31.49)	112.84 *** (25.66)
R <sup>2</sup>	0.02	0.13	0.10	0.00	0.06	0.09

Table 4: Results - Matched Sales. N=19,318. Standard errors are clustered by municipality. Significance Key: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1. Data sources include the Cuyahoga County Fiscal Officer, Home Mortgage Disclosure Act, and the American Community Survey.

	Foreclosure 2006-2008	Sale <Assessed 2006-2008	Bulk 2006-2008	Flip 2006-2008	Delinquent 2006-2008
Vacancy Registration	-1.04* (0.47)	-0.12 (0.77)	0.01 (0.17)	0.37 (0.78)	0.32 (1.82)
Inspection	2.31 * ** (0.49)	1.24+ (0.62)	0.25* (0.11)	0.49 (0.58)	9.37 * ** (2.16)
Inspection w/ Escrow	1.38 * * (0.46)	0.51 (0.98)	0.38+ (0.23)	-0.05 (0.64)	7.90 * * (2.81)
FHA VA Loan	-4.72 * * (1.40)	-2.88 * ** (0.59)	-0.15* (0.06)	-1.63 * * (0.59)	-7.11 * ** (1.96)
Rental Mortgage	0.83 (1.27)	2.36 (2.40)	-0.07 (0.10)	6.43 * * (2.12)	6.65+ (3.87)
High Cost Loan	14.70 * ** (1.23)	10.41 * ** (2.08)	0.13 (0.09)	2.23* (0.85)	51.81 * ** (3.62)
Cash (no loan data)	2.17 * * (0.65)	8.38 * ** (1.65)	0.44 * * (0.14)	5.99 * ** (0.94)	23.66 * ** (3.10)
Multifamily	-0.02+ (0.01)	-0.04* (0.02)	-0.00 (0.00)	-0.06 * ** (0.01)	-0.07+ (0.04)
Vintage (decade)	-0.75+ (0.39)	-1.21 (0.80)	-0.01 (0.04)	-0.30* (0.15)	-2.57 * ** (0.47)
Square Feet (1000)	0.53 (0.63)	2.30* (0.94)	0.02 (0.10)	2.86 * ** (0.71)	8.96 * ** (2.40)
School Performance	-0.01 (0.03)	0.01 (0.04)	0.00 (0.01)	0.09 * * (0.03)	0.11 (0.14)
% Black	0.09 * ** (0.02)	0.13 * ** (0.02)	0.00 (0.00)	0.09 * ** (0.01)	0.28 * ** (0.05)
% Owner Occupied	0.04+ (0.02)	0.07 (0.05)	-0.00 (0.01)	0.04 * * (0.01)	-0.06 (0.07)
Median Income	0.03 (0.05)	-0.02 (0.07)	0.01 (0.01)	-0.05* (0.02)	0.09 (0.10)
% No High school	0.13+ (0.06)	0.17 (0.14)	0.01 (0.01)	0.20 * ** (0.04)	0.09 (0.18)
% College Grad	-0.15* (0.06)	0.03 (0.08)	-0.00 (0.01)	0.17 * ** (0.04)	-0.40 * * (0.13)
Unemployment	0.16 (0.30)	0.60* (0.25)	-0.02 (0.03)	-0.05 (0.13)	0.15 (0.39)
Median Home Price 04	0.02 (0.02)	0.02 (0.02)	-0.00+ (0.00)	0.00 (0.01)	0.06. (0.04)
Price Trend 92/93-02/03	0.01 (0.01)	-0.01 (0.02)	-0.00 (0.00)	-0.05+ (0.03)	-0.05 (0.04)
Sale Price	-0.00 (0.01)	-0.03* (0.01)	0.00 (0.00)	-0.04 * ** (0.01)	-0.08 * ** (0.02)
Property Tax Rate	1.66 (1.37)	-1.66 (1.67)	0.08 (0.20)	-2.11 (1.49)	3.66 (3.84)
2005	-0.03 * ** (0.01)	0.01 (0.01)	0.00 (0.00)	0.04 * ** (0.01)	0.07* (0.03)
Constant	138.81+ (79.15)	228.85 (158.46)	1.60 (7.98)	50.85 (30.50)	481.80 * ** (95.40)
R <sup>2</sup>	0.09	0.07	0.00	0.05	0.15

Table 5: Results - Matched Sales (2). N=19,318. Standard errors are clustered by municipality. Significance Key: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1. Data sources include the Cuyahoga County Fiscal Officer, Home Mortgage Disclosure Act, and the American Community Survey.

Specification	Early Foreclosure	Foreclosure	Sale Price < Assessed	Bulk	Flip	Tax Delinquent	
Unmatched/Unweighted N=42,479	Vacancy Registration	-0.33+ (0.17)	-1.92+ (0.98)	-3.80** (1.23)	0.09 (0.20)	-0.17 (0.53)	-1.71** (0.60)
	Inspection	0.24 (0.26)	3.82** (1.18)	1.30+ (0.72)	-0.32+ (0.18)	-0.02 (0.48)	1.94* (0.94)
	Inspection w/ Escrow	-0.54* (0.26)	2.49* (1.19)	0.02 (0.52)	-0.10 (0.22)	-1.30* (0.57)	1.04 (0.96)
Cash Sales N=7,142	Vacancy Registration	-0.69+ (0.37)	-2.32* (1.04)	-2.72. (1.66)	-0.36 (0.36)	0.72 (1.79)	-1.13 (1.20)
	Inspection	0.58 (0.37)	5.28*** (1.09)	2.14 (1.93)	0.65** (0.23)	-0.76 (1.41)	3.38* (1.43)
	Inspection w/ Escrow	-0.34 (0.39)	3.20* (1.32)	2.03 (1.92)	0.53 (0.49)	-0.12 (1.26)	5.15** (1.65)
Loan Sales N=12,176	Vacancy Registration	0.16 (0.19)	-5.47* (2.08)	-4.10* (1.81)	-0.10 (0.08)	-0.47 (0.68)	-0.34 (0.87)
	Inspection	0.38* (0.18)	3.86+ (2.07)	0.38 (1.60)	0.05 (0.13)	0.59 (0.81)	3.72*** (0.95)
	Inspection w/ Escrow	0.15 (0.23)	1.30 (2.08)	-0.11 (1.53)	0.18 (0.22)	-1.11 (0.74)	4.27* (1.90)
Below Median Sales N=9,693	Vacancy Registration	0.20 (0.47)	-7.29* (3.10)	-1.50 (2.97)	-0.27 (0.29)	-0.97 (1.18)	0.71 (1.67)
	Inspection	0.60* (0.28)	0.16 (1.96)	-0.96 (2.36)	0.34 (0.29)	-1.15 (1.10)	3.79** (1.21)
	Inspection w/ Escrow	0.10 (0.36)	0.67 (2.39)	1.94 (2.67)	0.51 (0.39)	-2.74* (1.12)	8.58*** (0.89)
Above Median Sales N=9,625	Vacancy Registration	-0.08 (0.18)	-2.33 (1.58)	-1.58 (1.39)	-0.03 (0.14)	-0.14 (0.65)	-0.45 (0.88)
	Inspection	0.09 (0.22)	6.30* (3.13)	3.53* (1.71)	0.10 (0.16)	-0.62 (0.70)	2.21 (1.55)
	Inspection w/ Escrow	0.13 (0.18)	1.31 (2.15)	0.37 (1.60)	0.02 (0.25)	-0.78 (0.76)	0.39 (1.69)

Table 6: Alternate specifications: results for the effect of ordinances on the next sale of homes sold in 2004 or 2005. Regressions included controls for property, loan, borrower, neighborhood and school characteristics. Data sources include the Cuyahoga County Fiscal Officer, Home Mortgage Disclosure Act, the American Community Survey and the Ohio Department of Education.

Specification	Foreclosure 2006-2008	Sale < Assessed 2006-2008	Bulk 2006-2008	Flip 2006-2008	Delinquent 2006-2008	
Unmatched/Unweighted N=42,479	Vacancy Registration	-1.90* (0.73)	-1.64 (1.12)	-0.09 (0.14)	-0.32 (0.31)	-2.43 (1.63)
	Inspection	1.74*** (0.43)	1.11+ (0.61)	-0.15 (0.10)	0.30 (0.37)	6.35* (2.70)
	Inspection w/ Escrow	-0.38 (0.32)	-1.03+ (0.55)	-0.04 (0.20)	-0.92* (0.44)	0.45 (2.15)
Cash Sales N=7,142	Vacancy Registration	-0.92 (0.63)	-0.03 (0.90)	-0.04 (0.43)	1.83 (1.24)	1.36 (3.07)
	Inspection	3.19*** (0.54)	2.86*** (0.97)	0.68*** (0.19)	-0.14 (1.04)	6.45* (2.81)
	Inspection w/ Escrow	2.22*** (0.61)	0.82 (1.33)	0.84+ (0.46)	1.15 (0.95)	9.59* (3.85)
Loan Sales N=12,176	Vacancy Registration	-2.07* (0.80)	-1.51 (1.00)	0.00 (0.05)	-1.06 (0.71)	-4.40+ (2.36)
	Inspection	2.32*** (0.78)	-0.18 (0.73)	-0.04 (0.10)	0.68 (0.71)	10.39*** (3.18)
	Inspection w/ Escrow	1.56+ (0.84)	0.32 (1.34)	0.11 (0.13)	-0.83 (0.79)	7.94+ (4.04)
Below Median Sales N=9,693	Vacancy Registration	-0.72 (0.98)	-0.29 (2.07)	0.16 (0.29)	0.78 (1.57)	5.85. (3.77)
	Inspection	1.34 (0.89)	1.66 (1.09)	0.36 (0.22)	0.45 (0.97)	12.70*** (2.38)
	Inspection w/ Escrow	2.29*** (0.74)	1.03 (1.59)	0.56* (0.24)	0.02 (1.37)	17.90*** (2.66)
Above Median Sales N=9,625	Vacancy Registration	0.15 (0.45)	1.49*** (0.54)	-0.03 (0.14)	0.32 (0.33)	0.32 (1.42)
	Inspection	3.93*** (0.79)	1.63+ (0.82)	0.20 (0.13)	-0.15 (0.36)	4.44* (2.04)
	Inspection w/ Escrow	1.80*** (0.63)	0.77 (0.90)	0.37 (0.27)	-0.89 (0.57)	1.80 (2.19)

Table 7: Alternate specifications: results for the effect of ordinances on the future outcomes of properties that sold during 2004-2005. Regressions included controls for property, loan, borrower, neighborhood and school characteristics. Data sources include the Cuyahoga County Fiscal Officer, Home Mortgage Disclosure Act, the American Community Survey, and the Ohio Department of Education.

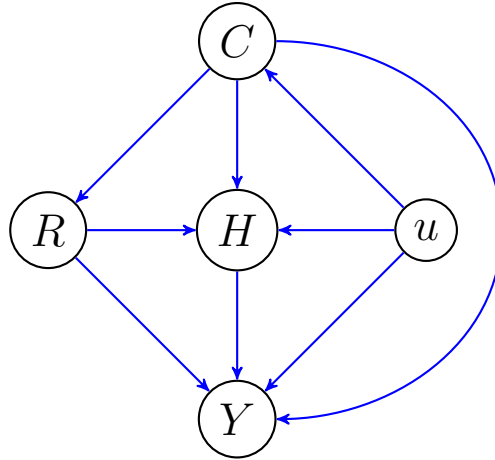


Figure 1: Model of the effect of local housing ordinances on neighborhood stability.  $R$  is local ordinances,  $C$  is city,  $H$  is transaction (property and sale),  $u$  represents observed and unobserved individual characteristics, and  $Y$  is housing/neighborhood outcome.

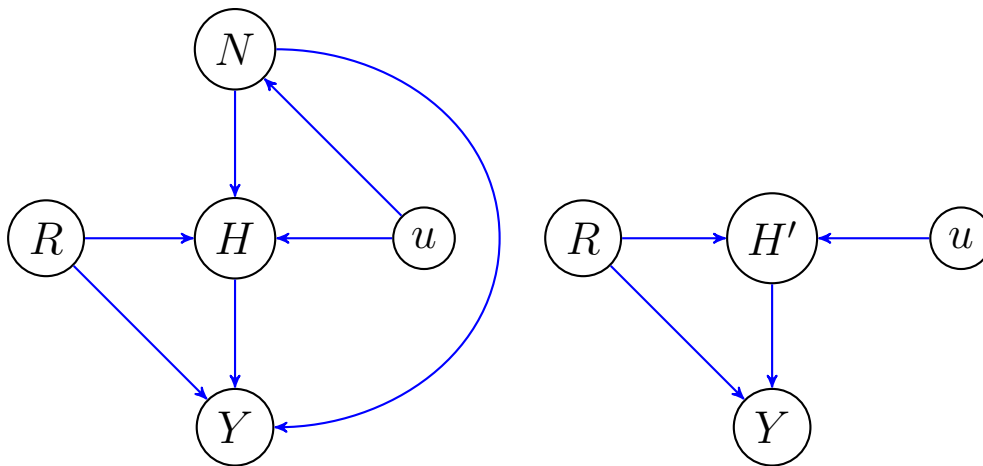
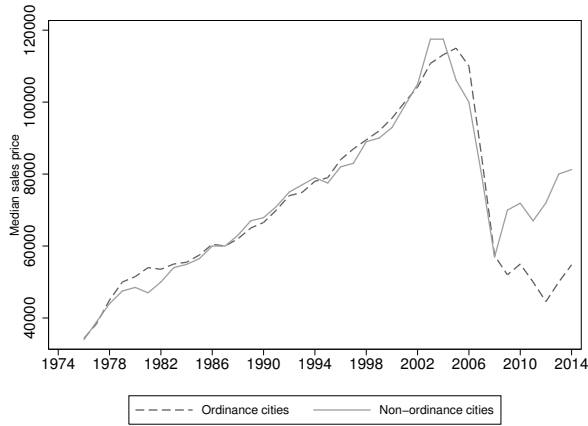
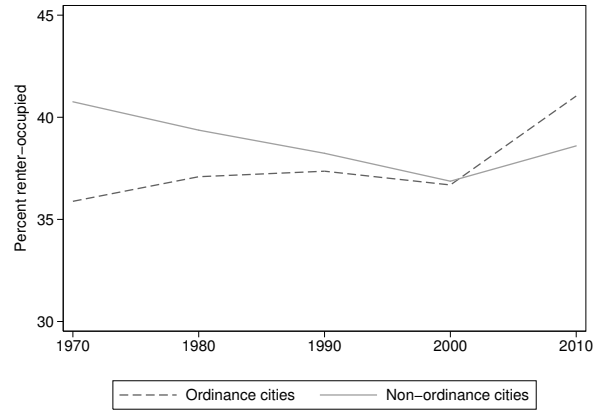


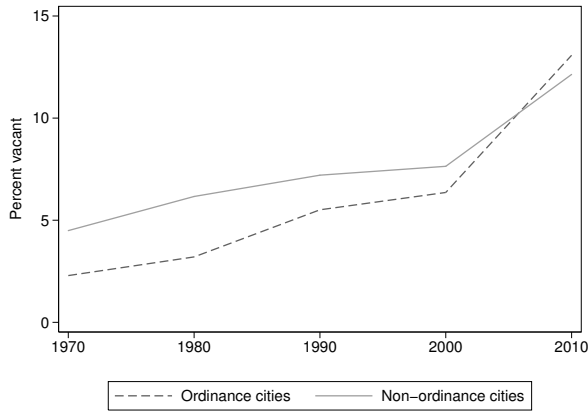
Figure 2: Model of the effect of local housing ordinances on neighborhood stability with stronger assumptions imposed to address confounding and selection.  $R$  is local ordinances,  $N$  is neighborhood characteristics,  $H$  is transaction (property and sale),  $H'$  is an index of property, neighborhood, and sale characteristics,  $u$  represents observed and unobserved individual characteristics, and  $Y$  is housing/neighborhood outcome.



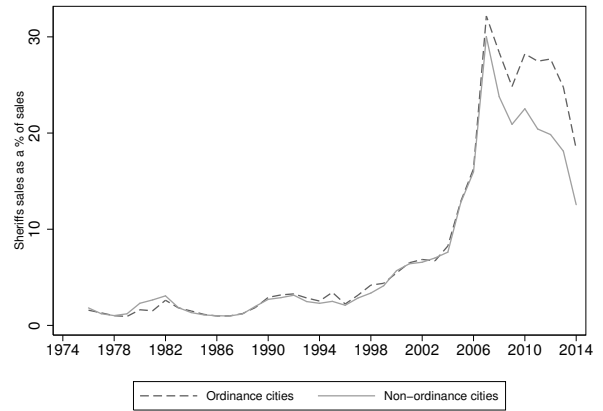
(a) Median Sales Price



(b) Percent Renter Occupied



(c) Percent Vacant



(d) Sheriff's Sales as percent of All Sales

Figure 3: Time trends in housing market indicators (a-d). Values are the average of the ordinance and non-ordinance city measures. Data sources: Cuyahoga County Fiscal Officer and Decennial Censuses.