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A Staff Report of the Federal Reserve Bank of Cleveland
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Applying Research to Policy Issues
in Distressed Housing Markets:
Data-Driven Decision Making

The Federal Reserve Bank of Cleveland

FOREWORD

This publication is a compilation of research published by the Federal Reserve Bank of Cleveland on housing markets that are experiencing foreclosure and/or a large number of vacant properties, including a policy white paper released in May of 2013 and several policy discussion papers, economic commentaries, and working papers issued in the 2009 to 2012 timeframe. Before reading this compilation, I anticipated that it would shed light primarily on housing market conditions and potential policy solutions in Cleveland and, possibly, in a few other large cities with similar housing markets within the Cleveland Fed District (e.g., judicial foreclosure states with a backlog of vacant or low-value properties).[1] While the papers in this volume accomplish that objective, I was also struck by their broad applicability in terms of information and policy considerations for a wide range of housing markets and even for national policy discussions.

To provide some context for readers not familiar with the Federal Reserve Bank of Cleveland's research and policy efforts that are the focus of this volume, I have divided my comments into two parts. First, I discuss some key policy and research questions this volume addresses in order to provide a roadmap of the topics explored by the papers in this compilation. Second, since the papers reflect housing-related research conducted by both the Research Department and the Community Development Department of the Federal Reserve Bank of Cleveland, I provide some context on the work of these two departments and how this work fits into the broader mission of the Federal Reserve System.

KEY QUESTIONS FOR POLICYMAKERS AND PRACTITIONERS

While the papers in this volume are grounded in the experience of cities within the Cleveland Fed District, the following questions the papers address also apply to markets outside the District.

1) For any state with a backlog of vacant or low-value properties, how can its markets benefit from the application of the policy considerations described in these policy and research papers—such as fast-tracking foreclosure of abandoned properties or providing support for land banks—in order to help reduce the oversupply of housing?

2) What are the unique housing-market challenges and characteristics in states with older industrial cities and other weak markets that are struggling with housing troubles that predate the 2008 housing crisis? Or, as the first paper in this volume puts it, "how did we arrive here?"

3) Is there a policy path to help differentiate between investors that play a constructive role in supporting distressed housing markets and investors that may be characterized as harmful (e.g., with no intent to pay property taxes or maintain properties)? If so, what are the policy prescriptions that create incentives to weed out harmful speculation without hampering beneficial investment?

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[1] The Cleveland Federal Reserve Bank District comprises Ohio, western Pennsylvania, the northern panhandle of West Virginia, and eastern Kentucky.

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4) What is the role of data collection and access to data in informing housing decisions made in the public, private, and nonprofit sectors? Like Ohio, many other states with distressed housing markets have a dearth of standardized, electronically stored data. Is there a cost-effective path toward providing this data, one that could offer a payoff for policymakers, businesses, and community development practitioners?

5) Finally, what implications do these papers have for efforts being considered at the national level— for example, to establish national guidance on fast-tracking vacant and foreclosed properties?

While the papers in this compilation don't attempt to answer all of these questions in full, they provide valuable data and policy options for others considering these issues.

BACKGROUND ON FEDERAL RESERVE RESEARCH AND COMMUNITY DEVELOPMENT FUNCTIONS

Given that this publication includes work from both Research and Community Development staff, it may be beneficial to provide some context on the work of these two functions and the potential benefits that can come from this type of cross-divisional work. The Federal Reserve's work in economic research provides a wide range of independent academic research focused on adding to the general knowledge and understanding of the economy. The Community Development function within the Federal Reserve System—consisting of individual Community Development departments at the Board of Governors and at each of the 12 Federal Reserve Banks—is an important outward-facing function that supports the Federal Reserve's activities and mission as they relate to community reinvestment, consumer compliance supervision, and economic research.[2] Community Development staff accomplish their work through a range of activities, including convening stakeholders, conducting and sharing research, and identifying emerging issues.

The fact that the work in this volume includes contributions from both Research and Community Development is illustrative of the synergy that can exist between traditional economic research and convening stakeholders, understanding emerging issues, and considering the implications of research on public policy. When this synergy is taking place, the "boots on the ground" outreach work typically conducted by Community Development staff to understand economic challenges and emerging issues in a community can inform economic research and identify new research questions. And the economic research, in turn, has the potential to shed light on what works and to identify economic challenges in communities, information that can inform local policy and practice.

While this type of partnership may appear to be common sense, my experience has been that it is often difficult to put into practice. The existence of this volume is an indication that the Cleveland Fed has been able to put in place a productive working partnership between these two divisions.

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[2] For additional information on the Federal Reserve Community Development function and the range of activities and research taking place through this function, see the Federal Reserve Community Development Perspectives report released June 2014.

For readers seeking additional research and analysis on a range of housing and community development topics, individual Reserve Banks and the Board of Governors provide additional resources on their respective public websites. In addition, the Federal Reserve has a System web portal—FedCommunities.org—that contains hundreds of community development resources from all 12 Reserve Banks and the Board of Governors. This portal, launched in 2014 and hosted at the Federal Reserve Bank of St. Louis, contains resources on affordable housing, neighborhood revitalization and stabilization, and foreclosure mitigation, among other topics. The web portal enables viewers to search by topic and to receive notification of new resources as they are published. It also allows users to receive customized alerts on new resources filtered by topic and/or Federal Reserve Bank District.

CONCLUSION

The challenges described in these papers have been long in the making, and it will require thoughtful, data-driven, and sustained policy responses in order to address them in any meaningful way. While it is useful to understand and track developments in the housing market on a national basis, this compilation reminds us that the overall United States housing market is made up of many heterogeneous housing markets, each with unique challenges. As a result, meaningful change will require solutions grounded in a deep understanding of conditions on the ground. The papers that are part of this compilation provide valuable local context, data, and policy options. As a result, it is my hope that this volume will be useful to a wide range of stakeholders—researchers, lenders, nonprofit practitioners, businesses, and policymakers—as they explore steps they can take to respond to these critical challenges.

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[3] The views expressed here are those of the author and don't necessarily reflect the position of the Federal Reserve Board of Governors or the Federal Reserve System.

Policy Considerations for Improving Ohio's Housing Markets

Executive Summary

Housing markets across the United States are showing signs of real stability. Prices, new construction, and sales are all improving from their recessionary lows. While this is good news for the economic recovery, the fallout from the housing crisis is still with us. Many communities carry scars from rampant foreclosures and vacant properties. Restoring the health of the housing sector is an effort that continues.

This assessment is especially relevant in Ohio. Some of the state's older industrial cities are struggling with housing troubles whose roots predate the recent crisis. These weak markets require policies tailored to fit their specific needs.

At the heart of Ohio's housing woes are two long-running trends: decades of population loss and economic stagnation in many of Ohio's older industrial cities that have given rise to a supply of housing in excess of local demand, too much of which stands vacant and abandoned; and spillover effects from a foreclosure rate that was elevated long before the recent recession. Together, these developments make Ohio a special case that does not fit neatly into the more familiar boom–bust narrative observed on a national scale.

In this report, we outline some of the main findings from the Federal Reserve Bank of Cleveland's years of research and outreach with Ohio bankers, community development practitioners, and other market participants.[1] We offer this white paper as an Ohio-centric companion to the nationally focused housing market report issued by the Board of Governors of the Federal Reserve System in January 2012[2], and we offer it in the same spirit—as providing a framework for weighing the pros and cons of programs aimed at stabilizing the housing sector. We hope that our analysis can help inform more effective housing policies for Ohioans.

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[1] The Federal Reserve Bank of Cleveland's empirical research focuses almost exclusively on Cuyahoga County —home to Cleveland—because it is the only county in Ohio that has consistently made its housing market data readily available. However, after sharing this research through outreach in other cities and counties in Ohio, practitioners have informed us that the conditions in Cuyahoga County mirror housing market conditions in many of Ohio's counties.

[2] Board of Governors of the Federal Reserve System, "The U.S. Housing Market: Current Conditions and Policy Considerations" (Jan. 4, 2012).

Research and outreach conducted by the Federal Reserve Bank of Cleveland has pointed to five policy areas that merit careful consideration in Ohio:

- **A foreclosure fast-track for vacant and abandoned properties:** It takes a long time—an average of one to two years—for mortgage loans to go from delinquency through the foreclosure process in Ohio. When a home is vacant and abandoned, efforts to protect homeowners may unintentionally create costs with no corresponding benefits. These "deadweight losses" resulting from a lengthy foreclosure process include legal costs, physical damage to properties, crime, and downward pressure on neighboring property prices. Many states have moved to speed up the mortgage foreclosure process in cases where the owner has abandoned the home.

- **Elimination of minimum-bid requirements:** Ohio law currently requires minimum bids of at least two-thirds of a foreclosed property's appraised value at the first auction. Although this may tamp down some unhealthy speculation at foreclosure auctions, it may also price some well-meaning property rehabbers out of the market. There are ways to offset the tradeoff between opening auctions to more investors and inadvertently encouraging unhealthy speculation. Eliminating the minimum-bid requirements could also enhance market efficiency by lowering transaction costs and reducing the amount of time properties sit empty.

- **Addressing harmful speculation:** In extremely low-value housing markets, some entities engage in "harmful speculation," or the purchase of distressed property with no intent to invest in improving it or paying property taxes. Two features of Ohio law help this business model to persist: The ability to become the new owner of property through a corporation without being registered to do business in Ohio, thus hampering the ability of code enforcement officials to pursue the owner for violations; and the ability to transfer the property without paying back taxes or correcting code violations. Requiring registration with the Secretary of State and the payment of back taxes or corrections of code violations before low-value properties could transfer to new owners could go a long way toward empowering local governments to tackle this problem, with carefully crafted exemptions preventing undue delays in property transfers.

- **Expanded access to land banks:** Nonprofit land banks have done significant work since the 2009 legislation that established their missions of acquiring, remediating, and putting into productive use vacant and abandoned properties. Property demolitions by land banks can help reduce oversupply of housing, the underlying cause of widespread vacancy and abandonment. Eliminating the populations requirement would make land banks available to all Ohio counties.

- **Improved data collection and access:** Good data helps inform decisions made in the public, private, and nonprofit sectors. Understanding Ohio's housing markets is especially difficult because of the dearth of standardized, electronically stored data. Data storage practices vary across Ohio counties, and are determined by inertia and budget constraints. With reliable data, policymakers, businesses, and community development practitioners can better identify what works and what doesn't, allowing them to allocate resources more efficiently. The payoff from a small investment in housing data standardization could be substantial.

We begin this report with a recap of recent trends in Ohio housing markets. We focus on the twin trends of the oversupply of legacy housing relative to demand and a persistently high foreclosure rate. We then highlight the specific complications with the foreclosure process across Ohio counties, including the lengthy period of time that it takes to complete a foreclosure. Finally, we lay out five areas where state-level policy might be especially effective in addressing Ohio's housing problems.

The Nature of the Problem

Housing markets are struggling in many of Ohio's older industrial cities. Property values are low, the foreclosure process is lengthy, and some houses stand vacant for extended periods of time. Given that much of the housing stock in central cities and inner-ring suburbs is very old, the combination of these conditions creates an environment conducive to property abandonment and urban blight.

Whether foreclosed, vacant, or abandoned, each type of distress lowers surrounding property values.[3] This in turn erodes neighbors' equity and municipalities' property-tax bases. Community development practitioners working in Ohio neighborhoods report that vacant and abandoned structures are magnets for crime and vermin, and become fire hazards. Taken together, distressed properties pose serious threats to neighbors, communities, and local governments. Moreover, they inhibit future development of the most affected areas.

The problems of foreclosure, vacancy, abandonment, and low-value property are interrelated. Addressing just one aspect will not make a substantial difference in the overall problem. For example, a large share of the properties that enter the foreclosure process are vacant, and remain vacant during the foreclosure process.[4] Ohio's judicial foreclosure process is lengthy, taking an average of 9.5 months from the foreclosure filing to the sheriff's sale.[5] This process is prolonged even further with additional lengthy periods of loan delinquency (before foreclosure filing) and time spent as real-estate owned (REO) property,

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[3] For example, see Stephan Whitaker and Thomas J. Fitzpatrick IV, "The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes," Federal Reserve Bank of Cleveland Working Paper no.11-23r (2011) (noting that foreclosed, vacant, and tax-delinquent properties all have different impacts on surrounding property values).

[4] Safeguard Properties, the largest field servicer in the country, reports that 25% of homes it inspects when loans are delinquent but not yet in foreclosure have already been vacated by their owners or (in the case of rental properties) tenants.

[5] According to sample data obtain from Lender Processing Services from 2007-2012 and the Bank's calculations.

during which time the lender attempts to sell the property to an end user.[6] On top of that, homes sold at foreclosure auctions, especially in low-income areas, remain vacant at much higher rates than homes sold in arms-length transactions between willing buyers.[7]

This period of extended vacancy, sometimes beginning even before the foreclosure is filed, provides ample opportunity for homes to fall into substantial disrepair due to lack of maintenance or vandalism (including homes stripped of metal to sell for scrap). The more damaged the home, the less it is worth, and the more likely it will be abandoned. This deterioration likely contributes to the fact that a substantial portion of property sold out of REO sells for only a fraction of its prior estimated market value.[8]

This pattern—foreclosure leading to prolonged vacancy, and sometimes abandonment—might seem to suggest that preventing foreclosures is the best way to combat abandonment. But this does not appear to be the case: the majority of vacant and abandoned properties have not been through a recent foreclosure.[9] Recognizing that low-value property, foreclosure, vacancy, and abandonment are related but distinct issues, and the macro trends influencing them, is a critical step towards crafting effective policy interventions.

How We Arrived Here

Ohio's current housing market woes are largely driven by two trends. The first is the supply/demand imbalance in housing markets due to decades of new housing construction that has outpaced household growth. The second is the long-term effect of the elevated foreclosure rate in many of Ohio's neighborhoods since well before the recent recession.

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[6] The average time loans spend in delinquency is between 6 and 14 months, depending on how you measure delinquency. If you start counting from the last time a loan payment is 30 days delinquent (meaning a second payment is missed and it will transition to 60 days delinquent), the average time is six months. If you start counting the first time a loan payment is thirty days delinquent (though many of these become current again), the average is 14 months.

[7] Stephan Whitaker, "Foreclosure-Related Vacancy Rates," Federal Reserve Bank of Cleveland Economic Commentary No. 2011-12 (2011) (demonstrating that foreclosures in higher-poverty areas, which tend to be in the central city, remain vacant after foreclosure at a much greater rate than foreclosures in lower-poverty areas, which tend to be in the outer-ring suburbs).

[8] Thomas J. Fitzpatrick IV and Stephan Whitaker, "Overvaluing Residential Properties and the Growing Glut of REO," Federal Reserve Bank of Cleveland Economic Commentary No. 2012-03 (2012); and Claudia Coulton, Michael Schramm, and April Hirsh, "Beyond REO: Property Transfers of Extremely Distressed Prices in Cuyahoga County, 2005-2008," Case Western Reserve University, Mandel School of Applied Social Sciences, Center on Urban Poverty and Community Development.

[9] For example, see Stephan Whitaker and Thomas J. Fitzpatrick IV, "The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes," Federal Reserve Bank of Cleveland Working Paper no.11-23r (2011) (noting that the number of vacant and tax-delinquent properties in Cuyahoga County far exceeds the number of recent foreclosures).

The Supply/Demand Imbalance in Housing Markets

Every one of Ohio's largest MSAs has more housing units than households to occupy them, a trend almost always exacerbated in the central city.[10] The figure below illustrates the ratio of total housing units to total households in 2010. A ratio greater than one means there are more housing units than households to occupy them. Each MSA is divided between its central county (the one containing the central city) and its surrounding counties. In most cases, the central county ratio is higher than the surrounding county ratio because households tend to move 'up and out' of the older housing stock in central cities into newer housing stock in suburbs and exurbs.[11] In that sense, the excess supply of housing in central cities (and thus their counties) is less likely to be absorbed by future households than the excess supply of housing in surrounding counties is, due to the housing stock being older, and thus closer to the end of its life cycle, and the fact that households are migrating away from central cities.

Ratio of Total Housing Units to Total Households in 2010
Central County vs. MSA excluding the Central County

Source: Haver Analytics and U.S. Census Bureau (CenStats USA Counties database)

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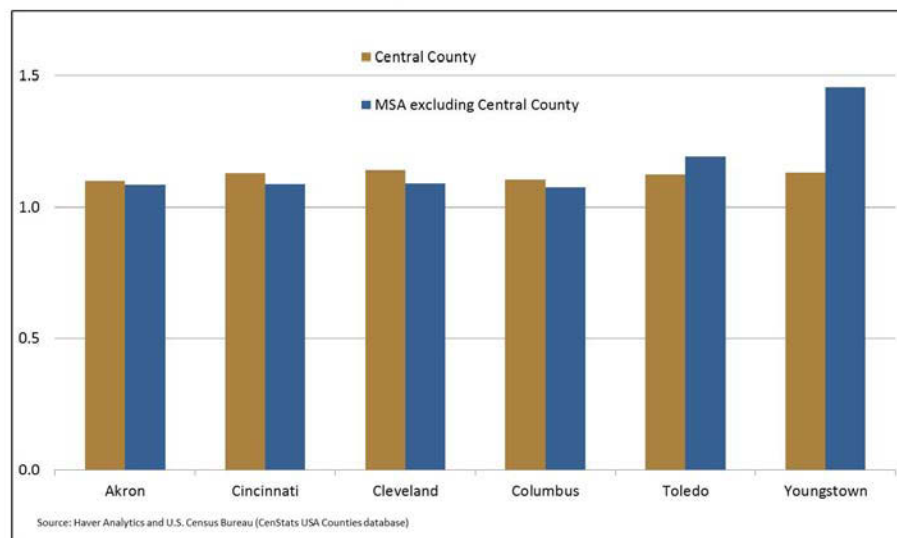
[10] Generally, depopulation tends to happen most rapidly in the urban core. See Kyle Fee and Daniel Hartley, "The Relationship between City Center Density and Urban Growth or Decline," Federal Reserve Bank of Cleveland Working Paper No. 12-13 (2013) (In the Cleveland MSA from 2000 to 2010, for example, population density declined most substantially in the central city, while some suburbs saw increases); and Kyle Fee and Daniel Hartley, "Urban Growth and Decline: The Role of Population Density at the City Core," Federal Reserve Bank of Cleveland Economic Commentary No. 2011-27 (2011).

[11] Thomas Bier and Charlie Post (2006). "Vacant the City: An Analysis of New Homes v. Household Growth," in Alan Berube, et al. (ed.) *Redefining Urban and Suburban America* Washington, D.C. The Brookings Institution.

Difference Between Total Housing Units and Total Households in 2010
Central County vs. MSA excluding Central County

Source: Haver Analytics and U.S. Census Bureau (CenStats USA Counties database)
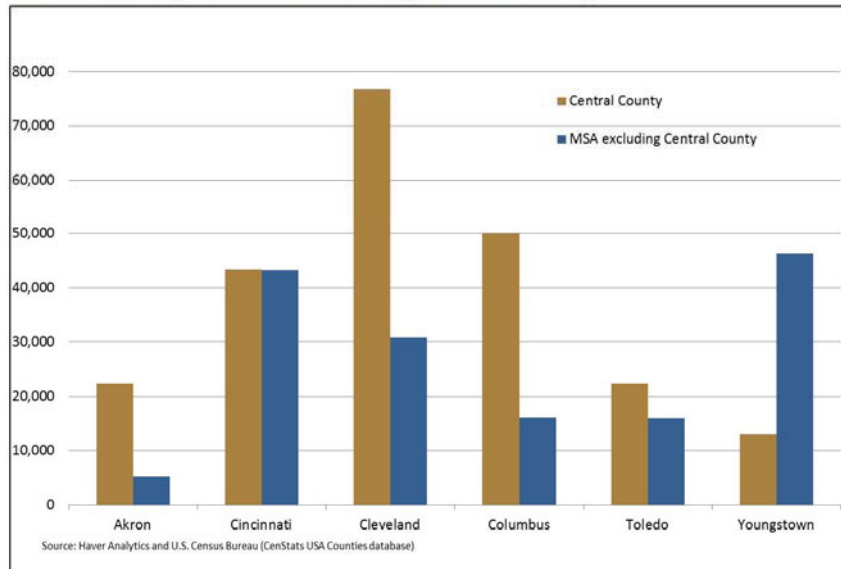
The ratios are useful for illustrating the trend across counties and MSAs, but the raw numbers give a better sense of the size of the supply/demand imbalance. The above graph illustrates the excess supply of housing units relative to households in the central and surrounding counties of Ohio's largest MSAs in 2010. It demonstrates, for example, why Cleveland is well known for abandoned property: In 2010 Cuyahoga County, home to the central city of Cleveland, had more than 70,000 more housing units than it had households. It is worth noting that in areas with very large numbers of students not living in dorms, such as Cincinnati (Hamilton County) and Columbus (Franklin County), the estimate of the excess number of housing units to households may be overstated due to the difficulty of counting students. But community development practitioners report problems with vacancy and abandonment, albeit to a lesser extent, in those areas as well.

Change in Housing Units & Households in Ohio, 1980-2010

Central County: (1980-2010)						
	Akron	Cincinnati	Cleveland	Columbus	Toledo	Youngstown
New Building Permits (total units)	61,976	68,828	71,264	211,864	42,090	14,746
Total Change in Households	32,931	11,707	-18,422	154,418	8,028	1,378
Change in Total Housing Units	44,743	34,042	25,126	179,949	17,642	3,250

MSA excluding Central County: (1980-2010)						
	Akron	Cincinnati	Cleveland	Columbus	Toledo	Youngstown
New Building Permits (total units)	18,570	237,696	114,603	95,057	29,991	22,173
Total Change in Households	18,008	200,932	91,633	98,982	20,519	5,226
Change in Total Housing Units	19,942	224,711	106,138	107,376	24,582	12,031

This supply/demand imbalance is the result of a long-running trend. Ohio has long been building more housing units than its households can fill. From 2000 to 2010, 175,000 more housing units were built than households formed in Ohio. The charts above illustrate these trends since 1980 in Ohio's largest MSAs. In both the central and surrounding counties, more new housing units were constructed than new households formed.

This supply/demand imbalance also helps explain why Ohio's largest MSAs did not see much housing price appreciation during the pre-recession boom experienced by the nation, but are now experiencing price declines. During the boom, the large availability of housing stock in Ohio put downward pressure on prices, while localized demand and the modest housing price appreciation that was experienced at the MSA level encouraged the construction of new housing in suburban and exurban markets. During the bust, this supply/demand imbalance has continued placing downward pressure on housing prices. Still, the overall price movements at the MSA level during this period were muted relative to national movements.

Ohio MSA Housing Price Index Values

Source: Federal Housing Finance Agency, FHFA
shading indicates recessions.
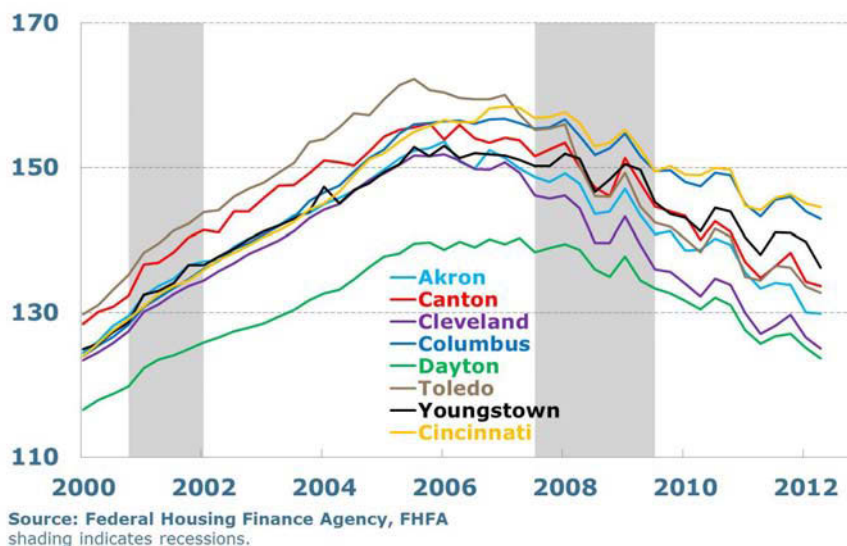
Even so, some neighborhoods have experienced quite large price movements. The housing stock in the central city and inner-ring has experienced greater price declines than the MSA-level measure suggests.[12] This is partially driven by the steadily growing supply of

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[12] Francisca G.-C. Richter and Youngme Seo, "Inter-Regional Home Price Dynamics through the Foreclosure Crisis," Federal Reserve Bank of Cleveland Working Paper No. 11-19 (2011) (finding price declines were steeper in the central city and inner-ring suburbs than area averages); and Thomas J. Fitzpatrick IV and Mary Zenker, "Municipal Finance in the Face of Falling Property Values," Federal Reserve Bank of Cleveland Economic Commentary no. 2011-25 (2011) (finding that in 2010 homes in the central city and inner-ring suburbs of Cuyahoga County (home to Cleveland) sold for 30% to 50% of their tax-assessed values, while homes in Cuyahoga County (containing those areas) sold for 82% of their tax-assessed values).

legacy housing relative to the current population's demand, which puts downward pressure on prices.[13] But the price difference is also driven by unoccupied housing that has fallen into severe disrepair and eventually has been abandoned, often becoming an eyesore that further lowers surrounding property values.[14] The differences between housing markets in the central city and some inner-ring suburbs and those in outer-ring suburbs can be seen in much of the housing market research conducted on weak markets: In general, home prices are lower and vacancy rates higher in older industrial central cities than in their suburbs.[15]

Foreclosure Measurement

Although vacancy and abandonment are caused by aging housing and a supply/demand imbalance in housing markets, recent increases in foreclosures have only compounded these problems. There are many ways to measure foreclosures. Here we focus on two statistics. The first is the foreclosure inventory (sometimes described as the "foreclosure rate"). Foreclosure inventory is a ratio of all of the residential home mortgage loans currently in the foreclosure process (between foreclosure filing and foreclosure auction) to all residential home loans. This tells us the share of loans that is currently in foreclosure. The second measure is the 90-day delinquency rate. This is the share of residential home loans that has missed at least three consecutive payments, but upon which the lender has not yet foreclosed. Once a loan becomes 90 days delinquent, the delinquency is rarely cured (through payment of the arrearage or a loan modification, for example), and these loans tend to transition to foreclosure. Together, these measures give us an idea of not only current foreclosure activity, but probable future activity.

We look at prime mortgages and subprime mortgages separately. We do this to illustrate the issues Ohio was having before and after the recent housing crisis with these

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[13] Glaeser, Edward L., Matthew E. Kahn, and Jordan Rappaport, "Why Do the Poor Live in Cities? The Role of Public Transportation," Journal of Urban Economics 63(1): 1-24 (2008).

[14] Daniel Hartley, "The Effect of Foreclosures on Nearby Housing Prices: Supply or Disamenity?" Federal Reserve Bank of Cleveland Working Paper, no. 10-11R (2010).

[15] For example, see Francisca G.-C. Richter and Youngme Seo, "Inter-Regional Home Price Dynamics through the Foreclosure Crisis," Federal Reserve Bank of Cleveland Working Paper No. 11-19 (2011); Stephan Whitaker and Thomas J. Fitzpatrick IV, "The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes," Federal Reserve Bank of Cleveland Working Paper No.11-23r, Figure 2, p.39 (2011) (mapping the median home sales price in Cuyahoga County, Ohio); Stephan Whitaker, "Foreclosure-Related Vacancy Rates," Federal Reserve Bank of Cleveland Economic Commentary No. 2011-12 (2011) (demonstrating that foreclosures in higher-poverty areas, which tend to be in the central city, remain vacant after foreclosure at a much greater rate than foreclosures in lower-poverty areas, which tend to be in the outer-ring suburbs); and Thomas J. Fitzpatrick IV and Mary Zenker, "Municipal Finance in the Face of Falling Property Values," Federal Reserve Bank of Cleveland Economic Commentary no. 2011-25 (2011) (noting that housing in outer-ring suburbs tends to hold its value relative to county-estimated taxable market values).

different mortgage products. It is important to note that the vast majority of home loans are prime, but the exact ratio of prime loans to subprime loans changes over time. We also only look at 16-30 year amortizing loans, as loans amortizing over less than 15 years are a very small portion of the market from 2000 to 2012.

What is clear is that Ohio has been suffering from elevated levels of foreclosure since well before the national housing crisis and subsequent recession, which began in late 2007. Ohio saw an early jump in subprime mortgage foreclosure rates in 2002 (when more than 6 percent were in foreclosure), but these rates did not peak until nearly a decade later (when nearly 20% of subprime loans were in foreclosure). While the subprime foreclosure inventory has dropped from its peak, it still remains uncomfortably high at more than 12 percent. Subprime 90-day delinquency rates also remain high, despite a noticeable drop from their peak in 2010. Beginning in 2006, our data covers a large portion of the market—over 80%. According to this sample (which underestimates the total), there were an average of 1,600 subprime loans at least 90 days delinquent and 3,140 subprime loans in foreclosure in any given month in 2006. By 2012, there were an average of 4,200 subprime loans at least 90 days delinquent and 6,160 subprime loans in foreclosure in any given month. Declining rates of 90-day delinquency suggest that lenders are beginning to work through their backlogs, but they remain high, suggesting that subprime loan foreclosures may remain elevated in the coming years.

Ohio Conventional Subprime Loans

Source: LPS Radar
Shading indicates recessions.

Ohio's inventory of prime loans in foreclosure peaked in early 2012 at more than 4 percent. Since then the inventory has dipped below 4 percent, but still remains elevated compared to pre-recession levels of less than 1 percent. Using our sample to give an estimate of the magnitude of the problem, beginning in 2006 there were an average of 9,260 conventional prime loans at least 90 days delinquent and more than 9,580 loans in foreclosure in any given month. In 2012, the monthly average had grown to 32,070 conventional prime loans at least 90 days delinquent and more than 40,480 prime loans in foreclosure. Recently, the share of prime loans in 90-day delinquency has increased, although it remains below its 2010 peak. However, it seems to be diverging from foreclosure starts. This strongly suggests that elevated prime foreclosure rates will continue in Ohio for the foreseeable future.

Ohio Conventional Prime Loans

Source: LPS Radar
Shading indicates recessions.

Another factor that may contribute to elevated 90-day delinquency rates is selective foreclosure, where a lender decides not to foreclose on a property because it would cost more to foreclose than could be recovered from the sale of the property. This naturally happens most often when properties are of very low value to begin with. The negative consequence from a decision to *not* foreclose is that remaining liens inhibit redevelopment by substantially increasing acquisition costs. Compounding the problem is that selectively unforeclosed, low-value properties may be geographically concentrated. Research by the U.S. Government

Accountability Office suggests this situation is most prevalent in markets with extremely distressed housing prices, such as Cleveland.[16]

Our research and outreach suggest that in high-poverty housing submarkets, lenders and servicers are selectively foreclosing on the "best of the worst" properties.[17] Before a recent change in law requiring sheriffs to do it, lenders would not always take the steps necessary to become the new owner of record of low-value foreclosed property. This resulted in local governments being unable to identify the actual owner of a property when they needed to contact that owner to address a code violation or property tax bill, for example. There have also been reports of lenders not triggering foreclosure auctions after receiving the foreclosure judgment on a low-value property. In other cases lenders seek to vacate foreclosure judgments rather than take possession of the low-value property. These situations may result in the borrower's moving out of the home and ceasing maintenance and tax payments, believing ownership has transferred to the lender. Likewise, the lender would not maintain the property or make tax payments, as it is not the owner. Because the economics create an incentive to not take possession of a property, and because there are now many local efforts to force the completion of the foreclosure process once it has started, it makes sense that some lenders would simply not foreclose at all. The Board of Governors of the Federal Reserve System recently released guidance for lenders who choose to discontinue foreclosure proceedings.[18] Unfortunately, these practices impact only homes that are already in the foreclosure process, and do not address the problem created by the decision to *not foreclose*.

In sum, Ohio's housing markets face some unique challenges, including population loss, low-value legacy housing, selective foreclosure, and spatially concentrated abandonment. Solutions to address these challenges are necessarily different from those in states where the housing boom and bust were more pronounced and where population has increased. In the next section of this report, we walk through five key policy ideas whose impact on Ohio housing markets could be especially beneficial.

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[16] Government Accountability Office, "Additional Mortgage Servicer Actions Could Help Reduce the Frequency and Impact of Abandoned Foreclosures," GAO-11-93 (2010), available at http://www.gao.gov/products/GAO-11-93.

[17] Stephan Whitaker and Thomas J. Fitzpatrick IV, "The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes," Federal Reserve Bank of Cleveland Working Paper No.11-23r (2011) (Noting the positive coefficient on foreclosures in high-poverty areas).

[18] Board of Governors of the Federal Reserve System, "Guidance on a Lender's Decision to Discontinue Foreclosure Proceedings" (July 11, 2012), available at http://www.federalreserve.gov/bankinforeg/srletters/sr1211.pdf.

Policy Considerations

Ohio's troubled housing sector is only one component of the state's overall economy. Additionally, there are national and local forces that operate independently of state policy and have a substantial impact on Ohio's housing sector.[19] Nonetheless, there are real short- and long-term gains that can be realized by addressing the issues that face Ohio's housing markets. The policy actions we focus on in this section fall into two categories: 1) addressing the foreclosure process, and 2) addressing the low-value property problem. We also comment on the importance of quality data in helping to inform the decisions of market participants. To help illustrate how the challenges discussed above and the policy considerations discussed below tie to the path homes take to vacancy and abandonment, please review the figure in Appendix A, titled "Policy Considerations for Improving Ohio's Housing Market."

Addressing the Foreclosure Process, Part One:
A Foreclosure Fast-track for Vacant and Abandoned Properties

Between 2007 and 2012 in Ohio, the average time it took for a residential home loan to go from an uncured 30-day delinquency through foreclosure auction was between 15.5 and 23.5 months.[20] The judicial foreclosure process has its strengths, but speed is not one of them. It takes much longer on average to foreclose on a mortgage in states like Ohio that require judicial foreclosure than in states that do not. This is due to a number of factors, including statutorily prescribed periods (the time the borrower is given to respond to a foreclosure filing, for example), the additional opportunity that borrowers have to challenge the lender's right to foreclose in court, overburdened court dockets, and the numerous steps in the process that create opportunities for bottlenecks. These factors arguably are counterbalanced by the protection afforded to consumer interests and the greater potential for uncovering illegal foreclosure practices.[21]

But there are cases when these protections create a cost with no corresponding benefit—a deadweight loss. The costs of foreclosing on a vacant and abandoned property are numerous: legal fees associated with the time spent on the judicial foreclosure process, for example; physical damage done to the property by the elements or looters; additional crime; and the damage done to surrounding property values. When the owner's interest in the

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[19] For example, local governments utilize code enforcement and foreclosure or vacancy registries to help manage housing blight, and federal subsidies impact local housing construction and demolition activities.
[20] According to sample data obtained from Lender Processing Services from 2007-2012 and the Bank's calculations.
[21] One of the earliest judicial opinions in the recent crisis identifying unlawful foreclosure practices was in Ohio. In re Foreclosure Cases, 2007 WL 3232430 (N.D. Ohio, Oct. 31, 2007).

property has been abandoned and the property is already vacant, the extra protections offered by judicial foreclosure do not benefit anyone.

The Ohio legislature has already mitigated these deadweight losses in the case of property tax foreclosure. In 2006, Ohio's General Assembly passed House Bill 294, which allows for an accelerated tax foreclosure when the property is deemed vacant and abandoned.[22] This provision has been a boon to municipal efforts to gain control of vacant and abandoned properties and return them to productive use. A fast-track provision for non-tax foreclosures does not yet exist in Ohio. It would help eliminate these deadweight losses.

Colorado, Illinois, Indiana, Kentucky, New Jersey, and Wisconsin have enacted laws that expedite the process for non-tax foreclosures if property is vacant and abandoned.[23] Most of these bills and statutes apply only to residential real property. They authorize sale of the property within 35 to 120 days after a court determination that it is vacant and abandoned, substantially shortening the ordinary time periods. Several of the statutes also shorten the statutory redemption period—the time after a completed foreclosure during which a borrower may repay the foreclosed debt and retake the property—for abandoned property.[24] These experiences suggest that a carefully crafted law could significantly reduce the foreclosure timeline for vacant and abandoned homes in Ohio, perhaps by as much as one-half.

It is not easy to define abandonment in a way that expedites foreclosure but does not create an opportunity for abuse. Some states allow one or two circumstances—such as overgrown vegetation or boarded-up doors—to determine whether a property is officially vacant or abandoned. Other commonly used circumstances include accumulation of trash, disconnection of utilities, absence of window coverings or furnishings, police reports of vandalism, unhinged doors, multiple broken windows, uncorrected violations of housing codes, and a written statement clearly expressing the debtor's intent to abandon the property. Some states require a single observation of the circumstance, while others require observation over a period of time. Buildings undergoing construction, buildings unoccupied seasonally, and property used in agricultural production are often given exemptions.[25] Two of the statutes require clear and convincing evidence of abandonment.[26] (Pragmatically, this means lenders have to do more to prove abandonment than ordinarily required.)

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[22] Ohio Rev. Code §323.65 *et seq*.
[23] Colo. Rev. Stat. §§ 38-38-901 *et seq*. (2010); 735 ILCS 5/15-1108, 15-1200.5, 15-1200.7, 15-1219, 15-1504, 15-1504.1, 15-1505, 15-1505.8, and 15-1508 (2013); Ind. Code Ann.. §§ 32-29-7-3 and 32-30-10.6-1 et seq. (2012); Ky. Rev. Stat. § 426.205 (2012); N.J. Stat. § 2A:50-73 (2013); and Wis. Stat. §846.102 (2012).
[24] Minn. Stat. § 582.032 (2010); N.J Stat. § 2A:50-63 (1995), and Wash. Rev. Code. §61.12.093 (2012).
[25] Minn. Stat. § 582.032 (2010); N.J. Stat. § 2A:50-73 (2013); and Wash. Rev. Code. § 61.12.095 (1965).
[26] Colo. Rev. Stat. § 38-38-903(3) (2010) and N.J. Stat. § 2A:50-73 (2013).

Another consideration is who can file a motion or petition to expedite the foreclosure process. Current laws fall along a spectrum: Colorado's statute is more restrictive, limiting those who may request the accelerated process to the holder of a senior lien on a residential mortgage loan.[27] Indiana's law is more expansive, allowing a government official to intervene in foreclosure proceedings to establish abandonment.[28] This provision recognizes the impact of abandoned property on its surrounding neighborhood and the larger community.

Speeding up foreclosures raises important due process considerations for homeowners. But in cases of abandonment, a growing number of state legislatures have judged the benefits as outweighing the potential costs. Borrowers who have truly walked away from their homes do not benefit from a long and protracted foreclosure process. Nor do lenders, whose ability to take possession of and sell the property is unnecessarily impeded. Furthermore, the community and market impact of delay is significant. Fast-tracking the foreclosure to transfer property into the hands of a new owner could greatly benefit the lender, community, and market without incremental cost to the borrower. However, it is up to policymakers to determine the best way to respond to these issues in Ohio.

Addressing the Foreclosure Process, Part Two:
Elimination of Minimum-Bid Requirements

State law requires that the minimum bid at the first foreclosure auction on a foreclosed property be set at two-thirds of the property's appraised value. Community development practitioners report that this provision is an effective way to keep harmful speculators (discussed below) out of the market, because it removes the potential for ultra-cheap purchases at auction.

Unfortunately, minimum bids may have the unintended consequence of pricing some helpful property rehabbers out of the market. The median loss taken by purchasers at foreclosure auctions who sell their property the following quarter is 35 percent.[29] This makes it more likely that lenders will purchase properties at auction because they need not expend new cash to do so—they can simply credit bid, based on the unpaid loan amount they were due. Removing the minimum-bid requirement would open foreclosure auctions to more

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[27] Colo. Rev. Stat. §§ 38-38-902(1)(a) and 38-38-901(2) (2010).
[28] Ind. Code § 32-30-10.6-3(b) (2012).
[29] Thomas J. Fitzpatrick IV and Stephan Whitaker, "Overvaluing Residential Properties and the Growing Glut of REO," Federal Reserve Bank of Cleveland Economic Commentary No. 2012-03 (2012).

property investors and helpful rehabilitators, assuming that lenders adjust their bidding strategies.

Provided unhealthy speculation can be prevented, removing the minimum bid requirement would be more efficient than the status quo in two ways: First, it would lower the cost of moving property back into productive hands by eliminating the middle man and associated transaction costs. Instead of the bank buying the property and then selling it to an end-user, the end-user would have a better chance of directly buying the property at auction. Second, the amount of time it takes from foreclosure to reoccupancy by an owner or tenant would be reduced, thus shortening the time property sits vacant in neighborhoods.

The trade-off, as noted, is that eliminating the minimum bid requirements would create opportunities for additional unhealthy speculation. We discuss a policy direction that could more finely screen out speculative purchasers below.

Addressing the Low-Value Property Problem, Part One:
Harmful Speculation on Low-Value Property

The abundance of low-value residential property in Ohio's central cities invites housing speculation. We classify "unhealthy speculators" as those who invest nothing, or as little as possible, in maintaining the properties they purchase and often avoid paying property taxes. This type of speculator exists in markets throughout Ohio, and most local housing and code enforcement officials can provide examples. These speculators often own multiple properties, which they hold either in the hope of future home price appreciation or to rent out to tenants. In either case, the property is rarely maintained, often in violation of building and housing codes, and sometimes property taxes are not paid.

To get a better sense of who the unhealthy speculators are, we broke down purchasers into three categories: 1) large investors (who purchased or sold property 11 or more times in a two year period), 2) small investors (four to 10 times), and 3) individuals (three or fewer times). Lenders and Government Sponsored Enterprises (Fannie Mae, Freddie Mac, the FHA and VA) were examined separately. Our study encompassed vacancy rates and tax delinquency of properties owned by these different types of purchasers in Cuyahoga County between 2007 and 2009. Looking only at foreclosed homes sold by lenders, we found that homes purchased by large investors remained vacant at more than twice the rate as homes

purchased by individuals.[30] Large investors were more likely than small investors or individuals to allow their property to become property tax-delinquent after purchase, or to allow the pre-existing property tax delinquency to grow. They were also the least likely to pay past-due property taxes after purchase. And these patterns all become more pronounced with extremely low-value properties (those selling for $10,000 or less).

There is more than one way to address unhealthy speculation. Vigorous housing code enforcement may help, especially when used strategically. The problem with housing code enforcement is that it is a labor-intensive, expensive process. And if investors can sell their properties to another investor, a shell company, or an unsuspecting purchaser before they can be brought to court over the code violation, code enforcement becomes less effective. It appears that some large investors are aware they can sell properties to one another and avoid or delay legal repercussions. Eight out of 10 times, large investors sell low-value, tax-delinquent properties to other large investors, and the property-tax delinquency grows.[31] Additionally, there are times when it can be impossible to bring owners into court. Sometimes they are not registered to do business in the State of Ohio, nor is the company name they are operating under registered in their alleged state of incorporation.

There are two rather simple ways to address this problem. The first is to require that corporate entities purchasing property at foreclosure sale be registered to do business in the State of Ohio before the property can transfer to them. The Ohio Secretary of State's website has a searchable database of all registered businesses. Thus, determining whether the potential purchaser is registered in Ohio should not substantially delay the purchase and sale of homes. Although this will not make all unhealthy speculators comply with local codes, it should enable enforcement authorities to know where to find owners who are not maintaining their properties in accordance with the law, thus making local efforts such as code enforcement more effective.

The second change that could more directly address the problem would be a requirement that taxes be paid and the property brought up to code before it could be transferred to a new owner. This ought to provide a powerful incentive for purchasers to properly maintain their homes and pay property taxes. Similar laws already exist in a number

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[30] 31% of the properties purchased by investors were vacant, while only 15% of the properties purchased by individuals were vacant. O. Emre Ergungor and Thomas J. Fitzpatrick IV, "Slowing Speculation: A Proposal to Lessen Undesirable Housing Transactions," *Forefront* Vol. 2 No. 1 (2011).
[31] O. Emre Ergungor and Thomas J. Fitzpatrick IV, "Slowing Speculation: A Proposal to Lessen Undesirable Housing Transactions," *Forefront* Vol. 2 No. 1 (2011).

of states.[32] Interestingly, properties that are purchased with a home loan already have a similar system in place. Lenders want to make sure there will not be any outstanding charges that could become liens that supersede their mortgage, so they make sure any that exist are corrected before they lend against the property.

Crafting this law in a way that has minimal negative unintended consequences is no easy task. Even well-meaning property owners may occasionally fall behind on property tax payments or fail to maintain their homes in accordance with the local housing code.

Fortunately, there are a number of ways negative unintended consequences can be avoided. For example, the law could be crafted in such a way that counties would have to opt-in. That way, the law would only be in effect in counties where harmful speculation was a problem, and counties could wait to adopt it until they have the infrastructure to efficiently check for outstanding code violations or back taxes. A number of exemptions may make sense to facilitate the voluntary transfer of property to entities capable of caring for it, such as Community Improvement Corporations,[33] public entities, County Land Reutilization Corporations (land banks),[34] and similar entities. It may also make sense to allow transfer when the purchasing party has agreed to pay past-due taxes or make necessary repairs according to a mutually agreeable schedule. An exemption may also make sense when transfers are truly involuntary, such as in cases involving death, divorce, bankruptcy, or foreclosure. Finally, homes purchased with credit already have this requirement in place, and could be exempted.

Addressing the Low-Value Property Problem, Part Two:
Expanding Access to Land Banks

Ever since the original enabling legislation passed in 2009, Ohio's County Land Reutilization Corporations, or modern land banks, are proving to be an effective and efficient tool to address vacant and abandoned properties. Land banks are nonprofit entities formed by county governments with statutorily defined missions to acquire vacant and abandoned housing, remediate it, and put it back into productive use. They operate independently, are overseen by boards of directors composed primarily of public officials, and enjoy a stable revenue

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[32] For example, Maryland, Minnesota, and South Dakota all have similar laws in place. Md. Code, Real Property §3-104 (2012), Minn. Stat. §272.12 (2008); S.D. Codified Laws §§10-21-37 & 38 (1999).
[33] Organized under Ohio Revised Code § 1724.01 *et seq.*
[34] Created under §5722.01 *et seq.*

stream—all of which gives them the flexibility, accountability, and capability to tackle the sometimes enormous problem of vacant and abandoned housing.[35]

The Cuyahoga County Land Bank, the first of its kind in Ohio, now acquires, on average, more than 100 vacant and abandoned properties a month. Since it acquired its first properties in September 2009, the land bank has acquired more than 2,000 vacant and abandoned properties, facilitated the rehabilitation of nearly 500 properties, and demolished more than 1,000 properties. Though property demolition may sound undesirable, it can be a very effective strategy where a substantial oversupply of housing has led to significant vacancy and abandonment.

Ohio's original enabling legislation allowed only Cuyahoga County to incorporate a land bank. In 2010 the General Assembly responded to the requests of other communities who wanted access to land banking and altered the population requirement to allow 41 additional counties to create land banks.[36] To date 15 counties have established, or are in the process of establishing, modern land banks to address vacancy and abandonment. Many of these counties are much smaller than Cuyahoga County, demonstrating that land banks can be effective tools even when operating on much smaller scales. While not every county in Ohio needs a land bank, removing the population requirement would allow each county access to a tool to combat vacancy and abandonment, which they could use should the need arise.

Data Collection and Standardization

Housing data in Ohio is almost literally all over the map—there is no statewide standard, and different counties store data differently. We learned this lesson firsthand when trying to gather data on housing transactions and characteristics, parcel lists, and property tax information in electronic form. Storage practices seem driven by inertia and budget constraints.

This poses a large problem. Without standardized, electronically stored data, it is difficult for market participants to fully evaluate programs and opportunities. Data adds an important dimension to the decision making process by framing an individual's market experience. This can be seen clearly in Cuyahoga County, where Case Western Reserve

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[35] For a general description of Ohio's land banks based on the bill creating them (but not accounting for amendments since then) see Thomas J. Fitzpatrick IV, "Understanding Ohio's Land Bank Legislation," Federal Reserve Bank of Cleveland Policy Discussion Paper No. 25 (2009).

[36] Current law allows any county with a population of greater than 60,000 according to the most recent decennial census to incorporate a land bank. Ohio Rev. Code § 1724.04 (2010).

University's Center on Urban Poverty and Community Development maintains a free and publicly accessible social and economic data system.[37] The Northeast Ohio Community and Neighborhood Data for Organizing, or NEO CANDO, data system is the product of a longstanding collaboration among nonprofit organizations, foundations, government agencies, and the university. Housed in a single location, NEO CANDO regularly acquires, standardizes, and updates data from federal, state, and local governments, which users can download or access through its website.

The benefit of making this data accessible in an electronic format is that it helps the private, public, and nonprofit sectors understand local market conditions and make business decisions, craft policy, and undertake revitalization efforts. Private enterprise uses NEO CANDO to download clean, electronic local government data to use in their analytics. Local governments and community development practitioners use NEO CANDO in a variety of ways—from deciding where to focus revitalization efforts to applying for grants. Researchers also use it to better understand local market conditions in a way that would not otherwise be possible. Much of the data used in the research cited in this paper was accessed through NEO CANDO. Data-driven decision making leads to more efficient allocation of resources, and easily accessible electronic data is a tool that benefits everyone.

A first step toward better data would be to consult with businesses, local governments, housing economists, community development practitioners, and city planners to identify the types of data and storage methods needed to enable more applied housing research. This effort could lead to a template for local governments to follow, and perhaps provide incentives for adopting the template. While this may not result in NEO CANDO-like systems being set up across the state, it will nudge local governments towards providing the standardized, electronic data necessary for market participants to make better-informed decisions.

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[37] Data is made available via the internet, at http://neocando.case.edu/.

Conclusion

The housing boom and bust has played out differently throughout the country. Difficulties in dealing with foreclosed, vacant, and abandoned properties have hindered the pace of the economic recovery. The pace of recovery can also be importantly affected by the statutes that pertain to distressed properties within the states. The states have opportunities to alter these frameworks in ways that can enhance public welfare.

With the benefit of research and data analysis, we have identified some opportunities for Ohio to improve its ability to deal with foreclosed, vacant, and abandoned properties. This report has observed that Ohio's housing troubles are the result of forces that have been at work long before the recent financial crisis and recession. The issues are numerous and interconnected, and can only be addressed through sustained and carefully considered programs.

Understanding the tradeoffs inherent in any policy is a good first step. We hope that this report provides the analysis and information necessary to help continue efforts to restore strength and stability to Ohio's housing sector.
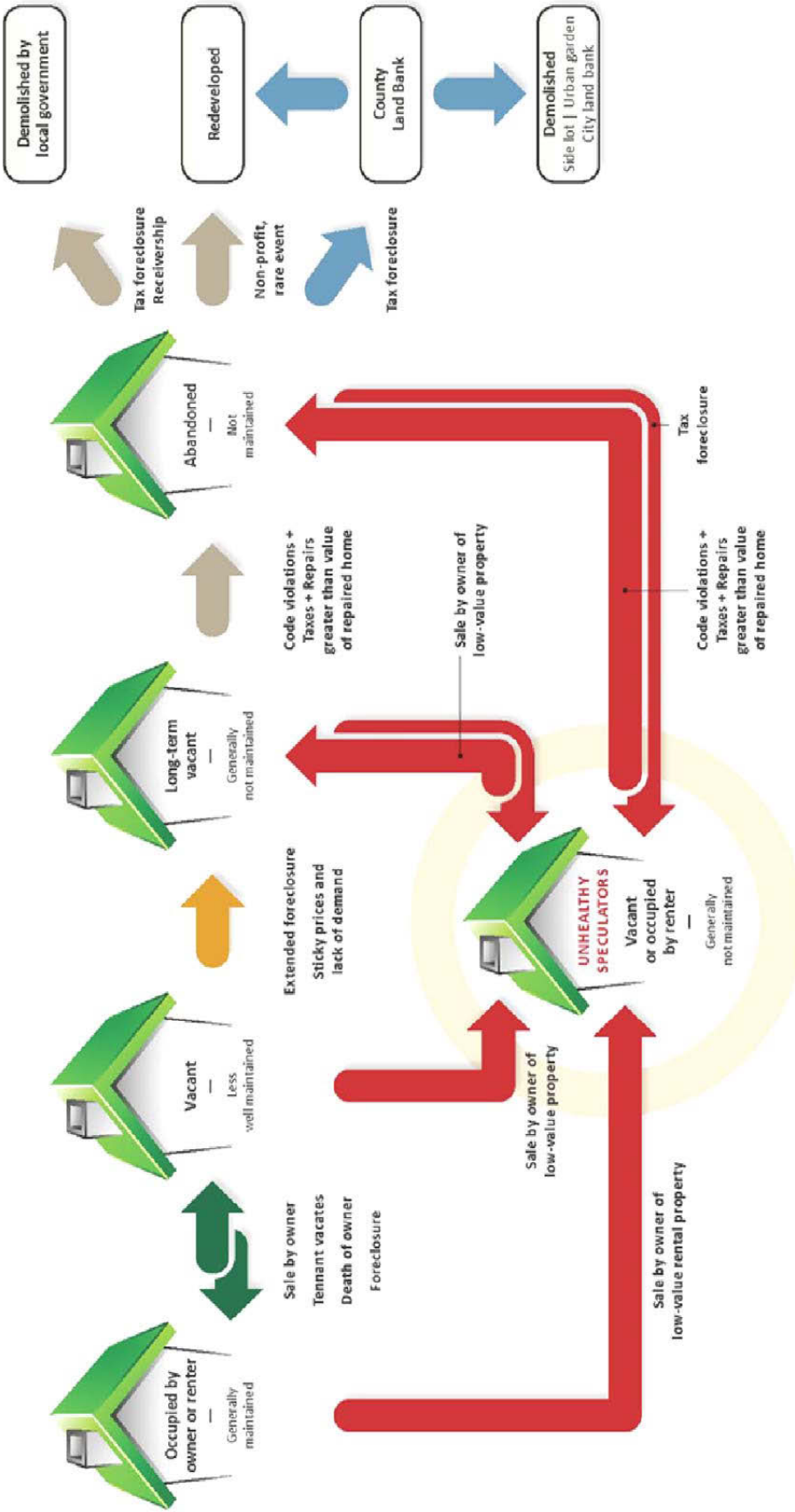
Appendix A

POLICY CONSIDERATIONS FOR IMPROVING OHIO'S HOUSING MARKET

Appendix B- Supporting Research

The following publications, cited in the preceding report and included here in their entirety, are products of housing-related research conducted by the Federal Reserve Bank of Cleveland over a multi-year period before, during, and after the housing crisis of 2008.

Policy Discussion Papers, published by the Research Department of the Federal Reserve Bank of Cleveland from 2000 through 2010, provide in-depth analysis on monetary and fiscal policy.

> **Understanding Ohio's Land Bank Legislation** (Fitzpatrick, Thomas J. IV.; 2009)

Forefront, the Federal Reserve Bank of Cleveland's policy journal, is devoted to critical economic and banking issues facing both the region covered by the Fourth Federal Reserve District and the nation.

> **Slowing Speculation: A Proposal to lessen Undesirable Housing Transactions** (Fitzpatrick, Thomas J. IV and Ergungor, O. Emre; 2011)

Economic Commentaries published by the Federal Reserve Bank of Cleveland provide deep analysis of economic issues.

> **Foreclosure-Related Vacancy Rates** (Whitaker, Stephan; July, 26, 2011)

> **Municipal Finance in the Face of Falling Property Values** (Fitzpatrick, Thomas J. IV. and Zenker, Mary; December 6, 2011)

> **Urban Growth and Decline: The Role of Population Density at the City Core** (Fee, Kyle and Hartley, Daniel; December 21, 2011)

> **Overvaluing Residential Properties and the Growing Glut of REO** (Fitzpatrick, Thomas J. IV. and Whitaker, Stephan; March 15, 2012)

Working Papers are preliminary versions of technical papers containing the results and discussions of current research. They are written for eventual publication in professional journals.

> **The Effect of Foreclosure on Nearby Housing Prices: Supply or Disamenity?** (Hartley, Daniel; September 2010)

> **Inter-Regional Home Price Dynamics through the Foreclosure Crisis** (Richter, Francisca G.-C. and Seo, Youngme; September 2011)

> **The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes** (Whitaker, Stephan and Fitzpatrick, Thomas J. IV.; September 2011)

> **The Relationship between City Center Density and Urban Growth or Decline** (Fee, Kyle and Hartley, Daniel; June 2012)

Understanding Ohio's Land Bank Legislation

By Thomas J. Fitzpatrick IV

Understanding Ohio's Land Bank Legislation

By Thomas J. Fitzpatrick IV

The effects of sustained high rates of foreclosure on numerous areas of Cuyahoga County have thrust land banking to the forefront of recent public policy discussions in Ohio. This *Policy Discussion Paper* seeks to inform those discussions by explaining the state's traditional land banking system and illustrating how the new land banking system, spelled out in Senate Bill 353/House Bill 602 and signed into law January 2009, works.

To contact the author or obtain further information about this research, please e-mail Anne O'Shaughnessy at anne.o'shaughnessy@clev.frb.org or call her at 216.579.2233.

Thomas J. Fitzpatrick IV is a visiting scholar in the Off ce of Policy Analysis at the Federal Reserve Bank of Cleveland. The author wishes to thank those that took time out of their busy schedules to offer questions, comments and guidance on this paper. You are too numerous to name individually, but this paper has greatly benef ted from your input.

POLICY DISCUSSION PAPERS

I.   What Is a Land Bank (and Why Do We Need One)?

Unlike federal land banks, which extend credit to farmers and ranchers, the land banks discussed in this article are typically established as a vehicle for community development and revitalization. A good working definition of a land bank is offered by Frank Alexander, director of the Project on Affordable Housing and Community Development at Emory University School of Law, who describes land banks as "governmental [entities] that [focus] on the conversion of vacant, abandoned, and tax-delinquent properties into productive use."[1] The duties of a land bank generally include assuming the title to tax-delinquent properties, then securing, rehabilitating or demolishing, and transferring those properties to responsible developers or homeowners to ensure the properties are put to use instead of remaining vacant or abandoned.[2] Policymakers are increasingly considering the land bank model to address the problem of vacant and abandoned properties in cities like Cleveland, which has an abundance of vacant housing.

One factor exacerbating the growing number of vacant properties is the high foreclosure rate in Cuyahoga County, which has been described as the epicenter of the foreclosure crisis.[3] The problem of vacancy touches most of Ohio, which a recent study estimated as having more than 15,000 vacant and abandoned buildings and nearly 10,000 vacant and abandoned lots across a handful of cities.[4] In fact, the foreclosure crisis has exacerbated a longer-term trend of increased housing vacancy driven in part by Cleveland's population decline.[5]

Vacant and abandoned properties are not readily absorbed by housing demand in cities that are losing population. In the greater Cleveland metropolitan area, for example, permits for new construction outpaced population growth by nearly 50 percent from 1990 to 2000.[6] Because most of this new growth occurred outside of the city and inner-ring suburbs, those core areas were left with higher concentrations of vacant and abandoned housing.[7] Looking ahead, even after foreclosures return to lower levels, cities like Cleveland will continue to face the challenges of concentrated areas of vacant and abandoned housing.

Why is this issue such a challenge for municipalities? Studies have shown that vacant and abandoned buildings are magnets for criminal activity[8] and that reducing vacancy suppresses criminal activity.[9] Thousands of fires are also reported in vacant structures each year, causing tens of millions of dollars in damage.[10] Vacant and abandoned properties also remain off tax rolls and lower the value of surrounding properties, further eroding the real property tax base.[11] Perhaps most significantly, vacant properties signal that a neighborhood is on the decline.[12] They undermine a neighborhood's sense of community and discourage further investment.[13] Moreover, such disinvestment often spreads across neighborhoods and worsens the overall health of a city.[14] For these reasons, neighborhoods, schools, and city governments bear the greatest costs induced by vacant and abandoned property.[15]

The process of land banking is not intended to replace the operation of private markets, but rather to assist where there is a failure of market conditions.[16] Private markets are not likely to provide an adequate remedy for this problem and in some cases may aggravate it. Private parties have little or no incentive to purchase land when the property taxes owed on the land exceed its fair market value.[17] Similarly, private parties are very unlikely to purchase land with defects on its title, because it is rarely cost-effective to cure title defects.[18] When

land speculators do purchase and hold tax-foreclosed property, cohesive redevelopment plans can be held up or completely prevented. This speculation problem is exacerbated when speculators reside out of state, beyond the reach of local jurisdictions.

An efficient land bank, on the other hand, can help municipalities address the costs borne by neighborhoods, schools, and city governments by working to reduce vacancy and abandonment. For instance, land bank systems can deter harmful land speculation by enabling land banks to obtain title to distressed properties before they are offered to the public. Land bank systems can also deter harmful tax-lien speculation by enabling land banks to purchase tax liens against distressed properties instead of these liens being offered for sale to the public. And land banks can fill an important gap in private markets by purchasing undesirable land and removing defects on the title, a critical function since property without clear title is undesirable to private buyers, who cannot obtain title insurance without clear title. Overall, land banks undertake their tasks with the goal of returning distressed properties to private entities that will put the land to productive use. If no private interest exists for land bank acquisitions, the land can be converted into public green space and donated to municipalities.

II.   Ohio's Traditional Land Banks

Up until January 2009, the Ohio Revised Code only allowed local authorities to establish a type of land bank called a land-reutilization program. These land banks typically do not pursue tax foreclosures or otherwise take an active role in addressing the problem of vacant and abandoned properties. Instead, they are commonly used to hold properties, usually vacant lots, in inventory. Established in an earlier era to address a different problem, these passive land banks may not be adequately equipped to address the problem facing Ohio today. This section will explore the history of Ohio's traditional land banking system and illustrate why it is not suited to address the modern vacancy and abandonment problems facing communities across the state.

A. History of Land Banks in Ohio

Passive land banks, or those that simply hold properties for future use, were designed in 1976 to address widespread tax delinquency. In the mid 1970s, Cleveland's population declined significantly, which contributed to more than 11,000 parcels of land becoming tax-delinquent.[19] At the time, tax-foreclosure procedures required that lawsuits be brought against property owners rather than against the properties themselves. Because many of these tax-delinquent owners had left the jurisdiction, numerous tax foreclosures could not be filed. To help address the effects of widespread tax delinquency, then, legislators enacted a bill in 1976 enabling local authorities, most commonly cities, to create passive land banks.[20]

The 1976 legislation also modified tax-foreclosure procedures so that real property tax foreclosures were actions against property, rather than against property owners, thus allowing actions against tax-delinquent properties even after owners left the jurisdiction.[21] When a county foreclosed on a property, the property would then be advertised and offered for sale at public auction. If a parcel was not purchased after being offered at two auctions, the legislation allowed for passive land banks to receive, manage, and convey the property to private third parties.[22]

In 1988, the Ohio legislature modified the land bank law to permit the abatement of property taxes on land held by passive land banks.[23] The 1988 legislation also created a dedicated fund for the prosecution of delinquent real property taxes.[24] A small percentage of delinquent real property taxes and assessments is placed in the fund to finance tax-foreclosure suits by county prosecutors and to cover passive land bank costs. Finally, the 1988 legislation altered notice requirements to streamline judicial tax foreclosure proceedings.[25] More recently, House Bill 294 was passed in 2006 to expedite the tax foreclosure process.[26] Under the changes made by HB 294, the foreclosure of distressed properties may be adjudicated with an administrative hearing rather than through a judicial proceeding.

B. Challenges Faced by Passive Land Banks

Passive land banks may have worked effectively to address the tax-delinquency problems faced by Cuyahoga County in 1976, but they are not fully equipped to address the problems Ohio faces today. The fact that passive land banks are municipal programs, rather than separate legal entities, has four important implications. First, passive land banks have no operating budgets or staffs of their own, and most local governments lack the tools necessary to address the vacant and abandoned housing problem.[27] The limited funding these passive land banks receive comes from participating local governments and the housing trust funds available to support activities related to the transformation of land bank properties.[28] Because passive land banks lack dedicated staff, time spent on passive land bank issues reduces the time and resources that localities can direct to other important issues.

Second, passive land banks operate only within local governments, so they cannot address vacancy and abandonment regionally. This limits the redevelopment planning each program can undertake. The spread of urban decay is not bound by city limits. Redevelopment strategies in one municipality will affect those of its neighbors and beyond. Consider that in Franklin County, home to Columbus, a land-reutilization program has been organized at the county level, but is unable to actively foreclose on tax-delinquent properties within municipalities without their consent.[29] This restriction hinders the county's redevelopment efforts.

Third, because passive land banks are not legal entities, they do not have the power to acquire real-estate-owned (REO) properties or contract to upkeep inventoried parcels. These actions must be executed at the city level. This lack of leverage creates inefficiencies both for the parties holding REO properties and for Ohio government, because it forces multiple municipal negotiations for the purchase or upkeep of REO properties.

Fourth, because passive land banks are government programs as opposed to separate legal entities operating independently from local governments, local governments are exposed to legal liability. Under the state's pre–2009 legislation, local governments bore the legal liability for all properties in a land-reutilization program's inventory. The most distressed properties carry with them the most significant exposure to liability, which may serve to discourage effective use of land banks.

Incidentally, passive land banks are limited to taking unimproved land[30] unless the structures on the land are slated for demolition or are unoccupied and acquisition is "necessary for the implementation of an effective land reutilization program."[31] The tendency has been for passive land banks, such as the one in Cleveland, to acquire only unimproved land.[32] A couple of driving factors were likely at play: First, the legal liability and costs associated with

holding the land may motivate passive land banks to acquire only unimproved land. Second, passive land banks do not have the funding to engage in wide-scale rehabilitation or demolition. These factors demonstrate that passive land banks are designed to address a different problem entirely, as many of today's tax-delinquent properties have buildings in need of rehabilitation or demolition located on the parcels.

Passive land banks also take a long time to acquire tax-foreclosed properties. Under Ohio's former land bank legislation, tax-foreclosed property had to go through two public auctions, held only a few times a year, before being transferred to passive land banks (and prior to being offered at a public auction, the property had to be advertised for 21 days). Even the majority of expedited HB 294 foreclosures were required to go through at least one auction before they could be transferred.[33] Thus, properties acquired by passive land banks sometimes sat vacant for up to nine months after foreclosure and before being transferred to the program, allowing plenty of time for such properties to fall into disrepair or to be stripped by looters.

Communities that established a countywide land-reutilization program under the previous law had to contend with the challenges imposed by a cumbersome land-acquisition process. To begin with, the requirements that had to be satisfied before a land-reutilization program could take title to a property limited the types of properties the program could access. In the case of the Franklin County Land Reutilization Program, the properties it most commonly acquired after being offered at public auction were (1) vacant lots with delinquent taxes in excess of property value, (2) abandoned homes or commercial structures, and (3) environmentally distressed properties.[34] Franklin County could not acquire recently vacated or abandoned homes for its land-reutilization program because the Ohio Revised Code required that those properties first be offered for sale at public auctions.

Ohio's new land banking system addresses the shortcomings detailed above by establishing land banks as separate legal entities with their own staffs, budgets, and independent legal status. Land banks organized under the new system will have the resources and ability to address the regional problems of vacancy and abandonment more efficiently and effectively than former law allowed. Further, they will have the legal independence necessary to shelter localities from legal liabilities associated with minimizing the effects of vacant and abandoned housing.

Under Ohio's new and banking system, a county land bank can be organized as a corporation that is empowered to foreclose on tax-delinquent properties. Once the county land bank has title and obtains appropriate municipal permits, it can either contract the properties for rehabilitation or demolition or sell them to responsible developers. If properties are rehabilitated, the county land bank will resell them individually to homeowners. Alternatively, county land banks can bundle clusters of acquired properties and sell them to developers.

III.   How the Land Bank Bill Alters Ohio's Traditional Land Banking Model

Intended to modernize Ohio's current land bank system, Senate Bill 353/House Bill 602 (the Land Bank Bill) allows for the creation of County Land Reutilization Corporations (CLRCs)— nonprofit community improvement corporations authorized by and subject to the Ohio Revised Code[35]—to help acquire, reclaim, rehabilitate, and reutilize vacant land. The bill effectively establishes a pilot land-bank program that, for now, is limited to Cuyahoga County[36] and will run for two years from the date on which a CLRC is incorporated.[37] The land banking system established under the Land Bank Bill alters the state's current model in four significant ways:

- It gives CLRCs the power to regionally address vacant and abandoned housing.
- It streamlines the primary method of property acquisition: tax foreclosure.
- It secures a source of funding for the county land bank without creating new taxes.
- Finally, it assures that the land bank has the ability to organize as a corporation that is legally distinct from a local government.

A. County Land Reutilization Corporations: A Modern Land Banking Model

i. CLRC Powers

The new legislation gives CLRCs both special and traditional corporate powers. Special powers include the ability to contract with numerous government organizations and county boards. Counties will be able to provide CLRCs with all the basics needed to run a business— data storage, office space, etc.—at or below market rates. CLRCs would be empowered to contract with municipalities for management of property. Finally, CLRCs would be able to initiate foreclose on tax liens.

As an Ohio Revised Code § 1724 corporation, CLRCs have most of the traditional powers of corporations.[38] Among these are the abilities to develop regional strategies for addressing the vacant and abandoned housing problem, negotiate directly for the acquisition of REO properties, maintain other entities' REO properties for a fee, accept properties as gifts or donations, purchase properties from individuals, and contract for the rehabilitation or maintenance of inventoried properties. Negotiating at the county level with banks or servicers to acquire REO properties makes the process more efficient for all parties involved. Servicers and municipalities within a county will not have to engage in numerous transactions, each resulting in the transfer of a handful of distressed REO properties. Instead, a CLRC can negotiate for every distressed REO property in the county.

As an independent corporation, a CLRC will also have the freedom to decide how to dispose of property. This could entail anything from rehabilitation and resale to demolition. Because a CLRC is organized to effect land redevelopment, it could vet potential new owners to ensure they are ready to be homeowners. Alternatively, the CLRC could sell to private developers who bring forward approved plans to help accomplish long-term community development. The CLRC also has the flexibility to adapt to new market demands quickly, choosing to lease properties, for example, if there were a sudden demand for leased space.[39] The Land Bank Bill thus gives land banks increased independence and flexibility.[40]

As will be discussed more fully in the funding section, CLRCs may borrow money via loans or lines of credit and by issuing financial instruments or securities. They may request that a county's Board of Commissioners pledge a source of revenue to secure a borrowing and is-

sue notes in some circumstances. If CLRCs are operating within the boundaries of a city or other municipality, they may request that the municipality issue bonds to fund CLRC activities within those boundaries. The Land Bank Bill also empowers CLRCs to spend money assisting municipalities in abating residential nuisances and to fund prosecutions for violations of laws governing real estate, encouraging CLRCs and municipalities to collaborate.

ii. CLRC Immunities

The Land Bank Bill also grants CLRCs important immunities. Because CLRCs would be in the business of acquiring vacant, abandoned, or otherwise distressed real property, they should be immune from some regulations. The new law immunizes CLRCs from state environmental regulations and orders, permits, licenses, variances or plans approved or issued under any such regulations. There are, however, some immunities absent from the list that may actually benefit CLRCs.

Substantial exposure to liability comes with acquiring nuisance properties.[41] The potential for nuisance lawsuits is a real possibility between the time when a CLRC acquires a property and when that property is rehabilitated, demolished, or sold. Similarly, there is a real possibility of successful negligence lawsuits against a CLRC between the time a CLRC acquires title to a negligently maintained property and when the property is rehabilitated, demolished, or sold.

CLRCs would not benefit from sovereign immunity because they would be independent corporations created by county governments. Thus, it might be wise to provide CLRCs with temporary immunity from lawsuits that are based on the condition of the property when it was acquired. Such immunity could run from the time of property acquisition by CLRCs until the expiration of a reasonable time necessary to cure the property's defects.[42] While the recently enacted Land Bank Bill is a step in the right direction by granting some immunities, it could have offered CLRCs further important protections.

iii. Checks and Balances

Granting a CLRC broad powers and immunities renders it a potent redevelopment tool in the right hands. Such powers and immunities, however, also raise the question of who or what will operate as a check on a CLRC to balance out its powers. In this case, the answer is twofold. First, the board of directors of every CLRC will be comprised of three elected officials and two directors appointed by elected officials and approved by municipalities in the relevant counties. Thus, voters could change the leadership of a CLRC by electing different officials.

Second, municipalities can effectively prevent CLRCs from operating within their borders. Although it is not spelled out in the Land Bank Bill, as a pragmatic matter, CLRCs will have to work in cooperation with municipalities. The CLRCs will not be able to obtain permits for actions such as demolition, for example, unless municipalities issue the permits. The Land Bank Bill also grants municipalities the right of first refusal on all tax-delinquent properties within their borders. That is, if both a municipality and a CLRC are interested in receiving the same parcel of tax-foreclosed land, the municipality takes priority over a land bank.

As community improvement corporations, CLRCs will be subject to further oversight by the state auditor.[43] Each year, every CLRC will be required to file an annual report with the state auditor. Failure to file this report will result in a CLRC's articles of incorporation being cancelled by the Ohio secretary of state, at which point that CLRC would no longer be able to function as a corporation or under any special powers it had been granted.[44]

In addition, CLRCs will be subject to regular audits by the state auditor.[45] These audits will occur at least once every two years. Audits may also occur more frequently, which might be desirable to ensure CLRC powers and immunities are not abused.[46] These reports and audits ensure that the activities of CLRCs are in accord with their purpose of facilitating the reclamation, rehabilitation, and reutilization of vacant, abandoned, and tax-foreclosed land.[47] Finally, to ensure transparency, CLRCs will be required to keep regular corporate books and records of all transactions, including disclosure of prices paid and prices received for each parcel of land.[48]

Most notably, the Land Bank Bill imposes unique reporting requirements on CLRCs. No more than seven months after incorporation, each CLRC must file a report with the Ohio General Assembly summarizing the CLRC's activities. The report must contain a list of expenditures, revenues, parcels acquired and method of acquisition, among other things.[49] A similar report must be filed no more than 13 months after incorporation. Together, these reports will provide the legislature with information necessary to evaluate a CLRC's operations.

These checks should ensure that CLRCs do not abuse the powers and immunities granted by the Land Bank Bill. Because CLRCs are granted specific powers, immunities, and exemptions these checks accommodate public oversight and transparency of CLRCs, and continue Ohio's tradition of providing a strong home rule environment for municipalities.

B. Primary Method of Property Acquisition: Tax Foreclosure

Under the new legislation, land banks' primary method of property acquisition will continue to be foreclosure on tax-delinquent properties.[50] A land bank cannot focus its acquisition strategies directly on vacant and abandoned housing for a few reasons. For one, vacancy is difficult to ascertain and track. There is also no precise, widely accepted definition for abandoned property. And—in part because of these two factors—no organization currently acts as a central information repository to document the location of vacant and abandoned properties at the county level.[51] A county-level data repository would assist in a more regional evaluation of the vacant and abandoned housing problem, and may help tailor future strategic redevelopment plans.

Property-tax delinquency, however, is often a precursor to vacancy and abandonment when it occurs in neighborhoods with high foreclosure rates.[52] Emory University's Frank Alexander calls such delinquency "the most significant common denominator among vacant and abandoned properties."[53] A property owner's decision to stop paying taxes, combined with foreclosures in the neighborhood, is often a sign that the owner plans no further investment in his residential property.[54]

While the primary means of property acquisition remains the same as that of the passive land banks, the Land Bank Bill significantly reduces the time it takes to procure vacant or abandoned property. The bill creates an alternative redemption period[55] that runs for 45 days from adjudication of foreclosure, after which the right of equitable redemption expires. Once the 45 days have passed, the bill allows the parcel to be transferred directly to a CLRC without appraisal or sale. These changes address several shortcomings of passive land banks, in that this direct-transfer provision prevents speculators from purchasing and holding land without reinvesting in it.[56] The shortened acquisition timeline also helps ensure that the property does not fall into disrepair while going through the two public auctions

now required by law and reduces the opportunity for vandals to strip the property of copper pipe, aluminum siding, storm windows, and other easily sold materials.

Another important feature of the new law is that it provides a "title cleaning" mechanism for all properties that a CLRC acquires. This will make CLRC properties more attractive to responsible developers by ensuring the land has a marketable title. The mechanism works by automatically extinguishing any other interests in land that is transferred to a CLRC. This is a critical function of successful land banks, because without marketable title to a property, potential owners will not be able to obtain title insurance. If title to property cannot be insured, it is unlikely that the property will be purchased by either homeowners or developers.

The new law also updates the regulations governing tax liens and foreclosures in ways that benefit parties other than CLRCs. For instance, the Land Bank Bill adds a title-clearing mechanism to tax foreclosures.[57] It also changes the procedures for transferring title to properties when the taxes owed exceed the property's fair market value. Finally, it prevents the creation of tax liens in circumstances where owners are attempting to pay off their real property tax debts.[58]

C. Funding Mechanisms

Funding is one of the most critical aspects of any active land bank. Wide-scale rehabilitation and demolition, both of which may be necessary to address Ohio's vacant and abandoned housing problem, can be very expensive. Without a source of funding, passive land banks have limited ability to address the vacancy and abandonment problem facing Ohio. For example, a guiding consideration of the Franklin County Land Reutilization Program is minimizing its financial and staffing impact.[59] The new law specifies that the primary source of funding for CLRCs will be penalties and interest on delinquent real property taxes—which means no new taxes.

Previously, county treasurers sold tax certificates to private parties for the amount of the delinquent taxes.[60] Under the changes in the Land Bank Bill, CLRCs essentially would purchase tax certificates, individually or in bulk, instead of county treasurers offering them for sale to private parties. In this way, the Land Bank Bill allows for the public use of an existing tax and prevents tax liens from being sold to speculators. Under the funding mechanism for CLRCs established by the Land Bank Bill, no new real property taxes or assessments are imposed on punctual tax payers.

It is important to note that tax lien speculators do not capture all interest and penalties from delinquent property taxes. Some of these revenues flow to and are used by municipalities. Under the Land Bank Bill, municipalities will continue to receive the principal value of delinquent real property taxes and assessments. The penalties and interest, however, will now be redirected to CLRCs.

The Land Bank Bill makes the numerous statutory changes required to create a mechanism through which CLRCs can capture interest and penalties, including a revised tax distribution schedule. The new mechanism will function by way of the County Treasurer, upon approval of the County's Investment Advisory Committee, borrowing money from the County Treasury. Borrowed money is paid directly to taxing districts in amounts equal to their unpaid or delinquent real property taxes and assessments. As those unpaid and delinquent taxes are

recovered, the principal amount of the tax goes to pay off the line of credit. The penalties and interest are put into an account used to fund CLRCs.[61] At the end of the year, monies remaining but unused will be applied to debts incurred to advance payment to taxing districts.[62] This system should operate effectively at the county level because the County Treasurer has access to lists of all tax-delinquent properties in the county as well as the amount owed on each property.

The changes will allow the line of credit to be funded initially via several methods. First, the CLRC can borrow from the County Treasury. Second, if the County Treasury cash flow is insufficient to fund the new legislation's revised tax distribution schedule, a line of credit with a financial institution can be used to satisfy the deficiency. Finally, the Land Bank Bill creates an optional mechanism for the creation and sale of delinquent-tax anticipation securities. These would not be general obligations of the County. Instead, they would be supported with only a pledge of revenue from the collection of specifically identified delinquent real property taxes and assessments.

The Land Bank Bill does increase the rate at which interest is calculated on unpaid and delinquent taxes and assessments.[63] Each month the taxes are delinquent, 1 percent interest is charged against the amount owed. Late payment penalties (5% and 10%) remain the same. The current Cuyahoga County Treasurer projects that this interest rate increase will generate roughly seven million dollars in annual revenue in Cuyahoga County.

It should be noted that this funding system could also work at the municipal level. Previously, municipalities could purchase tax certificates from the county and pursue the lower interest and penalties for either general or specific use.[64] The fact that cities have not been doing this may be due to economies of scale. That is, the amount of interest and penalties collected by any one municipality, when compared to collection costs, may make pursuing the interest and penalties cost prohibitive. Aggregated at the county level, however, pursuing the collection of interest and penalties may prove to be cost effective.[65]

The Land Bank Bill also allows for numerous possible secondary sources of funding for CLRCs. First, CLRCs will capture the proceeds from the sale of any of their urban and suburban properties. This is made possible because CLRCs obtain clear title to land after the alternate redemption period, and because all delinquent taxes and assessments will be advanced to taxing districts. Thus, there would be no liens on the land that would entitle any person or taxing district to a portion of sale proceeds.

Second, the bill allows up to 5 percent of the delinquent taxes and assessments collection fund to be earmarked for use by a CLRC. This fund was used exclusively for the collection of delinquent real property, personal property, and mobile/manufactured home taxes and for passive land bank expenses.

Third, a Board of County Commissioners may provide additional funding. Boards are authorized to make contributions to corporations organized under Ohio Revised Code § 1724.[66] Boards are also authorized to levy additional property taxes to help fund CLRCs. Boards may also support CLRCs from their general operating tax levies.

Fourth, CLRCs are nonprofit corporations that can raise money in their own right. They can do this by borrowing money, issuing bonds, accepting gifts, and applying in their own names for grants.[67] CLRCs may grant mortgages on the land they hold in order to secure bor-

rowed money.[68] Finally, CLRCs may contract with lenders or servicers and GSEs to provide upkeep and manage temporarily vacant properties for a fee. This is a significant change from passive land banks, which could not independently pursue funding because of their status as government programs rather than independent corporations.

IV.   Conclusion

The reforms contained in the Land Bank Bill will modernize Ohio's land banking model in several ways. The state's passive land banks are not equipped to address the widespread vacant and abandoned housing problems plaguing many regions of Ohio. The Land Bank Bill enables land banks to organize at the county level as corporations directed by elected officials and appointees. The prototype CLRC will act as a county-level repository for data, allowing for regional evaluation of the vacant and abandoned housing problem.

The Land Bank Bill gives the new land banks operating budgets that are independent from municipal budgets without raising taxes. It encourages cooperation between CLRCs and municipalities. The Land Bank Bill also significantly reduces the amount of time it takes for land banks to acquire vacant properties, expediting the properties' return to the real property tax rolls.

There are aspects of the Land Bank Bill that should be carefully observed and considered by policy makers. For example, the lack of temporary immunity from lawsuits based on the condition of the premises when it is acquired by a land bank exposes land banks to legal liability. Also, the funding process for CLRCs will redirect some penalties and interest on delinquent real property taxes and assessments from municipalities to CLRCs. This may have short-term implications for municipal budgets, despite the assistance CLRCs may provide to municipalities. Representatives from municipal and county governments should work closely together to determine the total financial impact of CLRCs, taking into account both the municipal costs of funding CLRCs and the financial benefits municipalities will reap from CLRC operations in both the short and long term.

Ultimately, the successful economic development of a region involves numerous factors, including workforce training, transit systems, taxes, and the business climate. The Land Bank Bill does not guarantee community stabilization or development. Rather, it establishes land banks as an effective tool for stabilizing and developing communities. It will allow a single, countywide entity to take clear title to distressed properties, expediting rehabilitation and development of these properties. It should encourage the acquisition of distressed properties by granting land banks specific immunities and allowing municipalities to avoid liability associated with distressed properties.

In sum, the Land Bank Bill addresses many of the challenges faced by the state's traditional land bank model. The bill offers a well-rounded approach to solving the problems caused by excessive vacant and abandoned real property. The bill is designed to implement a pilot program in Cuyahoga County, an area that has been dramatically affected by vacant and abandoned real property. And, not insignificantly, the approach spelled out in the Land Bank Bill comes at a low cost because it requires no new property taxes or assessments to punctual taxpayers.

Endnotes

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2. Matthew J. Samsa, Reclaiming Abandoned Properties: Using Public Nuisance Suits and Land Banks to Pursue Economic Redevelopment, 56 CLEV. ST. L. REV. 189, 213 (2008).

3. See, for example, Les Christie, Where Cleveland Went Wrong, CNNMONEY.COM, November 14, 2007 available at http://money.cnn.com/2007/11/12/real_estate/Cleveland_foreclosure_factors/ (last visited November 2008); Associated Press, Cleveland Sues Banks Over Foreclosures, MSNBC.COM, Jan 11, 2008 available at http://www.msnbc.msn.com/id/22613244/ (last visited November 2008); Lisa Nelson, Foreclosure Filings in Cuyahoga County, Federal Reserve Bank of Cleveland, August 29, 2008 available at http://www.clevelandfed. org/Our_Region/Community_Development/Publications/Behind_the_Numbers/2008/0908/BTN_20080929. cfm (last visited November 2008).

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5. Cleveland has lost population every decade since 1950. Edward L. Glaeser & Joseph Gyourko, Urban Decline and Durable Housing, 113 JOURNAL OF POLITICAL ECONOMY 345, 346 (2005).

6. Thomas Bier & Charlie Post, Vacating the City: An Analysis of New Homes vs. Household Growth 5 (The Brookings Institution 2003).

7. Bier & Post supra note 6, at 2. The paper goes on to state that East Cleveland has approximately 3,500 abandoned units, or 13 percent of the abandoned units in the greater Cleveland area. Id. at 3. See also FRANK S. ALEXANDER, LAND BANKING AS METROPOLITAN POLICY 5 (Brookings Institute, 2008) ("[Excess supplies of real estate] can happen gradually over a period of years as populations shift from urban centers to suburban and exurban rings…"). The fact that real property is not fungible in nature, the supply and demand for land is often not flexible enough for prices and consumption to adjust to relative demand and available supply. Id. at 7.

8. Mark Setterfield, Abandoned Buildings: Models for Legislative and Enforcement Reform, Research Project 23, Trinity College (1997); William Speilman, Abandoned Buildings: Magnets for Crime, 21 Journal of Criminal Justice 481 (1993).

9. Douglass Goodman & Bruce D. Mann, An Empirical Investigation of More Police Time: Crime in Midwest Cities, 1990 v. 2000 16 (Working Paper Series University of Puget Sound July 2005), available at http://papers. ssrn.com/sol3/papers.cfm?abstract_id=770385.

10. Setterfield supra note 8.

11. A 1998 study of the Cleveland area showed that for every property in tax delinquency, house values within 1–2 blocks decreased by $778. Robert A Simons, Roberto G. Quercia & Ivan Maric, The Value Impact of New Residential Construction and Neighborhood Disinvestment on Residential Sales Price, 15 JOURNAL OF REAL ESTATE RESEARCH 147, 158 (1998). A more recent study found that an additional abandoned structure within 500 feet reduces the sale price of a residence by 2.27 percent, within 501–1000 feet by 1.92 percent, and within 1001–1500 feet by 1.5 percent. NIGEL G. GRISWOLD & PATRICIA E. NORRIS, ECONOMIC IMPACTS OF RESIDENTIAL PROPERTY ABANDONMENT AND THE GENESEE COUNTY LAND BANK IN FLINT, MICHIGAN 4 (MSU Land Policy Institute, 2007).

12. Alexander, supra note 1, at 4 (citation omitted). See James Goldstein et al., Urban Vacant Land Redevelopment: Challenges and progress, (Lincoln Institute of Land Policy, Working Paper, 2001); Edward G. Gotez et al., Pay Now or Pay More Later: St. Paul's Experience in Rehabilitating Vacant Housing (1998); Kathleen C. Engel, Do Cities Have Standing? Redressing the Externalities of Predatory Lending, 38 Conn. L. Rev. 355, 357–59 (2006).

13. ALEXANDER, supra note 1, at 4; Engel supra note 12, at 357–59.

14. ALEXANDER, supra note 1, at 4.

15. Alexander, supra note 7, at 5.

16. ALEXANDER, supra note 7, at 6.

17. ALEXANDER, supra note 1, at 8. See also Ana Baptista, Redeveloping City-Owned Vacant Lots: Strategies for the Equitable Redevelopment of City-Owned Vacant Land in Providence, RI, Brown University for Environmental Studies (2000) available at http://envstudies.brown.edu/oldsite/Thesis/2000/masters/abaptista/.

18. ALEXANDER, supra note 1, at 8.

19. Frank S. Alexander, Land Bank Strategies for Renewing Urban Land, 14 JOURNAL OF AFFORDABLE HOUSING 147 (2005).

20. Id. at 148.

21. Id. at 148.

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23. ALEXANDER, supra note 1, at 6; Alexander supra note 19, at 148; Ohio H.B. 603 Approved June 24, 1988.

24. ALEXANDER, supra note 1, at 6; Frank S. Alexander supra note 19, at 148; Ohio H.B. 603 Approved June 24, 1988.

25. ALEXANDER, supra note 1, at 6; Alexander supra note 19, at 148; Ohio H.B. 603 Approved June 24, 1988.

26. Part of the definition of "abandoned land" is that the land must be unoccupied. See Ohio Rev. Code § 323.65(A) (2008).

27. ALEXANDER, supra note 7, at 5.

28. ALEXANDER, supra note 1, at 26.

29. For more information about Franklin County's land reutilization program, see the Franklin County Treasurer's website at http://www.co.franklin.oh.us/treasurer/landbank/index.html (last visited November 2008).

30. Generally, unimproved land is land without any constructed improvements such as residential or commercial buildings or other structures.

31. Ohio Revised Code § 5722.01(E) (2008).

32. ALEXANDER, supra note 1, at 9.

33. The only time properties can be transferred directly to a land bank under current law is when the taxes owed on the property exceed the property's fair market value and the property is foreclosed upon via an HB 294 expedited foreclosure. Ohio Revised Code § 323.73(G) (2008).

34. See http://www.co.franklin.oh.us/treasurer/landbank/index.html (last visited November 2008).

35. The County Treasurer would act as the incorporator with approval of the Board of Commissioners. As with any corporation, a CLRC's articles of incorporation must be approved by the Secretary of State and are subject to review by the Attorney General for compliance with applicable law. Once incorporated, the board of directors is created. The County Treasurer (or his designee) and at least two County Commissioners (or their designees) must sit on the board. An amendment has been proposed that would allow large municipalities to appoint a director. The Board adopts a code of regulations for governance which provides for corporate government and appointment of officers to conduct business and management of property, and establishes policies and procedures (including agreements with municipalities and other agencies). The code of regulations for governance must conform to Ohio Revised Code §§ 1702.11 & 1724 (2008).

36. The Land Bank Bill only allows for creation of a CLRC in counties with a population of 1.2 million or greater, according to the most recent census. It only allows CLRCs to be incorporated within one year of the effective date of the amendment, which would be December 2009. Thus, only counties meeting the population requirement according to the last census would be eligible. In Ohio, only Cuyahoga County has a population exceeding 1.2 million as of the 2000 census.

37. After two years, the Land Bank Bill prevents CLRCs from acquiring new title to properties by all direct, and most indirect, means.

38. For a list of powers, see Ohio Revised Code § 1724.02 (2008).

39. The Land Bank Bill caps the amount of occupied property a CLRC can own at 25 percent of the CLRC's inventory.

40. This increased independence and flexibility is accompanied by significant accountability, discussed infra, in section III.A.iii.

41. Samsa supra note 2, at 228.

42. Although such a time limit could be a specific number of days, granting immunity for a "reasonable period" would allow courts to consider surrounding circumstances and to account for changes in the amount of time it takes to rehabilitate or demolish buildings. It also allows land banks to avoid nuisance or negligence liability by strategically acquiring properties so that no one property sits too long without being addressed.

43. Ohio Revised Code § 1724.05 (2008).

44. Ohio Revised Code § 1724.06 (2008).

45. These audits are required by Ohio Revised Code § 1724.05 (2008) and subject to Ohio Revised Code § 117.11 (2008).

46. Ohio Revised Code § 117.11(A) (2008).

47. Ohio Revised Code § 1724.05 (2008); Land Bank Bill Proposed Ohio Revised Code § 1724.01(B)(2).

48. Ohio Revised Code § 1702.25 (2008).

49. The reports must contain: (1) an itemized list of CLRC revenues and receipts from any and every source; (2) CLRC expenses; (3) the number of parcels acquired by the CLRC and how they were acquired; (4) the disposition of all property; (5) the number of parcels of abandoned land the CLRC foreclosed upon via tax lien certificates; (6) the value of tax lien certificates acquired by the CLRC; (7) a summary of CLRC nuisance abatement and code enforcement activities; (8) the number of employees and officers of the CLRC; and (9) the compensation CLRC officers received.

50. As discussed in section III.A.i., infra, a CLRC will be empowered to purchase REO property from servicers and lenders (as well as other property owners, if necessary) and accept gifts and donations as well.

51. Municipal Departments of Community Development may act indirectly as repositories of the location of vacant and abandoned properties because of the information they receive from Community Development Corporations. CLRCs could aggregate and supplement this information to further one of their primary goals: acting as county-level repositories of this information to further regional evaluation of the vacant and abandoned housing problem.

52. ALEXANDER, supra note 1, at 4.

53. ALEXANDER, supra note 1, at 4.

54. ALEXANDER, supra note 1, at 14.

55. The redemption period is the time after foreclosure that former owners may pay the amount of the lien against the property and regain title. Under current law this period lasts until sale to a third party.

56. This direct-transfer provision may also have the effect of preventing investors from assembling land on their own for new investment projects. Such investors, however, should be able to purchase land from land banks if their projects are viable, since the assembling of distressed parcels of land for sale to developers is a primary duty of a land bank.

57. This mechanism clears title of all encumbrances save federal tax liens, as well as easements and covenants that run with the land and were established prior to the tax lien.

58. No tax lien certificates can be issued against properties with owners in bankruptcy, where the taxes have already been paid, or where there is a valid tax contract in effect. Similar to these borrower protections, the bill also allows the county treasurer to collect guaranteed funds from homeowners and use them to pay off tax liens, preventing foreclosure.

59. See http://www.co.franklin.oh.us/treasurer/landbank/index.html (last visited November 2008).

60. These sales are subject to Ohio Revised Code §§ 5721.30, et seq. (2008).

61. This is not a completely new system. Currently tax certificates can be purchased by private individuals to for the principal amount of unpaid and delinquent taxes. Revenue from the sale of such certificates goes to the appropriate taxing districts (those selling their interest in unpaid or delinquent real property taxes and assessments). After holding the certificates for one year, the purchaser may attempt to collect the taxes, along with penalties and interest. Essentially the bill would result in these certificates being sold to a County Land Reutilization Corporation instead of to private "tax lien" speculators.

62. Whether money is remaining will be calculated using the first-in, first-out method. If debts are repaid and money still remains, the money can be reappropriated by the CLRC for the next year. If it is not reappropriated, it will be transferred to the county's general fund.

63. Interest is currently charged on delinquent property taxes on August 1 (for the prior 8 months) and December 1 (for the prior 4 moths). The tax rate is calculated according to Ohio Revised Code § 5703.47, which requires following this formula:

   [The rate of average market yield on outstanding marketable obligations of the U.S. with remaining periods of three moths or less] + 3 percent.

64. There is nothing in ORC §§ 5721.30 et seq. to prevent cities from purchasing tax certificates.

65. The success of the Genesee County Land Bank operating under a similar system suggests the collection of interest and penalties is cost-effective at the county level.

66. County Land Reutilization Corporations would be organized under Ohio Revised Code § 1724 (2008).

67. The Genesee County, Michigan, county land bank has been using EPA Brownfield grants to fund portions of its activities.

68. This is not nullified by the title-clearing mechanism set in place for CLRCs. Title is only cleared upon acquisition. Thus, subsequent encumbrances on title will not be washed away.

papers

Slowing Speculation: A Proposal to Lessen Undesirable Housing Transactions

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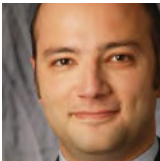
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In the City of Cleveland, 8.2 percent of the housing stock sits vacant or abandoned, according to the U.S. Postal Service. In this environment, private investment in fore-closed properties may sound like welcome news. Indeed, some speculative purchases can add liquidity to a distressed market and help heal distressed neighborhoods when properties are purchased for rehabilitation.

But if speculators fail to keep up with maintenance and taxes, allowing properties to sit empty and in disrepair, the opposite happens. In weak-market cities like Cleveland, some speculative investments extend the time that prop-erties sit vacant, lower the value of nearby homes, and make the vacancy problem much more challenging to fix.

But are such speculative investments a large enough problem to demand a policy response? We believe they are. Evidence shows that some investors may be transacting irresponsibly, potentially hurting neighboring homeowners in the process. We outline one of many policy options states might consider if they are looking for solutions to this problem.

Financing Holds the Key

The key to understanding—and addressing—these harmful transactions is to look at how most speculative transactions are financed. When a homebuyer applies for a mortgage, the bank requires that all claims on the property, including tax and code enforcement liens, be paid off by the closing. Banks also require that past-due taxes that have not yet become liens be paid prior to closing, so they do not supersede the bank's claim on the property.

But speculative home purchase transactions are not always funded through the banking system. If investors pay cash or secure nonbank seller financing, they can postpone paying off liens, past due taxes, and housing code assess-ments against the property, often for many years.

To address this problem, policymakers would need a rule that discourages investors from trying to quickly flip low-value properties without maintaining or improving them. One potential solution would require that all past-due taxes and code enforcement penalties be cleared before county recorders declare a property transfer official. This change would target the speculative activity that destabilizes weak housing markets.

This rule would apply to all residential property transfers but, in practice, would affect only the cash or seller-financed transfers of property with outstanding taxes or housing code assessments. To see how widespread cash and seller-financed transactions are, we analyzed the property transfers in Cuyahoga County, Ohio (home to Cleveland),

Keep in mind that a markup as low as a few hundred dollars can still provide a significant return in places such as Cuyahoga County, Ohio, where more than 40 percent of properties sold by financial institutions after a foreclosure are priced at less than $10,000, according to a 2008 Case Western Reserve University study (see "Resources" at the end of this article). This speculative activity seems to be most common among bulk buyers who purchase low-value properties in large numbers.

> **We consider speculation harmful when the buyer has no intention of improving or maintaining the property or paying its taxes — but expects to resell as much of its stock as possible quickly, "as is," and at a small markup.**

How is this strategy profitable? When buying foreclosed or lender or real estate-owned (REO) properties, irresponsible buyers have a built-in advantage over rehabbers. While rehabbers must take into account the costs of improvements and delinquent tax payments, speculators who plan to flip the property at a quick profit don't, so they can bid higher. Typically, after taking over the property, the speculator sells it as soon as possible to an unsuspecting out-of-state (or even out-of-country) buyer who believes the property is a great investment.

This belief could be rooted in the promise of future appreciation or a predictable rental income stream after minor rehabilitation. Only after the transaction closes does the new buyer find out that the property has more in delinquent taxes than the price paid to acquire it, or that the property is in need of substantially more rehabilitation than was originally thought. More often than not in these situations, the new buyer abandons the property, which may go into tax foreclosure and be sold at auction, where it may once again be acquired by a bulk buyer. As this cycle continues, the property remains vacant, falls into further disrepair, and becomes a nuisance to the entire neighborhood.

Consider what would happen if these speculators *didn't* exist. First, distressed property values would fall, freeing up resources for rehabbing or demolition. Second, a large amount of distressed property would go on the market, which would allow for large-scale rehabilitation, redevelopment, or demolition and the associated economies of scale.

in 2009. Transfers totaled 16,828 excluding foreclosures; about half of them did not have any associated mortgage as reported under the Home Mortgage Disclosure Act. That is, they were most likely all-cash or seller-financed transactions. All transactions with conveyance amounts less than $10,000 (almost 3,000 of them) were in this category. Of those small-dollar transactions, almost one in three had a tax delinquency at the time of transfer.

We do not suggest that all of these transactions involved harmful speculation, as many delinquencies clear around the time of the transfer. For a significant number of properties, however, tax delinquency is persistent or grows after the transfer. These are the properties that will likely be affected by this proposal. (Note: While we include housing code assessments in our proposal, we are unable to report the data on this component of the problem because of lack of uniform record-keeping across municipalities.)

Undesirable Housing Transactions in Cuyahoga County, Ohio

We consider speculation harmful when the buyer has no intention of improving or maintaining the property or paying its taxes — but expects to resell as much of its stock as possible quickly, "as is," and at a small markup. Speculators tend to factor in the probability that some of their purchased properties will languish or be lost to tax foreclosure. But they buy them anyway because the markup on properties sold is high enough to pay for the lost properties.

For example, the Cuyahoga County Land Bank (which acquires distressed properties to demolish, rehabilitate, or repurpose for long-term neighborhood stability) has been able to regularly solicit bids in small and bulk packages for demolition as its inventory has grown. As a result, the land bank reports that it has seen its average demolition cost fall by nearly 35 percent.

Figure 1. Outcomes for Homes Sold out of Foreclosure in Cuyahoga County, Ohio, 2007–09

Large Investors (percent)
Small Investors (percent)
Individuals (percent)
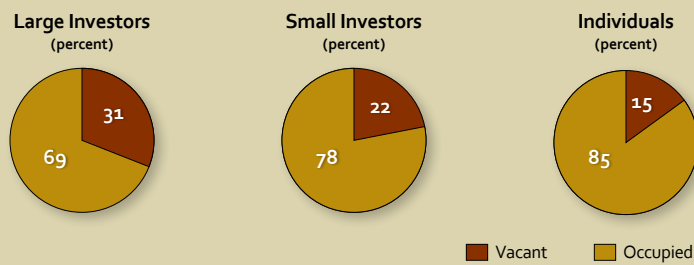
Source: Cuyahoga County Auditor.

Substantiating Anecdotes: Data on Housing Transactions and Tax Delinquency

Some transactions illustrate the bulk-buyer business model. For example, Cuyahoga County records show that one tax-delinquent property was acquired by a bulk buyer from a securitization pool for $1 and resold four days later for $10,000. The new owner (a low-volume investor) resold the property six months later for $72,000.

A fascinating transaction, but how frequently are properties sold in bulk transactions? And what is the evidence for harmful activity? We looked at the period from 2007 to 2009 and divided investors into groups: high-volume (large) investors, who purchased or sold 11 or more properties, and low-volume (small) investors, who purchased or sold four to 10 properties. The great majority of transactions occur among people who buy or sell three or less properties over four years; we classify those as "individuals" buying or selling for consumption purposes.

Cuyahoga County Auditor's records show that of 18,692 residential properties sold out of foreclosure by financial institutions and government agencies in the 2007–09 period, about one-quarter were bought by large investors, another one-quarter by small investors, and most of the rest by individuals. As figure 1 shows, 31 percent of the properties bought by large investors were still vacant as of June 2010.

The vacancy rate was 22 percent for small investors and 15 percent for individuals (and these differences persist after controlling for property characteristics). Clearly, outcomes for homes bought by some investors are worse than for those bought by others.

Furthermore, large investors seem to have a preference for tax-delinquent properties. In 2009, 21 percent of the properties sold with a tax delinquency from the previous year were purchased by large investors. Yet, they purchased only 9 percent of properties sold without a delinquency.

This preference for tax-delinquent properties wouldn't matter if the buyers paid those taxes, but that isn't the case. The weighted average of the green bars in figure 2 shows that 44 percent of the properties purchased by large investors in 2009 were later tax-delinquent, despite being current the previous year. Comparable figures are 39 percent for small investors and 21 percent for individuals. In transactions where large investors sell to small and other large investors (red and green bars farthest to the right in figure 2), this pattern is particularly pronounced. In almost 60 percent of such transactions, the purchaser does not pay property taxes.

Meanwhile, the data show that when individuals and financial institutions (yellow and blue bars in figure 3) purchase a tax-delinquent property from any group, delinquencies consistently get paid more than half of the time. Large investors, however, consistently avoid paying back taxes. The most glaring result is when large investors sell tax-delinquent property to other large investors; delinquent taxes are paid in only 13 percent of those cases (green bar farthest to the right in figure 3). When large investors sell to small investors, back taxes are paid in 23 percent of the transactions (red bar farthest to the right in figure 3). Added up, the data show that most of the time, individuals transact more responsibly than small and large investors.

A final situation worth paying attention to is when a property's tax balance actually grows after a purchase (figure 4). In these transactions, not only are back taxes not being paid, but purchasers are not paying current taxes as they come due. Again, the culprits are mostly large investors who sell to other large investors (green bar farthest to the right in figure 4)—who allow the delinquent tax balance to grow nearly 76 percent of the time. In almost all types of property transfers, investors are the worst tax avoiders.

Status Changes of Tax-Delinquent Properties in Cuyahoga County, Ohio, by Seller and Buyer Type, 2009

Buyers ■ Small investors ■ Financial institutions ■ Individuals ■ Large investors

Figure 2. Properties That Fell into Tax Delinquency
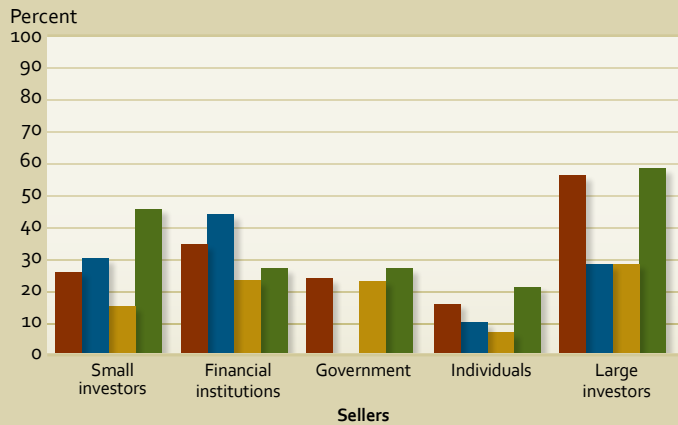
Figure 2a. Properties That Fell into Tax Delinquency: Low-value Transactions
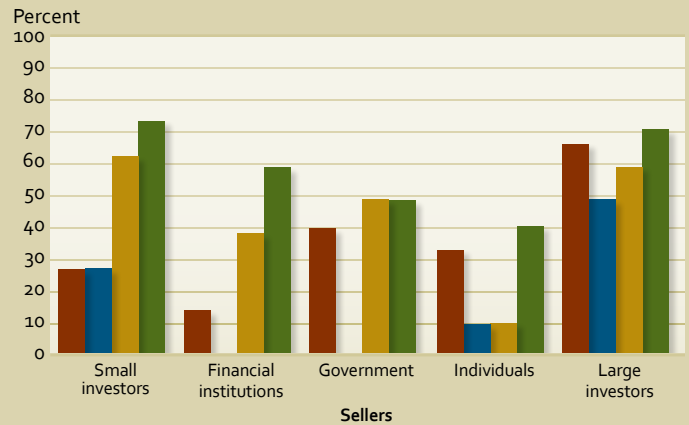
Figure 3. Properties That Became Current
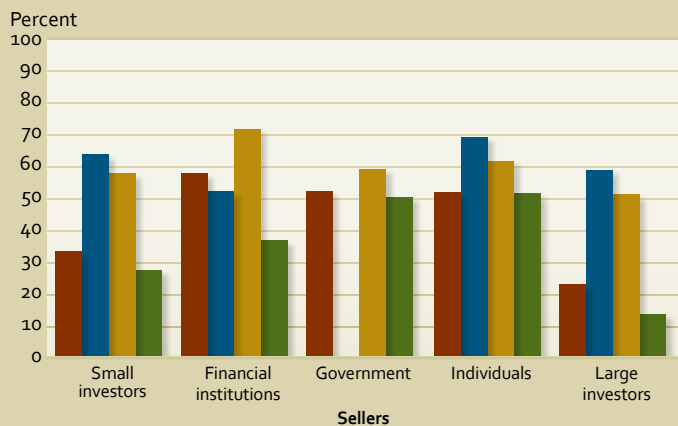
Figure 3a. Properties That Became Current: Low-value Transactions
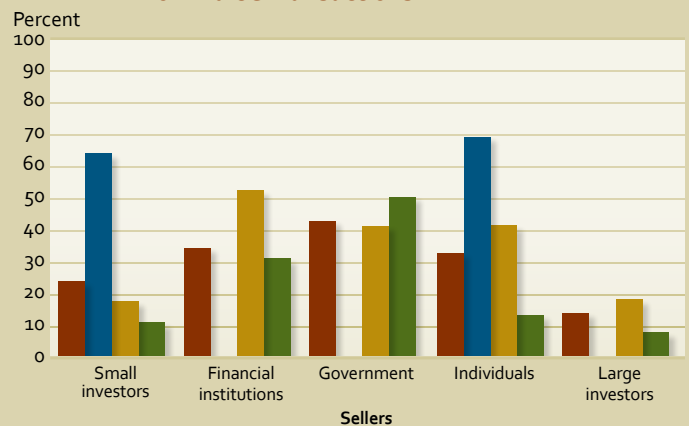
Figure 4. Properties Whose Tax Balance Grew after a Purchase

Figure 4a. Properties Whose Tax Balance Grew after a Purchase: Low-value Transactions

Note: Low-value transactions have conveyance amounts of less than $10,000.
Source: Cuyahoga County Auditor.

Taken together, these findings support the anecdotal reports that large and small investors pay the taxes on properties they purchase less frequently than financial institutions, governments, or individuals. The problems are more acute in the low-value cash or seller-financed transaction category with conveyance amounts of less than $10,000 (figures 2a, 3a, and 4a).

A more promising policy solution would require a change in state law: preventing county recorders, who are charged with tracking owners of real estate, from recording any new ownership of property that has outstanding delinquent taxes or code violation penalties.

While we have no direct evidence of harmful activity, owners of tax-delinquent properties are not likely to have the incentive to maintain them because they can be taken away in a tax foreclosure. The result can be devastating to neighborhoods.

Potential Remedies

Some have suggested that one way to address the harmful-transaction problem would be to create a list of known repeat offenders and prevent them from acquiring property. A law of this type exists in Pennsylvania, where municipalities may petition to prevent a foreclosure auction purchaser from acquiring a property if that purchaser has been convicted of a housing code violation and has not corrected it.[1] But using blacklists to prevent property acquisition may not be effective in a world where anyone placed on such a list could incorporate a new entity to continue acquiring property, which can be done quickly and inexpensively. In that sense, blacklists may be under-inclusive.
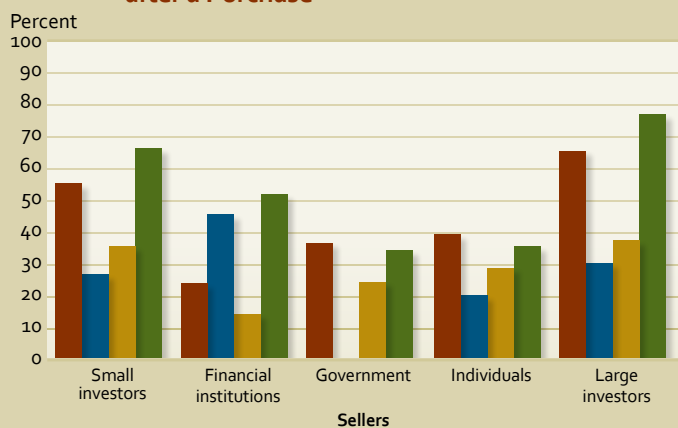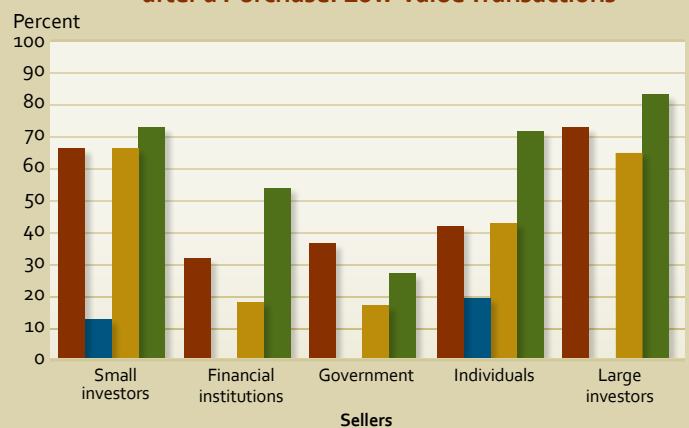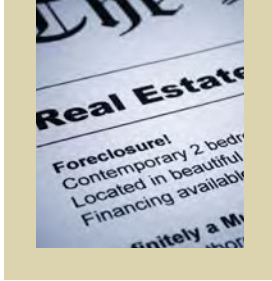
A more promising policy solution would require a change in state law: preventing county recorders, who are charged with tracking owners of real estate, from recording any new ownership of property that has outstanding delinquent

taxes or code violation penalties. Currently, the Ohio Revised Code requires recorders to record authentic instruments properly presented.[2] Changing the law to prevent tax avoiders from closing on a transaction would directly address the problem by undermining the business model undergirding undesirable transactions. Unless purchasers paid taxes, improved the property, or kept up to code, they would be unable to legally transfer ownership.

This solution would give every purchaser an incentive to maintain properties and keep them on the active tax rolls, or they would be unable to turn over inventory. Such a transfer restriction would discourage buyers from purchasing property for which they could not provide upkeep. It might also prevent corporate shell games, where a corporate entity sells a property to another corporate entity controlled by the same owner or owners in order to delay delinquent tax or housing code enforcement actions.

A few words of caution: Because well-meaning purchasers can fall behind on taxes, broad transfer restrictions may be overly inclusive. Policymakers should carefully craft such restrictions to minimize unintended consequences. In the presence of such a restriction, for example, depository institutions may be reluctant to foreclose on a property if the property owner failed to pay taxes and they were not paid by the lender. Transfer restrictions may also chill the acquisition of properties with large amounts of outstanding taxes or code violations, even when potential purchasers would seek to rehabilitate the property or otherwise ensure its productive use.

These unintended consequences can be mitigated to some extent. For example, policymakers may want to allow properties to be transferred to public entities or land banks, to facilitate voluntary surrender of property despite back taxes and code violations. This type of exception may involve a county's forgiving some or all back taxes when responsible buyers purchase property or allowing ownership transfers if the new owner agrees to pay taxes or code violations over time. Additionally, it may make sense to allow involuntary property transfers related to a death, bankruptcy, foreclosure, or divorce, despite back taxes or code violations. These exceptions to transfer restrictions

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1. See 53 Pennsylvania Statutes § 7328(b.2) & 72 Pennsylvania Statues § 5860.619(c) (2010), enacted in 1998. Missouri attempted to create a similar provision that prohibits persons from bidding on property at sheriff's sales, VAMS § 141.550.2(2) (1998), but the entire bill containing the law was struck down because the title of the bill was vague, violating Missouri's constitutional requirement that bills have clear titles. See Home Builder Association v. State, 75 S.W.3d 267 (Sup. Ct. Mo., 2002).

2. Ohio Revised Code §§ 317.13 & 317.22 (2010).

should be carefully crafted. Broad exceptions may allow undesirable transactions to continue, while narrow exceptions may inhibit healthy transactions.

Even with these exceptions, there could be a short-run slowdown in transfer activity as the market adjusts to the new rules. While some homeowners in the affected areas may see this as a negative outcome, we believe there are positive long-run consequences for all weak markets. Properties will be channeled to the land bank or to private rehabbers at lower cost in the absence of irresponsible buyers. This frees up resources for rehabilitation or demolition. A smaller and more pristine housing inventory should stabilize home prices and strengthen the market in the long run.

Another possible unintended consequence of this proposal is that in the short run, the restriction would slow the transfer of all property because of the time it takes to check for back taxes and assessments. This delay could be significant if records on real property taxes and other public assessments are not kept in an easily accessible electronic format.

According to an informal survey we conducted with county recorders, at least four of Ohio's 88 counties do not yet keep electronic tax records. Code violation records are kept at the municipal level, and it is unclear how many are kept electronically. To avoid slowing the transfer of real property, the state legislature may choose to allow counties to opt in or out of restrictions on transfer. In any case, lawmakers would need to work closely with lenders, real estate buyers and sellers, community development practitioners, and county governments to create exceptions and minimize unintended consequences while limiting harmful transfers.

Final Thoughts

Stories about irresponsible property speculators abound. Their very business model allows them to pay more than bidders who are interested in rehabilitation. Our analysis shows that large investors focus on tax-delinquent properties and often fail to pay property taxes. As a result, entire communities sometimes are unable to break the cycle of disinvestment and decline of their housing stock.
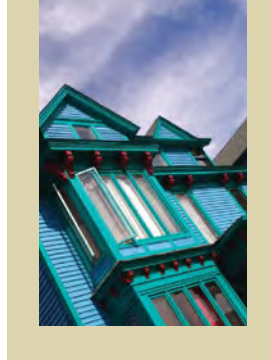
Requiring all past-due taxes and code enforcement penalties to be cleared before transfer could help many neighborhoods in their battle against vacancy, abandonment, and blight. It is one of many ways policymakers could discourage the transactions that hinder the rehabilitation of housing stock. At a time when government budgets are stretched thin because of declining tax revenues, this policy proposal may give a jolt to the collection of property taxes. Cuyahoga County, for example, could have collected approximately $8.5 million in past-due taxes in 2009 under this proposal, notwithstanding the likely decline in the number of property transfers one would expect as high-volume investors left the market. This tax revenue could be used to acquire and rehabilitate or demolish additional distressed properties.

Still, the availability of such untapped resources to all Ohio counties and municipalities may create an incentive for private investors to fund efforts to improve electronic record-keeping of taxes and code enforcement programs. In other words, the public entities could fund their efforts through bond issues that would be repaid with the enhanced property tax receipts. While this latter point is not necessarily a policy recommendation, it shows that this proposal may have advantages that go beyond the prevention of harmful transactions. The overall benefits certainly seem to outweigh the costs. ■

What do you think?
We're interested in hearing your comments as we refine this proposal. Send comments to *forefront@clev.frb.org*

Recommended reading
Coulton, Claudia, Michael Schramm, and April Hirsch. 2008. "Beyond REO: Property Transfers at Extremely Distressed Prices in Cuyahoga County, 2005–2008." Case Western Reserve University Center on Urban Poverty and Community Development.

Resources
For suggested reading and information about states that restrict transfers of tax-delinquent properties, go to *www.clevelandfed.org/forefront*

Foreclosure-Related Vacancy Rates

Stephan Whitaker

The national foreclosure crisis has caused there to be millions more vacancies in our housing stock than before. Vacant homes lower their community's property values and quality of life. Neighbors and public officials know foreclosed homes sit empty for months, but precise measures of foreclosure-related vacancy are rare. Using data from Cuyahoga County, Ohio, I trace the rise and fall in the vacancy rates of homes during the 18 months following their foreclosure. Ominously, the data suggest that foreclosure may permanently scar some homes. Foreclosed homes still have higher vacancy rates than neighboring houses two to five years after a sheriff's sale.

As the housing market staggers into its fifth year of decline, the issues of foreclosure and vacancy continue to demand our attention. In 2010, 1.85 million consumers nationwide received a new foreclosure notice, compared to between 600,000 and 800,000 in the "normal" times of a decade earlier.

Almost all foreclosed homes are at least temporarily vacant; as long as they remain so, they impact the home values and quality of life in their neighborhoods. What if the vacancy associated with foreclosure lingers on long after the foreclosure? Could the rise in foreclosures translate into both a short- and a long-term increase in vacancy?

Using a unique data set covering Cuyahoga County, Ohio, I explore whether foreclosed homes are reoccupied at rates similar to those of other recently sold homes. The data reveal that foreclosed homes go through more than a year of very high vacancy rates following the auction and are substantially more likely to be vacant up to 60 months after the foreclosure.

The distribution of foreclosures is heavily weighted toward high-poverty areas, and homes in these areas are more likely to be vacant long after they are sold. However, even compared to homes in census tracts with similar poverty levels, foreclosed homes show higher vacancy rates than others years after the auction.

The Impact of Vacancy

Foreclosure and the vacancy it causes are a concern for policymakers because a foreclosure's impact extends to hundreds of people in the neighboring community. A foreclosure adds one more home to the supply on the market and so depresses the prices of all homes sold in the area. This leads to smaller gains or larger losses for people who must sell in the current market and devalues the largest asset most households own—their house. This lower value limits homeowners' ability to extract equity for expenses such as home improvements, starting a business, college tuition, or retirement. Owners of depreciated homes may constrain their spending to try to make up for the lost wealth, and this can act as a drag on economic growth.

A vacant home can also lower property values, even if it is not for sale. Vacant homes are often part of a "shadow inventory" because the owners intend to put them on the market when demand recovers. Every month, some of these owners will decide that the costs of holding an empty house outweigh the benefits of waiting. In locations with a lot of shadow inventory in addition to the active inventory, there is downward pressure on home prices.

Moreover, the exterior of a vacant home is usually less likely to be well-maintained than an occupied one. This detracts from the vitality of the neighborhood and the prices buyers are willing to pay for nearby homes. In high-crime areas, unoccupied homes are often broken into, stripped of valuable metals, and vandalized. In some cases, criminals move into the homes and run illegal operations from them.

As foreclosures have increased in recent years, so have the studies that estimate their economic impact. It is not surprising that economists have been able to detect a distinct difference in prices for homes near a recently foreclosed property. John Harding, Eric Rosenblatt, and Vincent Yao used data from seven metro areas to estimate the impact of a foreclosure on the sale prices of nearby homes. Their results suggest that a distressed property within 300 feet of a home sale will lower the sale price by 1 percent. John Campbell, Stefano Giglio, and Parag Pathak report a similar finding in their study, which analyzes two decades of sales records from Massachusetts. They observe that a foreclosure within 264 feet reduced the sale price of a house by 1 percent. These two studies build on a list of similar published findings.

In articles on foreclosure, authors usually note that foreclosures lead to vacancies, which can depress sales prices through the supply and disamenity channels discussed above. A study by the Federal Reserve Bank of Cleveland's Dan Hartley estimates the strength of the two channels separately. He finds that foreclosures in high-vacancy neighborhoods depressed prices by 2 percent via a disamenity effect, whereas foreclosures in low-vacancy neighborhoods depressed prices by 1.6 percent via a supply effect.

Parcel-level foreclosure data are widely available because the process must be recorded in court and property records.

Data on the vacancy of individual homes are more difficult to obtain, so only one study so far has estimated the impact of vacant homes on nearby property values. Brian Mikelbank used data, collected by the City of Columbus, which identified vacant and abandoned homes along with foreclosures. He estimated that a vacant home reduced the sale price of nearby homes by 3.6 percent in the year following the city's survey. Controlling for vacancies reduced the estimated impact of the foreclosures, reflecting the strong relationship between the two. Anecdotal information and aggregate figures suggest that foreclosures cause additional vacancies, but the relationship needs further study using data on individual properties.

A Study of One Ohio County

To study whether foreclosure increases the length of time homes stay vacant, a set of data have to be constructed. I focused on Cuyahoga County, a populous counties hit hard by the foreclosure crisis. I used county sales records from 2006 to 2010, and for vacancy data, I used the U.S. Postal Service's address database. Homes are recorded as vacant in the USPS database if they have been vacant for at least 90 days. Actual vacancy rates are likely higher because there are many short-term vacancies that are not captured in these data.

The vacancy observations used in this analysis were all made in 2010. Figures that represent how many homes

Figure 1. Occupancy before and after Home Sale
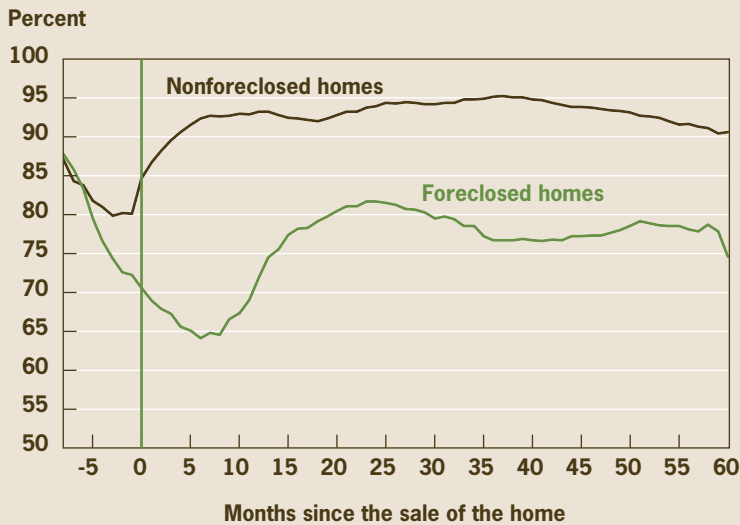
Percent

Nonforeclosed homes

Foreclosed homes

Months since the sale of the home

Figure 2. Percent of Foreclosed Homes Awaiting Resale, by Type of Buyer

Percent

Individual

Investor or nonprofit

Bank

All

Federal agency

Months since the sheriff's sale

Notes: Foreclosed homes are defined as homes sold at a sheriff's sale. Nonforeclosed homes are the remainder of homes sold. Vacancy is defined as a home being unoccupied for 90 days or more. Occupancy rates for each month from sale include all homes that can be observed with that number of months between the sale and the vacancy designation.
Sources: Author's calculations using all home sales recorded in Cuyahoga County from 2006 to 2010 and vacancy data from the U.S. Postal Service.

Sources: Author's calculations using all home sales recorded in Cuyahoga County from 2006 to 2010 and vacancy data from the U.S. Postal Service.

are vacant four or five years after a sale are calculated by taking homes that were sold in 2006 and observing whether they were vacant in 2010. Likewise, the vacancy rates calculated for the months close to a sale are based on sales in 2009 and 2010. The housing units are included in every month-difference group where it is possible to observe both sales and vacancies. Altogether, the calculations involve 85,000 properties and 130,000 sales transactions. I considered a sale a foreclosure if the transaction is recorded as a sheriff's sale.[1]

As to the question of whether foreclosed homes are more likely to be vacant after the sale, the simplest answer is yes. Six to nine months before the sale, the occupancy rates of both types of homes are essentially the same (figure 1). By the date of the sale, the homes in foreclosure are already more likely to be in an extended period of vacancy. After the sale, there is a sharp contrast: Homes sold through ordinary transactions are occupied by their new owners within a few months. Vacancies among the foreclosed homes increase during the same period.

At six months after a sheriff's sale, a third of foreclosed homes are in an extended period of vacancy. The occupancy of foreclosed homes climbs between seven and 15 months after the sheriff's sale, but it plateaus after that. In any month from two to five years after the sale, foreclosed homes are two to four times more likely to be vacant than those sold through ordinary transactions.

The Foreclosure Process and Vacancy

The connection between foreclosure and vacancy is built into the process and institutions. When a foreclosure auction is scheduled, the sheriff will physically remove the occupants of a home if they do not vacate voluntarily. Sheriff's auctions differ from ordinary sales in that potential buyers have little or no access to the homes beforehand. Buyers receive no disclosure documents and cannot sue the previous owner if an important defect was not disclosed. In some states, there is even the possibility (perhaps remote) that the previous resident can reclaim the house up to a year after the sale if they can come up with funds to repay their debt.

All of these unknowns and risks strongly discourage individuals from purchasing a home to live in at a sheriff's sale. Investors are willing to take the risk in some cases (17 percent of auction sales in the data). The vast majority (79 percent) of the top bidders at sheriff's sales are banks or the federal agencies (Department of Housing and Urban Development, Department of Veterans Affairs, and government-sponsored enterprises Fannie Mae and Freddie Mac) that currently hold the mortgage.

When a bank purchases a home at sheriff's sale, the property becomes "real estate owned" (REO) on the bank's books.

Figure 3. Occupancy before and after Home Sale
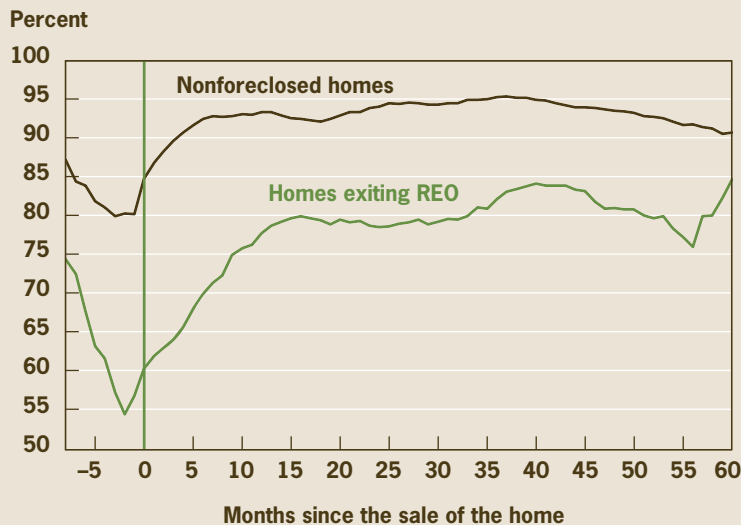
Figure 4. Occupancy before and after Sale of Foreclosed Homes, by Poverty Level

Notes: Foreclosed homes are defined as homes sold at a sheriff's sale. Nonforeclosed homes are the remainder of homes sold. Vacancy is defined as a home being unoccupied for 90 days or more. Occupancy rates for each month from sale include all homes that can be observed with that number of months between the sale and the vacancy designation. "Homes exiting REO" includes all homes that have a sale observed after the sheriff's sale. Homes purchased at the sheriff's sale by investors, nonprofits, and individuals are included.
Sources: Author's calculations using all home sales recorded in Cuyahoga County from 2006 to 2010 and vacancy data from the U.S. postal service.

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Banks generally hire real estate brokerages to market these homes. Although the brokerages enable potential buyers to inspect the homes, the banks still insist on selling the properties as-is. In exchange, they accept a lower price. Despite the discount, REO homes may spend more time vacant and on the market than other homes.

Offers from potential buyers must complete the bank's approval process, which can take weeks. Also, any undesirable feature of a home can both lower its selling price and extend its time on the market. Foreclosed homes often are not maintained as well as others because the previous occupants were in financial distress and chose not to pay for repairs on a house they expected to lose. REO homes sit vacant while the processes of attracting a buyer and completing the sale move forward relatively slowly. In contrast, homeowner sellers usually do not move out until after the closing.

The REO process can explain most of the large gap between the occupancy rates of foreclosed and nonforeclosed homes in the first year after their sales. Figure 2 shows the percentage of homes that have a second sale recorded after the sheriff's sale. The trends show that banks, investors, and nonprofits resell properties gradually over the 24 months after the auction. Federal Agencies unload most of their properties within a year, while individuals (just 4 percent of buyers) keep most of the properties they purchase.

Investor-owned homes are not technically REO, but investors seem to behave like banks and to serve a similar purpose. Instead of filling sheriff's-sale homes with tenants, investors are reselling them. Within two years, 75 percent of investor-purchased homes have been sold again. Just as banks buy their collateral out of the opaque auction market and then resell via broker viewings, investors are taking the risk of purchasing at auction and then reselling to buyers who can inspect the homes. The bank's REO process reduces its losses, and the investors profit from an arbitrage. If investor-owned homes are undergoing renovations or being marketed, they are contributing to the high vacancy rate, just like bank- and agency-owned homes. A portion (12 percent to 14 percent) of bank- and investor-owned homes do not record a second sale within the time observed.
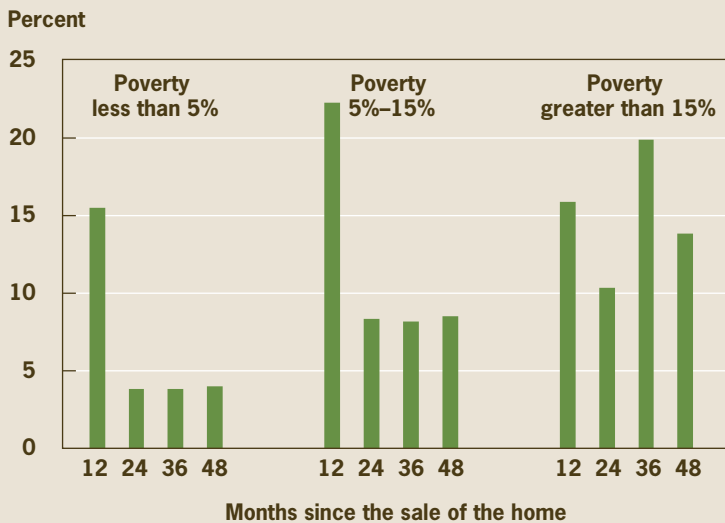
If we focus on the homes that exit REO status or are flipped, we still see a large difference between them and the nonforeclosed homes. Almost half of the previously auctioned homes are recorded in the data as having been vacant for 90 days or more at the time of their first sale after the sheriff's sale (figure 3). The new owners reoccupy these homes at a similar pace following the sale, but they are starting at lower levels. Fourteen months after being resold, 80 percent of the homes are occupied. However, a plateau is visible in this series as well. Three to five years after their post-auction sale, approximately 20 percent of these homes are still vacant.

Home Characteristics and Vacancy

The REO process explains much of the difference in the vacancy rates of foreclosed and nonforeclosed properties, but not all. The type of homes that go into foreclosure have something to do with it as well. In general, lower-value homes are more likely to be vacant. More of the homes sold in sheriff's sales are older and located in lower-income neighborhoods; 33 percent of nonforeclosed homes were built before 1941, compared to 61 percent of foreclosed homes; and 27 percent of nonforeclosed homes were located in high-poverty census tracts, compared to 60 percent of foreclosed homes. (A census tract is considered high poverty if at least 15 percent of its residents are living in households that fall below the official poverty threshold. A household's poverty status depends on the number of people living there and the total household income.)

If we divide up the foreclosure observations according to their census tract's poverty level, we observe that homes in middle- and upper-income areas are reoccupied almost to the same level as nonforeclosed homes (figure 4). The foreclosed homes in high-poverty areas are far less likely to be reoccupied at any time 18 to 60 months after the sheriff's sale. The very high vacancy levels in high-poverty neighborhoods are partly a reflection of Cuyahoga County's stagnant population. In some strong-market cities, such as New York or Los Angeles, surplus housing stock would be absorbed by new immigrants.

Figure 5. Foreclosure Gap since the Sheriff's Sale

Notes: The foreclosure gap is the difference between the vacancy rates of homes that have been foreclosed and homes that have not. Poverty level refers to the census tract.
Sources: Author's calculations using all home sales recorded in Cuyahoga County from 2006 to 2010 and vacancy data from the U.S. Postal Service. Data on the percentage of individuals living in households with income below the poverty line are from the 2005–2009 American Community Surveys.

The Foreclosure Gap

At this point, we might be ready to say that foreclosure is just a temporary problem. Homes may be vacant while owned by banks or investors, but after that, they may return to the vacancy level that is normal for their age and area. However, there is one more angle on the data suggesting that foreclosure does have its own long-term impact. We can calculate a foreclosure gap—the difference between vacancy in foreclosed and nonforeclosed homes—within narrow categories. Figure 5 presents one such calculation.

In low-poverty census tracts, the gap is large at 12 months following the sale, as we would expect. The gap shrinks to less than 5 percent, but it persists for at least four years. Three or four additional points of vacancy may not seem like much until you consider that occupancy in low-poverty areas often exceeds 95 percent. This foreclosure gap could be doubling the probability of vacancy for homes in these areas. The pattern is similar in medium-poverty areas, but the gaps are bigger. After four years, foreclosed homes' occupancy rates are 7 points lower than nonforeclosed homes'. In high-poverty areas, the foreclosure gap is large and does not trend downward. At any point between 12 and 48 months after a sale, foreclosure appears to add at least 10 points to the already high vacancy rate of homes in high-poverty areas.

Policy Implications

As the analysis here illustrates, homes that have been through a sheriff's sale have very high vacancy rates for a year and a half afterward. The data strongly suggest that foreclosures leave long-lasting scars on some homes, where the foreclosure gap persists for years after the auction, even when the comparison is limited to homes in similar areas.

Given the literature that links foreclosure and vacancy to lowered property values, policymakers may want to address the process in at least two ways. First, keeping homes out of foreclosure would avoid creating REO and other vacancies that seem to linger among previously foreclosed homes.

Second, for homes that must go through foreclosure, any incentives or changes in administrative procedure that could shorten the time in REO would be helpful. As long as a home in REO status sits vacant, it diminishes the sales prices of all nearby homes on the market. The shorter this time is, the fewer homes will be affected.

However, as with all complex issues, policymakers need to be mindful of unintended consequences. For example, forcing banks to decrease the length of foreclosed homes' time on the market could cause banks to lower sales prices, making the problem worse.

Footnote

1. If a home has a sheriff's sale anywhere in the data, it is not included in the vacancy calculations for nondistressed sales. It would be possible for the same property to contribute to the vacancy calculations based on two non-sheriff's sales (in 2006 and 2008, for example). However, because the sale is linked with a vacancy observed in 2010, the same home could not contribute twice to a single months-from-sale vacancy rate unless it had two non-sheriff's sales within one year. A second sale within a year is standard for foreclosed homes but very rare for never-foreclosed homes.

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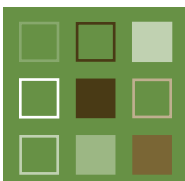
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Municipal Finance in the Face of Falling Property Values

Thomas J. Fitzpatrick IV and Mary Zenker

The fall in property values associated with the recent recession has caused a decline in property taxes which may be amplifying local government budget crises across the country. Cuyahoga County is set to reappraise property values in 2012, and when it does it may only then absorb the full force of the housing market losses caused by the recession. We estimate the potential losses in property values and the county's tax base and find that the impact could be significant.

Historically, recessions tend to trigger a drop in tax revenue and an increased demand for government services, which stresses government budgets. The most recent recession was no different, but this time, declines in municipal tax revenues have been more acute. At fault mostly are a prolonged period of high unemployment and a sluggish economic recovery, which have been compounded by a drop in transfer payments from state and federal governments.

Another factor that is contributing to the current sharp decline in tax revenue is the shrinking of the property tax base because of falling home prices. During and after earlier recessions, home prices remained flat or increased (figure 1). Stable home prices provide stable tax revenue, which is used to fund many critical city services, such as the local police force, fire department, public education, and infrastructure projects. The fall in property values that began in the recent recession—and that continues in many markets today—may be amplifying the budget crises across the country because of the decline in property taxes it is causing. This *Commentary* explores that possibility.

Recalculating Property Taxes

When residential property values fall, the impact on local government budgets depends not only on the extent of the losses but also on when the losses are realized relative to the budget cycle. The timing can vary by state, and it depends on how property values are calculated. While most states use appraisals to estimate the market value of property, they update these estimates in very different ways. The way estimates are updated can have a significant impact on when the losses in property values are realized.

California, for example, reappraises the value of properties for tax purposes whenever ownership of the property changes. This forces cities in California to reduce the taxable value of a property when it goes through foreclosure. With foreclosures figuring so prominently in the past

recession, this reappraisal mechanism has contributed to the budget challenges now facing California cities, as losses are realized immediately with every foreclosure.

Ohio, on the other hand, reappraises the value of properties for tax purposes every six years. While minor revisions are made between these formal appraisals, the methods are imprecise and they can miss big changes. Because a number of Ohio counties have yet to undergo the formal reassessment since the last recession, the full impact of the recession on property taxes and local government budgets may still lie ahead for many places.

Cuyahoga County is a case in point. One of Ohio's interim revision methods is to adjust the estimated tax value of properties every three years based on the prior three years of property sales. Cuyahoga County (home to Cleveland) will undertake its formal reappraisal in 2012, along with 19 other counties. The last formal appraisal, in 2006, occurred near the peak of the market in Cuyahoga County. The 2009 adjustment included sale prices from 2006, a fairly strong

Figure 1. Case-Shiller Home Price Index

Seasonally adjusted, 2000:Q1 = 100
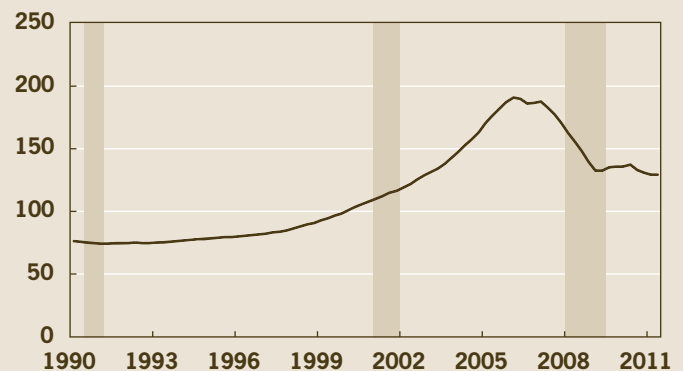
Note: Shaded bars indicate recessions.
Source: S&P, Fiserv, and Macromarkets, LLC.

year for the housing market. So even the adjusted property values in Cuyahoga County do not likely reflect the impact of recent housing price declines. Home values have continued to fall since the last adjustment, suggesting that there may be a large correction upon reappraisal.

Cuyahoga County: A Case Study

We estimated the loss in value that Cuyahoga County's property tax base might realize after its 2012 reappraisal. We started by acquiring the county's 2010 estimates of the market value of every taxable parcel of land in Cuyahoga County ("county estimates").

Next, we listed the sales prices of all residential properties sold for amounts over $0 (including foreclosure sales) from 2006–2010. If a parcel was sold multiple times in a single year, we took only the last sale in that year. We used the sales prices to estimate the current market value of homes ("market estimates"). Some properties are sold for $0, but the vast majority of these—transfers to trusts, interfamilial transfers, or other non-arms-length transactions—would provide no information about market value, so we exclude them.

The only type of $0 transaction that might reflect market value is a transfer of property to a land bank. Transferring a property to a land bank should only occur when the property has no net value, which happens when the sum of the property's rehabilitation costs, including accrued code violations and property taxes, carrying costs, and transaction costs, are greater than the property's expected value. If we included these transfers, it would lower our market estimates somewhat, depending on how many of these transfers there are.

Finally, we compared the county estimates and the market estimates and calculated the annual gain or loss for each property. When the market estimate was higher than the county estimate, we would expect a gain after reappraisal. When the market estimate was lower, we would expect a loss after reappraisal.

It should be noted that the actual 2012 appraisal values will vary from our market estimates for a few reasons. First, we look only at residential property (both single and multifamily), and we use sale values that may be stale. When a property last sold in 2006 or 2007, we use that as our estimate of market value for 2012 despite the decline of home values since then.

Second, our market estimates will be based on a sample that may not be representative, because we can only observe sales that occur. Blighted properties may not sell, just as properties in distressed neighborhoods may not sell. Conversely, people who own high-value properties may hold onto them in the hope of a market rebound.

Third, the actual reappraisal will consider 2011 sales information, which we do not yet have. Fourth, in 2012, appraisals will be "drive by" appraisals—so only the exterior of the home and neighborhood will be viewed. This will not reveal any substantial improvements inside the home, damage inside the home, or other defects such as cracks in the foundation.

Finally, appraisal is at least as much an art as it is a science. Deciding which properties to use as comparables and the extent to which home values should be adjusted based on neighborhood factors will vary depending on the appraiser.

As shown in figure 2, our market estimates give cause for concern. In 2006, when the last appraisal was conducted, and in 2007, market estimates of properties that sold exceeded county estimates. But since 2008 this trend has reversed. The differences between the market and county estimates from 2008 through 2010 imply that when property values are reassessed in 2012, they will be between 11 percent and 18 percent lower than the 2010 county estimates. The loss observed on property sales suggests that after reappraisal, the county tax base will be at least $1.1 billion lower than it was in 2010. But this dollar value estimate is based on the roughly 65,500 properties that were sold between 2008 and 2010, and assumes all other property held its value.

Figure 2. Estimated Market Values of Residential Properties: Cuyahoga County

Billions of dollars, for parcels sold during period
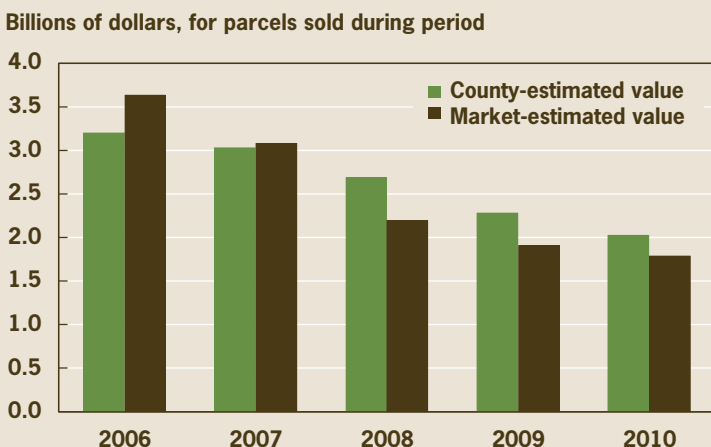
Source: Cuyahoga County auditor.

Figure 3. Estimated Market Values of Residential Properties: Cleveland

Billions of dollars, for parcels sold during period
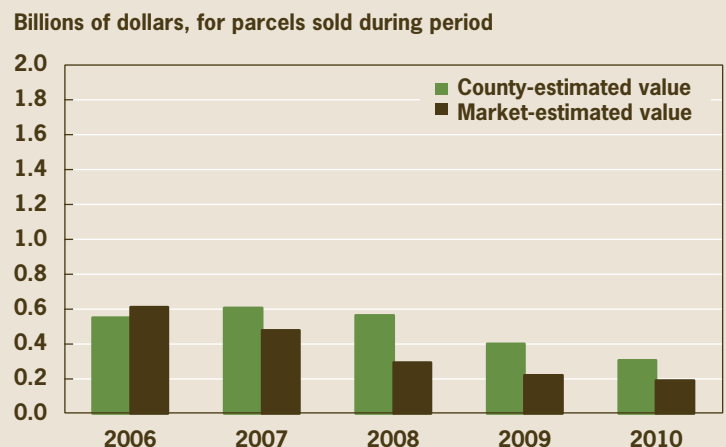
Source: Cuyahoga County auditor.

Cleveland, Inner-Ring, and Outer-Ring Suburbs

The declines in property values and the tax base are not distributed evenly across Cuyahoga County. The impact has been felt most strongly in Cuyahoga's central city (Cleveland) and its inner-ring suburbs (those that border Cleveland). The outer-ring suburbs have not been hit as hard.

All of these areas have followed a similar pattern since the 2007 recession: Market estimates exceeded county estimates in 2007, and sometime thereafter the trend reversed and county estimates exceeded market estimates (figures 3–5). In Cleveland and the inner-ring suburbs the reversal began in 2007. In the outer-ring suburbs it began one year later. But the relative differences between the county and market estimates are larger in Cleveland and the inner-ring suburbs than in the outer-ring suburbs. This suggests that property values have fallen to different extents across the county.

Table 1 contains the implied decline in property values calculated by comparing the market and county estimates. Again, keep in mind that the numbers are estimates, as looking only at the properties that sold is not a representative sample of taxable properties and the actual appraised values may vary for the reasons discussed earlier. Our nonrepresentative sample suggests that the outer-ring suburbs will fare best after the reappraisal, with new values coming in about 8 percent lower than they were in 2010.

While this decline is relatively minor, any decline will present a new challenge that municipalities have not faced during or after prior recessions. According to local policymakers, market estimates of properties that sold have always exceeded county estimates. If our calculations are even close, the 2012 reappraisal will be a first.

Things look more troubling in the inner-ring suburbs and Cleveland. After the 2012 appraisal, the inner-ring suburbs may see property values fall 26 percent to 30 percent lower than the 2010 county estimate. Cleveland's appraisal may be

Table 1. Estimated Declines in Property Values

	Implied change 2008 (percent)	Implied change 2009 (percent)	Implied change 2010 (percent)
Cuyahoga County	−18	−16	−11
Cleveland	−48	−45	−38
Inner-ring suburbs	−31	−30	−26
Outer ring suburbs	−8	−9	−8

Source: Cuyahoga County auditor.

38 percent to 45 percent lower. If appraisals come in close to this far below the 2010 county estimates, Cleveland and the inner-ring suburbs may face a significant tax revenue shock in 2012.

Implications for Tax Collections

Fortunately, large declines in the reappraisal values will have smaller effects on tax collections. In Cuyahoga County, residential property taxes are calculated by multiplying the tax rate of the district by 35 percent of the value of the home as appraised by the county. Basing property taxes on a percentage of the tax estimate reduces the impact of fluctuations in estimates on tax revenues. Governments sometimes use a value stabilizer in property tax calculations similar to that of Cuyahoga County, providing some protection against such steep declines in value.

This value-stabilizing feature would likely make the implied 8 percent decline in outer-ring-suburb property values have a small impact on property tax collection. However, any loss is unprecedented in the outer-ring suburbs, so the small loss could still cause problems in a post-recession environment experiencing sluggish recovery, where sales and income tax revenue remain low.

In Cleveland and the inner-ring suburbs, the impact on tax revenues might also be substantially lower than our market

Figure 4. Estimated Market Values of Residential Properties: Inner-Ring Suburbs

Billions of dollars, for parcels sold during period
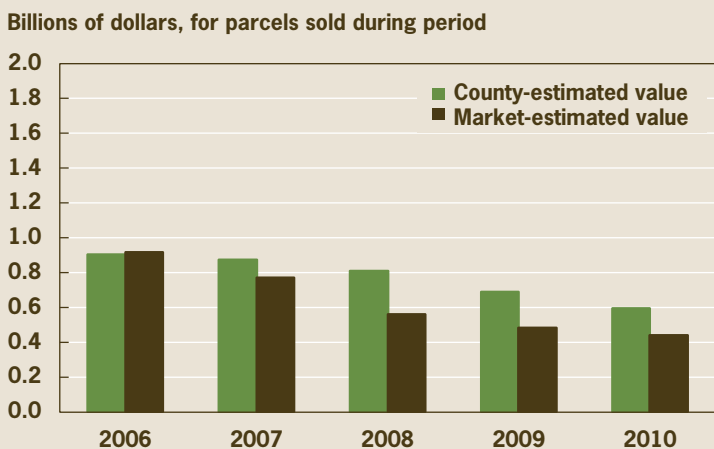
Source: Cuyahoga County auditor.

Figure 5. Estimated Market Values of Residential Properties: Outer-Ring Suburbs
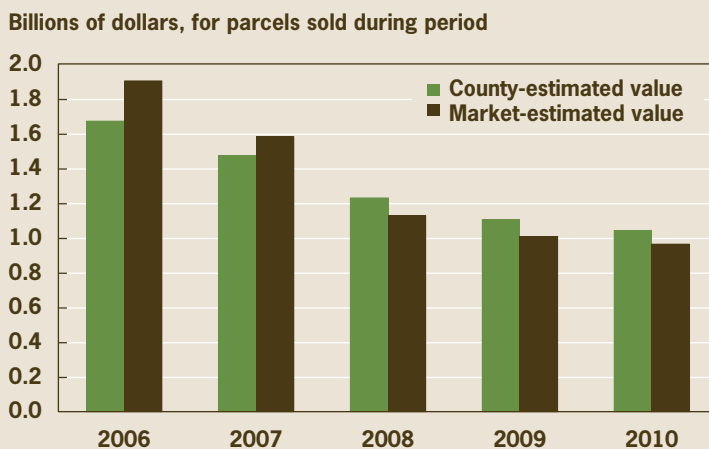
Billions of dollars, for parcels sold during period

Source: Cuyahoga County auditor.

estimates imply. First, for many properties, any decline in the appraisal value will have no impact on tax collections. Residential property may be in a period of tax abatement, when no tax is owed on the property. This is particularly important in Cleveland, which has abated taxes on some new residential construction in order to draw new home owners into the city.

Second, not all residential property owners pay taxes. On average, 52,000 properties in Cuyahoga County are nontrivially tax-delinquent in a given month, which represents nearly 10 percent of the parcels in the county. (Whitaker, Fitzpatrick 2011) Any decline in the value of these properties will have no impact on tax collections, since nothing is being collected. For example, according to Cleveland's 2009 Comprehensive Annual Financial Report (available through the Division of Financial Reporting and Control), the city collected roughly 60 percent of real property tax revenue owed in 2008 and 2009.

But if the implied change is close to the reappraisal value, the impact on tax collections in the central city and inner-ring suburbs could be significant, amplifying their budget issues. Implied declines of 30 percent or 40 percent of residential property values suggest large declines in property taxes, even considering the value-stabilization feature of the tax revenue calculation. Other states that adjust their tax estimates using methods similar to Ohio's may also see municipal budget crises amplified by the fall in property values.

If creative ways to make up for this lack of revenue are not found, local governments may face the undesirable choice of either raising property taxes or reducing funding for essential services. Both actions may make the municipality a less desirable place for new home owners to locate. Weakening housing demand may lead to further declines in property values. In any case, it appears that the dramatic fall in property values across the country will accelerate the financial distress of municipalities in the wake of the Great Recession.

Suggested Reading

"Ohio's Land Banking Legislation: Modernizing an Aged Model," by Thomas J. Fitzpatrick IV, 2010. *Journal on Affordable Housing and Community Development Law*, vol. 19:3.

"The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes," by Stephan Whitaker and Thomas J. Fitzpatrick IV, 2011. Federal Reserve Bank of Cleveland working paper no. 11-23.

Urban Growth and Decline: The Role of Population Density at the City Core

Kyle Fee and Daniel Hartley

In recent decades, some cities have seen their urban centers lose population density, as residents spread farther out to suburbs and exurbs. Others have kept populous downtowns even as their environs have grown. Population density in general has economic advantages, so one might wonder whether a loss of density, which may be a symptom of negative economic shocks, could amplify those shocks. We look at four decades of census data and show that growing cities have maintained dense urban centers, while shrinking cities have not. There are reasons to think that loss of population density at the core of the city could be particularly damaging to productivity. If this is the case, there could be productivity gains from policies aimed at reversing that trend.

The majority of people in the United States—eight out of ten—live in urban areas, or cities with more than 2,500 residents. Most economists who study cities believe that people tend to cluster together because they can work together more efficiently. In fact, denser areas are in general more productive than sparsely populated ones.

But there has been a trend over the past several decades of people spreading out. First, suburbs sprang up around nearly every large city, then outer-ring suburbs, and now exurbs. Some cities held onto residents in their central cities as their borders grew, while others lost density at their cores.

At the same time, many major cities struggled economically while others began to thrive. Former industrial powerhouses like Cleveland, Detroit, and Buffalo declined as the industries they depended on evolved. Meanwhile, cities like Boston, Chicago, and Philadelphia weathered the transition more successfully. At the other end of the spectrum, cities like Atlanta, Dallas, and Phoenix have grown rapidly.

One might wonder, since population density is correlated with productivity in general, whether it is also correlated with productivity within a metropolitan statistical area (MSA), and how density adjusts in different parts of an MSA as the population of the MSA grows or shrinks.

We take a detailed look at changes in population density within MSAs, focusing on differences between growing and shrinking MSAs. We see how patterns have changed over the past four decades. We find that growing MSAs have generally maintained dense urban centers, while shrinking MSAs have not.

Trends in City Populations
We examine population changes in about 180 metropolitan statistical areas (MSAs), using data from the 1980, 1990, 2000, and 2010 U.S. Census. We focus on these MSAs because each one contained at least 50 census tracts in 2000. We use city and MSA boundaries from 2000 so as to hold the geographical area constant (even though city and MSA boundaries may change over time).

Figure 1. Changes in Population Density

Growing cities

Panel A.

Changes in people per square mile

1980–1990

500

0

−500

0   10   20   30

Distance to central
business district (miles)
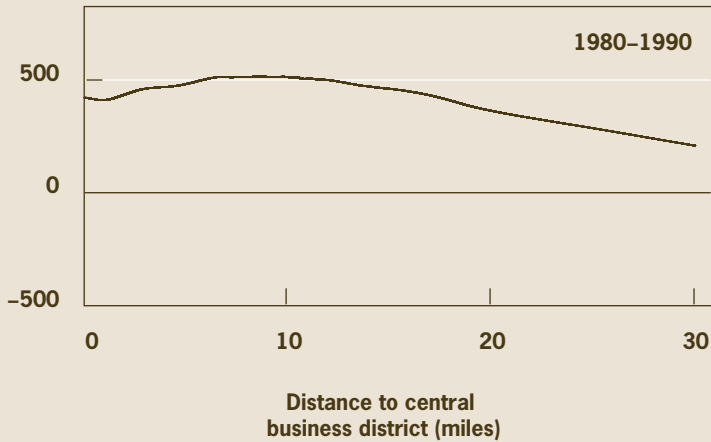
Panel B.

Changes in people per square mile

1990–2000

500

0

−500

0   10   20   30

Distance to central
business district (miles)
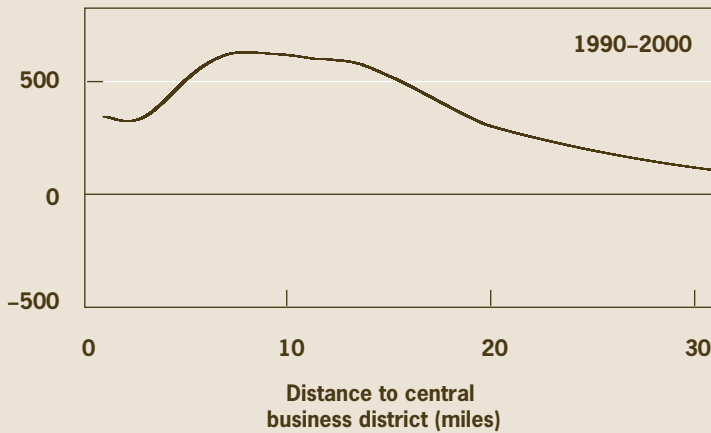
Panel C.

Changes in people per square mile

2000–2010

500

0

−500

0   10   20   30

Distance to central
business district (miles)
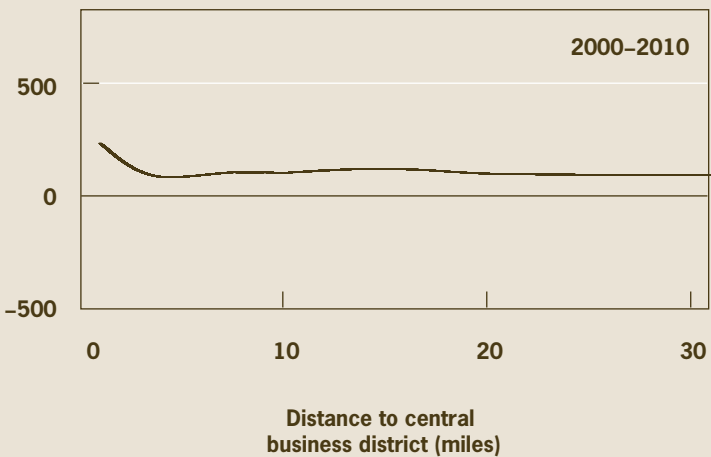
Shrinking cities

Panel D.

Changes in people per square mile

1980–1990

500

0

−500

0   10   20   30

Distance to central
business district (miles)
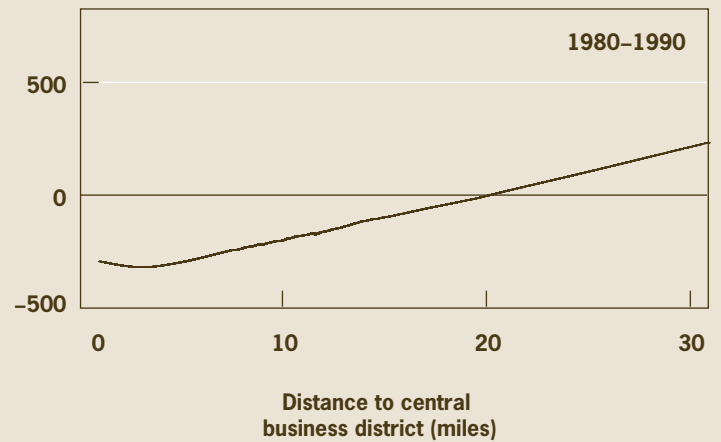
Panel E.

Changes in people per square mile

1990–2000

500

0

−500

0   10   20   30

Distance to central
business district (miles)
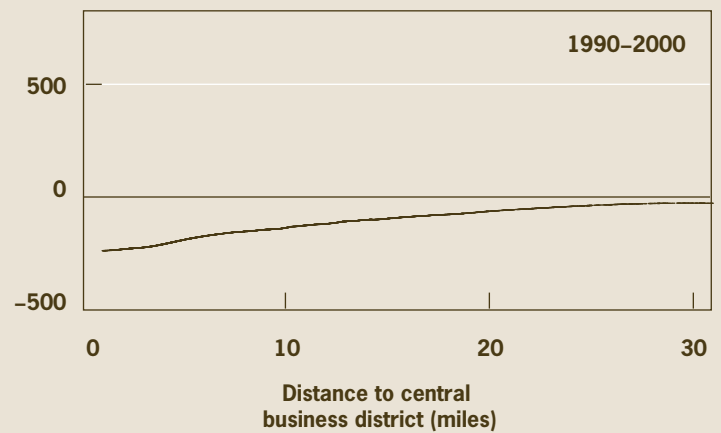
Panel F.

Changes in people per square mile

2000–2010

500

0

−500

0   10   20   30

Distance to central
business district (miles)

Source: U.S. Census/NHGIS.

Figure 1 shows average changes in the population density of census tracts as a function of the distance of the census tract from the central business district of the largest city in the MSA. Growing MSAs are on the left, shrinking MSAs are on the right.

Panel A shows that the peak increase in population density in MSAs that were growing during the 1980s occurred about 10 miles away from the central business district. Panel B shows that this pattern was even more pronounced in MSAs that were growing during the 1990s.

Panel C shows a much different pattern of changes in population density for MSAs that were growing during the 2000s. The biggest increase in population density was near the central business district, while there was smaller growth in population density farther away from the central business district. This may be due to gentrification and redevelopment of neighborhoods closer to the city center.

Panel D shows a big drop in population density near the central business district for cities that were shrinking during the 1980s. However, at distances between 20 and 30 miles from the central business district, population density was actually increasing during this period. This pattern is consistent with a "filtering" story of home-buying habits, in which more affluent households upgrade to larger and newer housing farther from the center of the city, while less affluent households take up the housing left behind in the closer suburbs. If cities are not growing, however, the areas closer to the city center will not attract new occupants.

Panel E shows a similar but less pronounced pattern for shrinking cities during the 1990s, with the biggest loss of population density close to the central business district. The main difference is that rather than increasing population density at distances farther than 20 miles from the central business district, the change in population density is just below zero.

Finally, Panel F shows a pattern similar to the 1990s for MSAs that were shrinking during the 2000s, except that there is less of a drop in population density very close to the central business district. This may be evidence of gentrification and redevelopment occurring even in some of the shrinking MSAs.

While figure 1 shows average changes in population density patterns for a large number of MSAs, it is also interesting to look at individual MSAs. Figures 2, 3, 4, and 5 show population density maps of Atlanta, Chicago, Cleveland, and Detroit in 1980 and 2010. We selected these cities to illustrate how population density has changed over time in cities spanning a range of growth levels. Atlanta represents huge growth—the population living within the boundaries of the Atlanta MSA in 2000 grew more than 70 percent from 1990 to 2010. Chicago reflects moderate growth, about 15 percent since 1990. Cleveland represents slight decline, about 1 percent since 1990. And Detroit illustrates large decline, around 14 percent since 1990.

The density maps reveal an outward spread of low-density suburbs in all four metro areas. Atlanta seems to maintain or increase its density in the center, while Chicago becomes less dense on the West Side and South Side (within the City of Chicago) but becomes denser in the Loop and near the Loop, the central downtown commercial district. In contrast, Cleveland and Detroit lose much of their density in the central cities.

Overall, in growing cities, population density either remained the same or increased in most areas. In contrast, in shrinking cities, formerly high-density city centers saw the biggest drop in density, while the surrounding low-density areas saw an increase population density. In practice, this thinning out of high-density areas of shrinking cities is consistent with population movements out of urban areas and into the surrounding suburbs.

Density and Education

In light of the evidence that denser places seem to be more productive than more diffuse places, a natural question to ask is whether cities that lose density in their core can maintain their economic advantages. The answer to this question may depend on the mechanism that is providing the urban productivity advantage. Economists have identified three such mechanisms: sharing, matching, and learning.

Sharing refers to spreading the cost of expensive goods and services like orchestras or professional football teams over many people. It also refers to businesses having the benefits of resources close at hand, for example, when a place with a large final goods sector has a wider variety of input suppliers in the area. Expertise is a resource, too, and places with dense populations can support more specialists and benefit from their input. There may in fact be gains to specialization that can only be realized in big cities.

Matching refers to an employer finding the best person for a job or a worker finding the best job for his or her skills. Bigger cities may allow employees with specific skills to match with employers looking for those skills more quickly and also to find an employer that they match with better.

Learning refers to the production, diffusion, and accumulation of ideas and knowledge.

In general, cities grow when they appear relatively more attractive than other cities, and they shrink when they appear relatively less attractive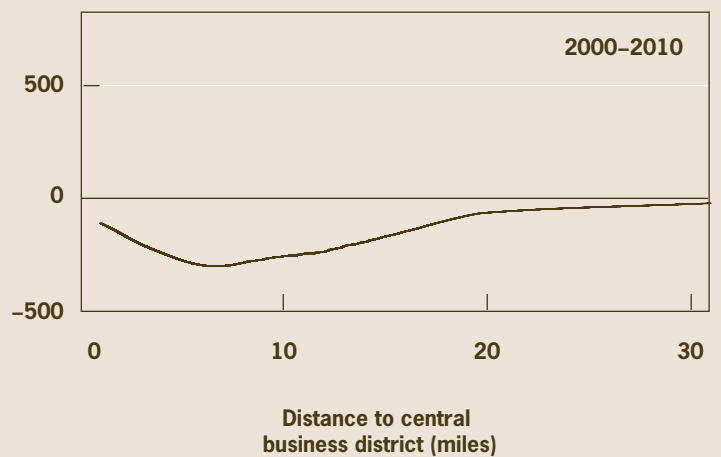. Cities look attractive if they offer high wages, a low cost of living, and amenities such as proximity to recreation (such as lakes, oceans, and parks), good weather, and low crime. Some cities grow faster than others because of changes in their relative attractiveness. When a city begins to look relatively more attractive, say because an industry which is concentrated in the city is booming and wages have been driven up, people will start to want to move there.

Figure 2. Population Density, Atlanta

1980
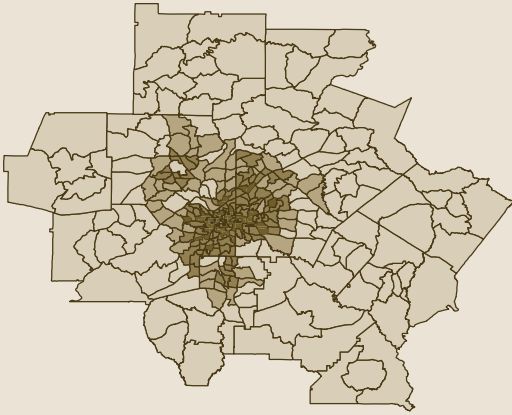
2010
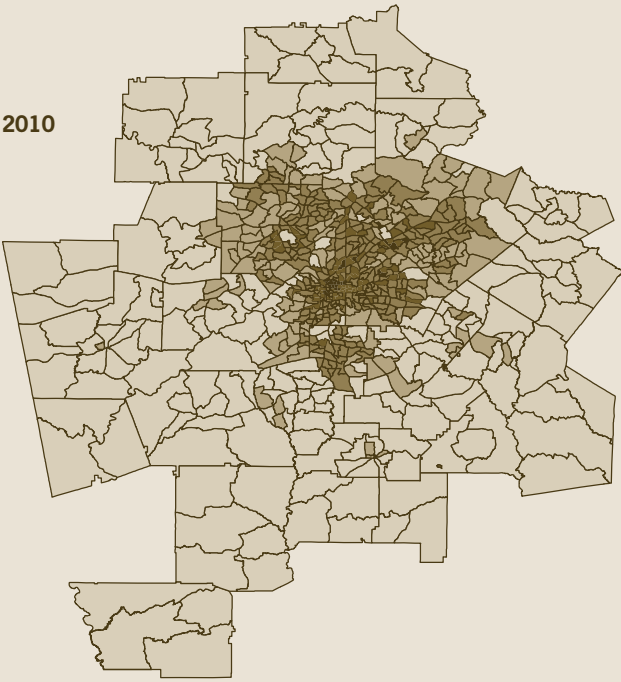
Figure 3. Population Density, Chicago

1980
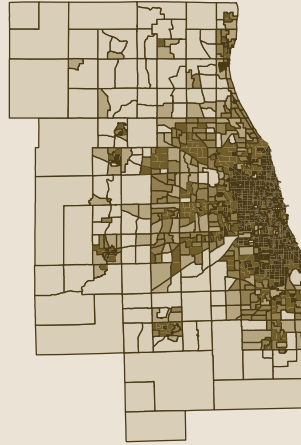
2010
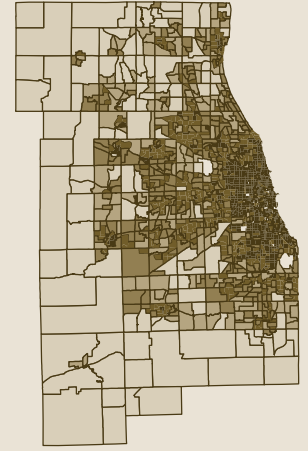
Figure 5. Population Density, Detroit

1980
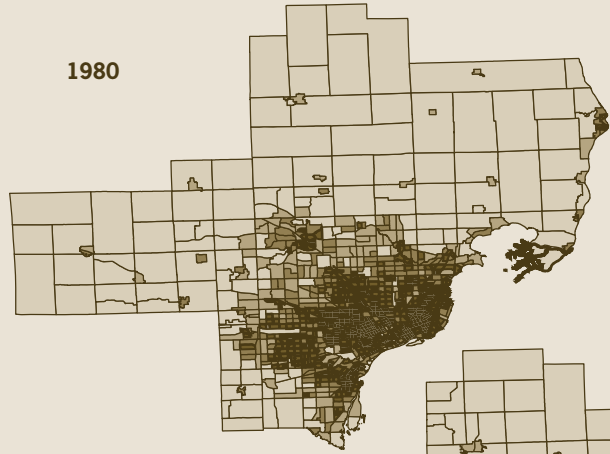
2010
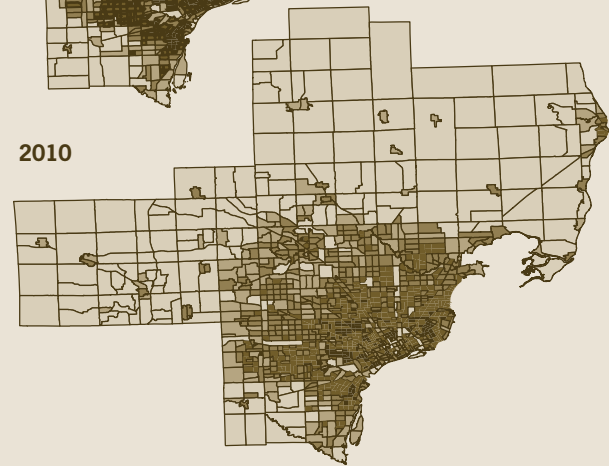
Figure 4. Population Density, Cleveland

1980
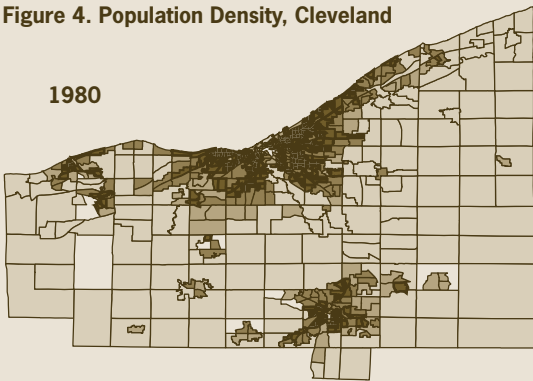
2010

People per square mile

☐ No data
☐ 0–1,000
☐ 1,001–2,000
☐ 2,001–4,000
☐ 4,001–7,000
■ Greater than 7,000

Source: U.S. Census/NHGIS.

Different cities may derive their economic advantage from one or more of the three mechanisms. However, it does seem to be the case that learning plays a role in one particular way.

Economists have documented a positive correlation between city growth and the average education level of the inhabitants. Edward Glaeser and Albert Saiz suggested that the reason it is the case that more educated cities tend to grow more quickly than less educated cities might be that more educated cities can adapt better to change and negative economic shocks. The evidence seems to support this hypothesis.

Does Core Density Matter?

Evidence suggests that denser MSAs are more productive. We have shown that population loss at the MSA level tends to be associated with a drop in population density at the core of the MSA. A question for future research is whether core density is particularly important for productivity or if the average level of population density across the MSA is all that matters. If core density is important for productivity, then it might be important for policymakers across the entire MSA to consider measures aimed at keeping the center city densely populated.

Of course, policymakers need to take into consideration the desire that individual households may have for low-density housing far from the city center and weigh it against the productivity advantages of density. In some respects, by promoting a dense core they may just be undoing or counteracting other policy incentives that are already in place and distorting individuals' natural behaviors.

Economists have found evidence that the construction of the interstate highway system played a part in fostering the growth of suburbs, as it provided quick access to city centers from the periphery. In large cities with congested highways, long commute times provide a restraint on how far out people want to live. However, this restraint is less present in shrinking cities whose highways flow smoothly.

Other policies, such as the mortgage interest tax deduction, provide incentives for households to live in places with owner-occupied housing, which tend to be in less dense places that have more single-family homes. Better schools and lower crime are often cited as reasons to move to the suburbs, yet it is not clear to what degree these differences may have been driven by policies that provide incentives for wealthier people to move further away.

If population density near the heart of a city helps keep a city growing and more productive, policymakers may want to consider the possibility of creating incentives for higher-density living. This may be especially worth looking at in MSAs with declining populations.

Recommended Reading

"Productivity and the Density of Economic Activity," by Antonio Ciccone and Robert E. Hall, 1996. *American Economic Review*.

"Microfoundations of Urban Agglomeration Economies," by Gilles Duranton and Diego Puga, 2004. In *Handbook of Regional and Urban Economics*.

"Urban Decline and Durable Housing," by Edward Glaeser and Joseph Gyourko, 2005. *Journal of Political Economy*.

"The Wealth of Cities: Agglomeration Economies and Spatial Equilibrium in the United States," by Edward Glaeser and Joshua Gottlieb, 2009. *Journal of Economic Literature*.

"Spatial Distribution of Economic Activities in North America," by Thomas Holmes and John Stevens, 2004. In *Handbook of Regional and Urban Economics*.

"Human Capital Externalities in Cities," by Enrico Moretti, 2004. In *Handbook of Regional and Urban Economics*.

"Did Highways Cause Suburbanization?" by Nathaniel Baum-Snow, 2007. *Quarterly Journal of Economics*.
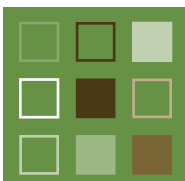
Kyle Fee is a research analyst at the Federal Reserve Bank of Cleveland, and Daniel Hartley is a research economist at the Bank. The views
they express here are theirs and not necessarily those of the Federal Reserve Bank of Cleveland, the Board of Governors of the Federal
Reserve System, or Board staff.

Overvaluing Residential Properties and the Growing Glut of REO

Thomas J. Fitzpatrick IV and Stephan Whitaker

Swelling REO inventories are the latest fallout of the housing crisis, costing lenders money and contributing to neighborhood blight. Yet lenders could avoid taking on so much REO if they could more accurately estimate the value of the homes they foreclose on, especially in weak housing markets. Correcting this apparent misunderstanding of the market could speed the clearing of REO inventories, save lenders money, and help stabilize housing markets.

Because foreclosure rates have been elevated for so long and housing demand has been weak, the number of properties repossessed by lenders has ballooned. The growth of these real-estate-owned (REO) inventories has shifted much of the national policy focus from preventing foreclosure to shedding REO inventory.

As REO inventories grow, a number of problems grow with them. For one thing, property sitting in REO is expensive for lenders. Lenders must keep their REO properties secure, bring them up to local housing codes, maintain them, pay property taxes, and market them for resale. Meanwhile, neighborhoods wrestle with increased vacancy and its consequences, as the vast majority of REO properties are vacant.

These problems are worse in weak housing markets, where the supply of housing exceeds the demand for it. Several factors combine to increase the odds that REO homes will actually cost more to maintain than lenders can expect to sell them for. For example, carrying costs are likely to be higher. Homes entering foreclosure and lingering in REO in weak markets tend to be older and of lower quality than homes entering REO in strong markets. Property in weak markets is more likely to be vandalized while sitting in REO, and older housing stock tends to deteriorate more rapidly. To top it off, weak demand for housing depresses overall housing prices.

In weak markets, lenders may be better served by not taking properties into REO in the first place, or minimizing the time properties spend in REO by donating them to land banks (see "How Modern Land Banking Can Be Used to Solve REO Acquisition Problems" in the Recommended Reading).

Why this is not occurring more often may be explained by the systematic overestimation of property values in weak housing markets by appraisers, investors, and lenders. Overestimating the value of a foreclosed home leads lenders to set too high a minimum bid at the sheriff's sale, which lowers the chance that someone will buy the home at the auction and take it off the lender's hands.

We analyzed sales data from Cuyahoga County, Ohio, and found signs that appraisers, lenders, and investors could be routinely overestimating the property values of foreclosed homes there. We suggest some simple identifiers that can help lenders better estimate home values in weak housing markets. And though we have focused on one county, we believe the situation could be the same in other places. The factors we identify as possible causes of overestimation in Cuyahoga County are likely to be found in many other weak housing markets around the country.

Estimated Property Values and the Reality Check

To investigate how accurately lenders are valuing properties prior to taking them into REO, we turned to a relatively weak housing market: Cuyahoga County, Ohio (home to Cleveland). We analyzed property transaction data from the county auditor from January 2006 to June 2011, comparing the auction price paid by the lender and the subsequent sale price of the home. If the sale price is less than the minimum that was set, we say the lender took a "loss."

Ohio is a judicial foreclosure state, which means that once a property has been foreclosed upon, it is seized by the county sheriff and auctioned off. Once the property has been seized, the sheriff pays for appraisers to go out and value the property. By state law, the minimum bid (or auction reserve) at the first auction is set at two-thirds of the appraised price. If there are no bids at the first auction, the lender can set the minimum bid for subsequent auctions, which are held weekly, at any amount up to the amount of the unpaid loan. For example, if a borrower had $100,000 of loan principal outstanding at the time of foreclosure, the lender could set the minimum bid at $100,000 plus foreclosure costs.

In theory, the lender should be setting the minimum bid based upon what it could obtain by selling the property, less carrying and transaction costs. Lenders typically obtain a real estate broker's price opinion or a "walk around" appraisal, and then they calculate expected costs and value the property accordingly. In Cuyahoga County, it is unclear if lenders are relying on the foreclosure appraisal or if they are obtaining additional valuations of the property. If no buyer, including the lender, offers the minimum bid at the auction, the property is re-auctioned the following week.

Table 1 summarizes the losses that lenders appear to take in the data we analyzed. Lenders' losses are compared to the losses taken by other major participants in sheriff's sales: investors and federal agencies such as Fannie Mae, Freddie Mac, and the Federal Housing Administration. Most major participants are either lenders who hold the mortgages and take ownership of property that is not purchased at auction, or investors who purchase property at auction.

Purchasers of property at Cuyahoga County foreclosure auctions tend to resell the property for less than they paid. Investors tend to do the best, selling properties for an average of 26.5 percent less than they paid at auction. Federal agencies do worse on average than investors, but better than lenders, selling properties out of REO for about 30 percent less than their auction reserves. Lenders tend to sell property out of REO for 42 percent less than the auction price.

Figure 1 charts the losses over the time properties spend in REO. Among homes sold after one year in REO, the losses are very high. At least a quarter of the long-held properties are complete losses, as indicated by the 25th percentile trend dropping below 90 percent. Even the "better" REO sales after a year, around the 75th percentile, are taking losses of 60 percent from the auction reserve. If a home sells after five quarters in REO, the median loss taken by lenders is roughly 80 percent of the auction price.

Table 1. Summary of Losses by Type of Auction Winner

Auction winner	Number of properties	Median loss (dollars)	Median loss (percent)	Mean loss (percent)	Total loss (millions of dollars)
Lenders	16,012	−19,474	−56	−42	−326.2
Investors	3,639	−18,900	−48	−27	−56.3
Federal agencies	3,434	−11,272	−32	−30	−47.1

Note: Losses are the difference between a property's auction reserve and the sale price at the exit from REO. Losses were calculated by the authors using sales transaction data from the Cuyahoga County auditor from January 2006 to June 2011.
Sources: Cuyahoga County auditor; authors' calculations.

Figure 1. Lender Losses on REO Properties
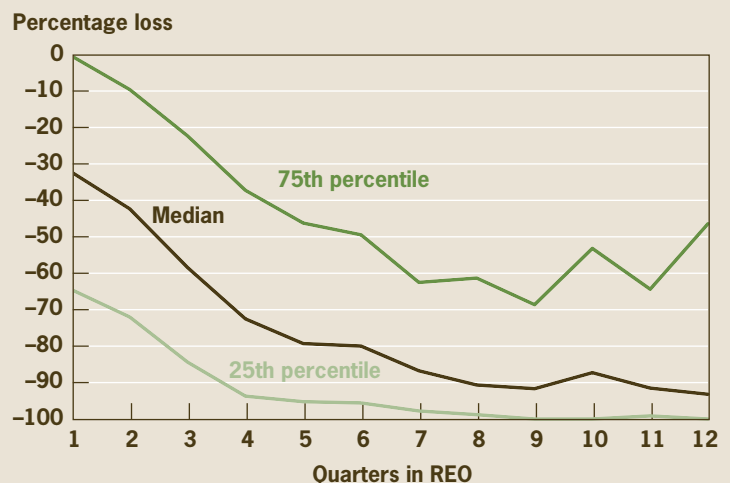
Note: Losses are the difference between a property's auction reserve and the sale price at the exit from REO. Losses were calculated by the authors using sales transaction data from the Cuyahoga County auditor from January 2006 to June 2011.
Sources: Cuyahoga County auditor; authors' calculations.

There are three forces that very likely combine to create the trend of higher losses the longer properties stay in REO. First, the higher-quality REO properties in any price range exit REO within the first few months. Those that take longer to sell are probably the ones that were in relatively poor condition when repossessed. Second, the homes may be rapidly deteriorating while the lenders own them. The lower-value homes in distressed neighborhoods are often vandalized and stripped of metals. Despite winterization, homes may suffer weather-related damage without an attentive occupant to immediately address problems when they arise. A third, potentially contributing, factor is any downward trend in home prices that occurs while homes sit in REO. Certainly, such a trend occurred in Cuyahoga County over the period we studied, owing to the growing supply of REO and recently foreclosed homes, along with weakening demand for property in distressed areas. In any case, what lingers is worth far less than the price the lender pays at auction.

Lenders might be overvaluing property in weak housing markets because they are using a uniform process that works well in most areas. For example, a drive-by appraisal of new housing stock is more likely to produce an accurate market price than it would for older, distressed housing stock. With few exceptions, newer homes will be in good condition inside and out. However, the age distribution of REO homes in weak markets is much older than most of the housing stock in the United States. In the Cuyahoga data, 86 percent of the homes in REO are at least a half-century old. Over the decades, some older homes were well

maintained and others were neglected, leading to a very wide range of conditions and values.

The inaccuracies may also be due to appraisers or brokers not having enough comparable arms-length property sales (regular market-based sales) in extremely distressed markets, where most sales in the last five years have involved recent foreclosures. Looking to older arms-length sales at stale prices for a drive-by appraisal or broker price opinion may also overestimate the sale price in these markets.

Some Simple Ways to Improve Accuracy

A sorting out of REO properties is bound to happen because lenders do not have perfect information about their collateral to assign the perfect reserve price. However, dividing up the data suggests that the issue is not inadequate inspections of individual homes, but possibly misunderstanding entire market segments. We can observe that auction prices are much closer to the eventual sales prices in the part of the market that is closer to "normal."

Nationally and regionally, the bulk of arms-length home sale prices exceed $100,000. As seen in figure 2, for homes with auction prices over $100,000, the auction price is close to the eventual sale price in at least half of the instances. For homes with reserves below $50,000 (57 percent of the REO inventory), the auction prices are substantially above what the house is eventually sold for. One possible reason for this systemic bias in auction prices in the below-$50,000 market segment is that lenders are calibrating valuation methods based on normal markets, not recognizing the unique situation of inflated appraisal values in the areas where most of their foreclosures have occurred.

Figure 2. Percentage Loss for Homes by Auction Reserve Price
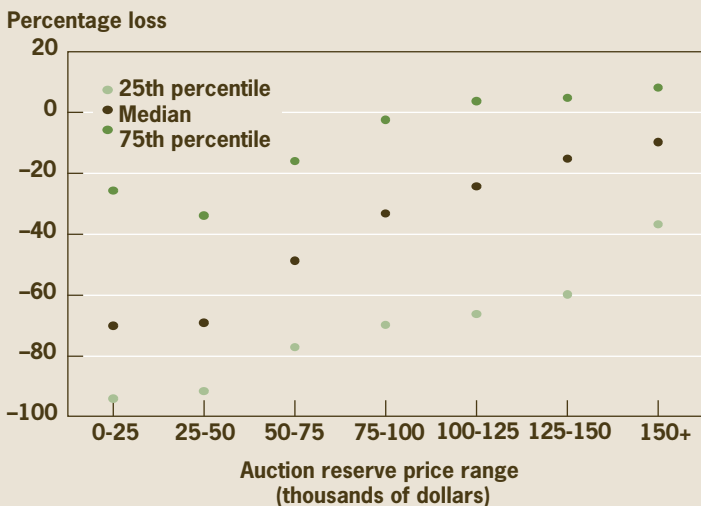
Note: Losses are the difference between a property's auction reserve and the sale price at the exit from REO. Losses were calculated by the authors using sales transaction data from the Cuyahoga County auditor from January 2006 to June 2011.
Sources: Cuyahoga County auditor; authors' calculations.

Figure 3. Percentage Loss for Homes by Neighborhood Poverty Level
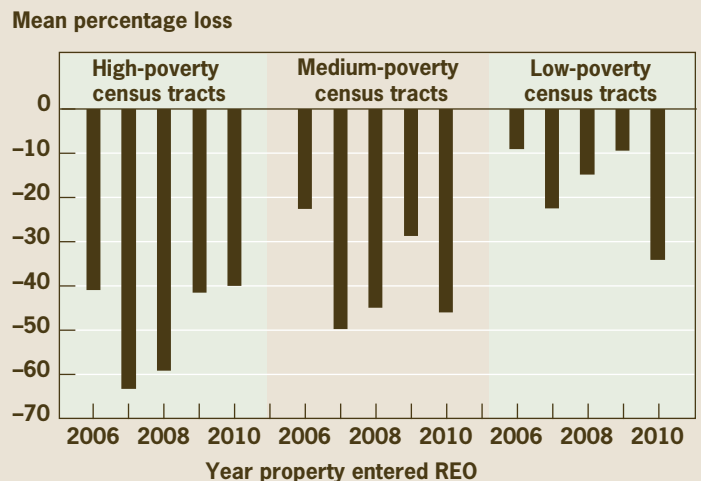
Notes: Losses are the difference between a property's auction reserve and the sale price at the exit from REO. The tract poverty level is estimated by the Census Bureau using the 2005–2009 American Community Surveys. The sample was limited to homes sold out of REO within two years.
Sources: Cuyahoga County auditor; Census Bureau, 2005–2009 American Community Surveys; authors' calculations.

The gap between the lender's auction reserve and the price received for selling the property out of REO seems to vary with a few easily observed characteristics. The age of the home being auctioned off contains a lot of information that lenders may find useful to incorporate into their auction reserve calculations. As mentioned above, older housing deteriorates more rapidly than new housing and may be concentrated in less desirable neighborhoods. Table 2 shows lenders' losses by the age of the home. While the method used by lenders to value property seems to be fairly accurate for newer homes, it again appears to grossly overestimate the value of homes constructed before 1941.

Neither the appraised value nor the lender's auction reserve seems to be factoring in the property's location. Table 2 contains lenders' losses by location of the property. Again, the method used by lenders to determine property values seems relatively accurate for properties located in either low-poverty census tracts or in the outer ring suburbs of Cuyahoga County, while auction reserves seem to be set too high in medium- and high-poverty census tracts and in Cleveland or Cuyahoga County's inner-ring suburbs.

Lenders do not seem to be consistently refining their methods for estimating the value of homes in weak markets. Estimates seem to be improving for only the lowest-poverty areas. Figure 3 shows the losses taken by lenders based on the year the property was taken into REO and the poverty level of the neighborhood.

From 2007 to 2009, losses dropped across the board, which could reflect appraisals becoming more accurate. (However, these drops may also be explained by other factors, such as

the first-time-homebuyer tax credit propping up housing demand in 2009 and 2010.) If the reduction in losses resulted from refining property-valuation techniques, losses should have remained the same or continued to shrink in 2010. It appears that the only area in which lenders are modifying their property-valuation techniques—either to lower auction reserves or foreclose more selectively—are the high-poverty areas of Cuyahoga County. In medium- and low-poverty areas, losses shot up in 2010.

Data for 2010 is not complete. The calculations for figure 3 are based on homes that exit REO within two years, and we have not yet observed two years of sales for all of the homes foreclosed in 2010. Updating these calculations will include the lower-quality properties that take longer to sell, thereby increasing the estimated losses on 2010 foreclosures.

Policy Implications
There are three reasons lenders may be overvaluing foreclosed properties. The first is that they may not actually be overvaluing property at all, but rather placing the minimum bid knowing the property is not worth it. Anecdotally, some lenders report placing the minimum bid just to obtain control of the property, even when they know it is worth less. However, it is unclear why lenders would want control of these properties.

On one hand, lenders might want to gain control at the auction to get higher prices for the home later. Buyers should pay more for REO homes, which they can inspect, than they would for a home at a sheriff's sale, where inspections are limited or impossible. Bidding on a home without inspecting it is risky, and the prices would have to be very

Table 2. Summary of Losses by the Property's Vintage, Neighborhood Poverty, and Location

	Percent of lender's REO properties	Median loss (dollars)	Median loss (percent)	Mean loss (percent)	Total losses (millions of dollars)
Vintage					
Pre-1941	62	–21,105	–69.6	–50.4	–218.3
1941–1959	24	–18,605	–38.2	–32.2	–77.8
1960–2011	10	–8,434	–10.9	–15.0	–19.9
Poverty in census tract					
High	43	–20,215	–75.9	–54.3	–142.3
Medium	37	–21,000	–50.3	–40.7	–135.9
Low	19	–12,429	–16.1	–18.4	–48.0
Location					
Cleveland	54	–19,134	–70.7	–50.3	–165.8
Inner suburbs	31	–23,883	–50.7	–41.1	–125.1
Outer suburbs	15	–10,600	–13.6	–16.2	–35.3

Notes: Losses are the difference between a property's auction reserve and the sale price at the exit from REO. Losses were calculated by the authors using sales transaction data from January 2006 to June 2011. The tract poverty level is estimated by the Census Bureau using the 2005–2009 American Community Surveys.
Sources: Cuyahoga County auditor; Census Bureau; authors' calculations.

low to entice bidders. Collecting the higher sale price after buyers inspect the property could justify setting auction reserve prices higher.

On the other hand, this strategy can work in the opposite direction. If a home is found to be uninhabitable and beyond repair after the sheriff's sale, the lender has foregone any proceeds from another bidder. Many of the REO homes eventually sell for prices so low that the proceeds would barely cover the maintenance and transaction expenses. If the lenders lowered the auction reserve to these prices, the same buyers might take more of the homes at the sheriff's sale, and the lender would not incur the expenses.

Lenders may be overvaluing properties because their valuation methods—which they use because they work well in most markets—don't happen to work well in weak ones. The evidence supports this explanation, since it is not only lenders that overestimate the value of properties acquired in the sheriff's sale, but all parties, including federal agencies and investors. Proper valuation methods would substantially discount the appraised value of homes in weak markets, bringing the estimates of value more in line with what the property will sell for on the open market. It is important to remember that lenders usually cannot legally enter the home and inspect the interior prior to foreclosure, which would prevent them from detecting hidden defects. But even when they are allowed to inspect the interior, it may not be feasible to inspect each property prior to foreclosure, given the number of foreclosures initiated every year.

Finally, there may be incentives that encourage lenders to overvalue foreclosed properties. Doing so would allow them to shift accounting losses from their loan portfolio to their REO portfolio. Solvency tests and supervisors of financial institutions place less emphasis on REO portfolios than on loan portfolios. This is a function of banks having relatively small REO portfolios in normal times, but always having an active loan portfolio that can be analyzed.

Regardless of why it is occurring, correcting the systematic overestimation of property values in weak housing markets appears to be relatively simple and has large potential ramifications. Our analysis suggests that if lenders place more weight on simple property characteristics—the age of the home and its location—in their value estimates, they will more accurately price property in weak housing markets.

More accurate pricing could lower REO carrying costs in a few ways. As discussed above, lenders could avoid taking on REO altogether by setting their auction reserves lower and allowing others to purchase more properties at auction. Additionally, more accurate prices might help lenders reduce the number of foreclosures they initiate by making more loan modifications look sensible. The more successful loan modifications the lender initiates, the fewer the homes that will end up in REO and the lower the lender's carrying costs will be. But if lenders are overestimating the value of weak-market property at foreclosure, then they are likely overestimating the value of the same property when determining whether to offer loan modifications through their net present-value calculations. If the current value of the property is overestimated, it is less likely that a loan modification will be offered, and when one is offered, it will be less generous than if the property's value is not overestimated.

Another way in which more accurate pricing could lower carrying costs is by helping lenders identify the properties that have the least value early in the foreclosure process. Knowing which properties aren't worth holding onto will facilitate their disposition to land banks, local governments, or community development corporations seeking to remediate blight. The Cuyahoga County Land Bank, for example, takes low-value REO property in exchange for contributions towards demolition costs. Transferring REO property to organizations dedicated to disposing of it lowers lenders' carrying costs for distressed properties that could have lingered in REO, hastens blight removal, and helps stabilize distressed housing markets.

Recommended Reading

"How Modern Land Banking Can Be Used to Solve REO Acquisition Problems," by Thomas J. Fitzpatrick IV, 2010. In *REO and Vacant Properties: Strategies for Neighborhood Stabilization*, Federal Reserve Bank of Cleveland, Federal Reserve Bank of Boston, and Federal Reserve Board of Governors.

"Ohio's Land Banking Legislation: Modernizing an Aged Model," by Thomas J. Fitzpatrick IV, 2010. *Journal on Affordable Housing and Community Development Law,* vol. 19, no. 3.

"Foreclosure-Related Vacancy Rates," by Stephan Whitaker, 2011. Federal Reserve Bank of Cleveland, *Economic Commentary* 2011–12.

"The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes," by Stephan Whitaker and Thomas J. Fitzpatrick IV, 2011. Federal Reserve Bank of Cleveland, working paper no. 11-23.

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**The Effect of Foreclosures on
Nearby Housing Prices:
Supply or Disamenity?**

by Daniel Hartley

The Effect of Foreclosures on Nearby Housing Prices:
Supply or Disamenity?

by Daniel Hartley

A number of studies have measured negative price effects of foreclosed residential properties on nearby property sales. However, only one other study addresses which mechanism is responsible for these effects. I measure separate effects for different types of foreclosed properties and use these estimates to decompose the effects of foreclosures on nearby home prices into a component that is due to additional available housing supply and a component that is due to disamenity stemming from deferred maintenance or vacancy. I estimate that each extra unit of supply decreases prices within 0.05 miles by about 1.2 percent while the disamenity stemming from a foreclosed property is near zero.

Key words: foreclosure, housing prices, neighborhood effects.

JEL codes: H23, R20, R30.

*First version posted September 2010.

1 Introduction

As housing prices fell and foreclosure rates rose in the late 2000s, lenders were put in the position of having to liquidate ever larger inventories of foreclosed homes. A number of articles in the popular press cited a "shadow inventory" of homes, part of which was made up of homes that had been repossessed by lenders but had not been listed for sale. In a July 7, 2009 segment on National Public Radio, Yuki Noguchi reported,

> "I do know that banks are holding onto inventory, and what they're doing is they're metering them out at an appropriate level to what the market will bear," says Pat Lashinsky, chief executive of online brokerage site ZipRealty.[1]

This strategy may have implications for the property values of homes that are near the bank-owned properties. As an owner of a nearby property or as a local public official concerned about tax revenue from properties near foreclosed homes would one rather have the bank "meter out" the properties to meet demand or sell them quickly to minimize the time that they sit vacant?

The answer to this question hinges upon the mechanisms through which foreclosures decrease nearby property values and the relative size of each effect. There are two primary mechanisms which are theoretically plausible ways by which a foreclosure may lower the value of other properties nearby. The first mechanism is by way of increasing the supply of homes on the market.[2] The second mechanism operates through the dis-amenity imposed on nearby properties if a foreclosed property is not properly maintained or if it falls victim to crime or vandalism, possibly while vacant.[3] This paper attempts to measure the effect of foreclosure on nearby property values and to decompose this effect into portions attributable to the aforementioned supply and dis-amenity mechanisms.

I pursue an empirical strategy under which identification of separate supply and dis-amenity effects depends upon the degree of segmentation between the single-family

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[1]The full segment can be found at http://www.npr.org/templates/story/story.php?storyId=106113137.

[2]Wheaton [1990] shows that prices fall as vacancies rise in a housing market search and matching model.

[3]Ellen et al. [2013] and Immergluck and Smith [2006b] investigate the connection between foreclosures and crime. See also Apgar et al. [2005].

and multi-family housing markets. Specifically, I consider two cases: segmentation and integration. In the segmentation case, I assume that foreclosure of a nearby single-family home affects the property values of single-family homes through both the supply and dis-amenity mechanisms. This is because foreclosure of a single-family home adds a unit of supply to the single-family market and creates the potential for a poorly maintained or vacant property. However, foreclosure of a nearby renter-occupied multi-family building affects the property values of single-family homes only through the dis-amenity mechanism. This is because, in the segmentation case, potential buyers of single-family homes do not view multi-family buildings as substitutes, so no supply is added to the single-family home market. In this case, renter-occupied multi-family building foreclosures may still affect single-family home prices but only through potential lack of up-keep and vacancy. In the integration case, the foreclosure of a nearby multi-family building will also affect property values of single-family homes through the supply mechanism. Under either assumption, identification of separate supply and dis-amenity effects hinges upon estimation of both the effect of single-family home foreclosures and the effect of renter-occupied multi-family building foreclosures on nearby single-family home prices.

I estimate the effects of single-family home and renter-occupied multi-family foreclosures on the universe of single-family home sales in Chicago between January of 2000 and May of 2011. Using a hedonic framework, I estimate the effect of single-family and multi-family foreclosures that occurred during the prior year on the log price of single-family homes within 0.05 miles. In addition to the universe of other residential foreclosures, I control for a large number of property characteristics that could affect home prices. I include month of year effects to control for seasonality of the real estate market. I also include census block * year effects to control for extremely local shocks and for spatial and temporal variation in housing prices.

I find that each foreclosure filing occurring in the previous year and within a 0.05 mile radius is associated with a reduction in the price of a single-family home of about 0.3 percent. However, I focus on comparing the effects of single-family foreclosures and multi-family renter-occupied foreclosures on nearby property values. I find that each single-family home foreclosure filing within a 0.05 mile radius occurring in the past year is associated with a reduction in the price of a single-family home of about

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1.3 percent.[4] Multi-family foreclosure filings in the past year within a 0.05 mile radius are not associated with a reduction in the price of a single-family home. Subtracting the multi-family effect from the single-family effect I estimate that the supply effect is around -1.2 percent, whereas the dis-amenity effect is about zero.

The other study that attempts to separate the supply and dis-amenity effect of foreclosures is Anenberg and Kung [2014]. Anenberg and Kung [2014] look at the effect of foreclosures in multiple listing service (MLS) data on nearby asking prices for homes. They find that each additional foreclosure listed is associated with a 1.5 percent drop in sales price for homes within 0.1 miles. The authors use MLS data from the Chicago, Phoenix, San Francisco, and Washington, DC metropolitan areas. They interpret the fact that they find an effect around the foreclosure listing date and a disappearance of the effect 3 to 6 months after the foreclosed home sells as evidence that the negative price effect stems from competitive pressure driving prices down rather than a dis-amenity effect. It is reassuring that although our studies use very different empirical approaches, we find quite similar results.

2   Data

I use data from several sources. Residential property sales and foreclosure data for the City of Chicago are from a private data provision company named Record Information Services. Property characteristic data and homeowner tax exemption claim data come from the Cook County Tax Assessor's Office.

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[4]This finding is in line with the findings of several other recent studies. Immergluck and Smith [2006a] find about a 1 percent reduction in the price of single-family homes in Chicago in 1999 for each foreclosure within one eighth of a mile. Schuetz et al. [2008] find a smaller effect, about a 0.2 percent reduction in price, in New York City between 2000 and 2005 in a 250 foot radius. It is not surprising that I find a larger effect. The New York City housing market was booming during their sample, whereas my sample includes the subsequent bust as well. As opposed to the hedonic framework used by the two aforementioned studies, Harding et al. [2009] and Gerardi et al. [2012] use a repeat sales approach. Harding et al. [2009] measure a discount of 1 percent per foreclosure at a distance of 300 feet (about 0.57 miles). In terms, of timing, they find that the effect peaks around the time of the foreclosure sale (when the property transfers from the owner in default to the lender or to another owner). Their sample is obtained by combining a large proprietary mortgage database which contains approximately half of all national mortgage transactions from 1989 to 2007 with other data and only using zip codes with high coverage rates (over 80 percent). Gerardi et al. [2012] use a larger and richer sample and still find an effect of -0.9 percent per foreclosure within 0.1 miles. The authors find that the negative effects peak before the properties complete the foreclosure process. Using data from Massachusetts, Campbell et al. [2011] also find a spillover effect of about -1 percent per foreclosure at a distance of 0.05 miles.

Property identification numbers allow the foreclosure and sales data to be linked to the property characteristic and tax exemption data. After geocoding the addresses, I calculate the distance between every sale and every foreclosure. Since I am interested in the effect of foreclosures on nearby properties but not on the foreclosed properties themselves, I drop any sale that is for a property identification number that appears in the foreclosure file. Table 1 presents descriptive statistics for single-family residential property transactions in the City of Chicago from January 2000 through May 2011.[5] The first four sections (in the top panel) present data regarding the number of single-family (SF), units of renter-occupied multi-family (UMFRO), units of owner-occupied multi-family (UMFOO), and condominium foreclosure filings that occurred within the past year within 5 mutually exclusive rings around each single-family property transaction: 0-0.05 miles, 0.05-0.10 miles, 0.10-0.15 miles, 0.15-0.20 miles, 0.20-0.25 miles. In order to limit the influence of outliers, all foreclosure count variables are Winsorized at their 99th percentile values. All regression specifications use Winsorized foreclosure counts and include dummy variables indicating whether the value of the original variable exceeded the 99th percentile level. The fifth section presents data regarding the sales price and structure characteristics of these properties.[6] The final section presents data regarding the year 2000 demographics of the census tracts in which the properties are located.

According to Emerson [2010], in Chicago the foreclosure process typically takes about 9 to 12 months from filing date to eviction. The foreclosure process begins when a complaint to foreclose mortgage is filed in the Chancery Division of the Circuit Court of Cook County. Foreclosure complaint filings are part of the public record. The owner is then served with foreclosure case court papers. If not challenged, a judgement of foreclosure is entered. The owner then has about 3 months to reinstate or redeem. If this does not happen, the property is sold at auction (called a judicial) sale. Public notice of the sale is given prior to the auction. The title is then transferred and an eviction order can be entered. The eviction can then occur 30 days later. At this point the owner is either the winner of the auction or the lender if the lender's reservation price was not met at the auction. When the reservation price is not met,

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[5]While I use transaction data that go back to January 2000, the foreclosure data go back to January 1998, providing enough data to estimate the effect of foreclosures that occurred in the year or two years prior to a transaction that occurred in January 2000. The last full month of foreclosure data is June of 2011.

[6]Throughout this paper all prices are real, expressed in terms of year 2010 dollars.

the lender will subsequently list the property for sale using the MLS (Emerson [2010]). I do not have access to the MLS data, and thus cannot observe which foreclosures results in lender-ownership and when they are listed in the MLS.

The foreclosure data that I use contain entries for the two foreclosure-related events that are public record. These events are the initial filing of the foreclosure and the auction date of the foreclosure if an auction is ever scheduled. Among the properties for which an auction is observed the mean time from filing to auction is eleven months, the median is about nine months, the 5th percentile is 5.5 months, and the 95th percentile is about two years. Throughout this paper, I focus on the foreclosure filing date, since this is the date when the foreclosure becomes public knowledge.[7]

The sample that I use for estimation includes all single-family residential property transactions in the City of Chicago from January 2000 through May 2011 and counts of the number of initial foreclosure filings within the past year and within 0.25 miles for each of the following categories: Single-family home foreclosure, renter-occupied multi-family building foreclosure, owner-occupied multi-family building foreclosure, and condominium foreclosure.[8] The mean number of units per multi-family building is 2.6 and the standard deviation is 2.4. In this paper, I refer to several types of geographical subdivisions of the city of Chicago including community areas, census tracts, census block groups, and census blocks. Figure 1 shows a map of Chicago with community areas outlined in black, census tracts outlined in dark gray, and census blocks outlined in light gray. Table 2 shows the number of each type of geographical division and the mean number of housing units and residents in each division. While the coarsest division, community areas, correspond to neighborhoods, the finest division, census blocks, are about the size of, and mostly, correspond to actual city blocks.[9]

Most neighborhoods in Chicago contain a mixture of single-family and multi-family buildings. According to the 2000 Census, 93 percent of the Census Block Groups in the city of Chicago that contain at least one unit of housing contain at least

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[7]However, my empirical specifications are not sensitive to the addition of foreclosure auctions as controls. Section 4.3 presents robustness specifications including foreclosure auction counts as controls.

[8]The specifications in column (3) of Table 5 and columns (3) and (4) of Table 6 use alternative samples that include either multi-family or condominium transactions.

[9]For more information on community areas, see http://en.wikipedia.org/wiki/Community_areas_of_Chicago

one single-family building and one multi-family building. Furthermore, 87 percent of the Chicago Census Block Groups with housing contain both owner-occupied single-family buildings and renter-occupied multi-family buildings.[10]

3 Empirical Methodology

My goals are to estimate the effect of residential foreclosures on the price of nearby property and to separate this estimate into a component due to excess supply induced by foreclosures and a component due to the dis-amenity of nearby foreclosures stemming from deferred maintenance or vacancy. Basically, my strategy is to separately estimate the effect of a single-family home foreclosure on nearby single-family home property values and the effect of a multi-family apartment building foreclosure on nearby single-family home property values. Then, with a few assumptions outlined below, I interpret the effect of a single-family home foreclosure as representing the combined effect of putting an additional single-family-home on the market and the dis-amenity effect of deferred maintenance or vacancy on the nearby properties. In comparison, under the assumption that the single-family and multi-family housing markets are segmented, I interpret the effect of a multi-family apartment building foreclosure on nearby single-family home property values as being due only to the dis-amenity effect of deferred maintenance or vacancy on the nearby properties. Let β_{SF} represent the effect of a single-family home foreclosure on nearby single-family home values and β_{MF} represent the per-unit effect of an N unit multi-family building on nearby single-family home values, then under the assumption of segmentation the impact of a single-family home foreclosure and an N unit multi-family building foreclosure on nearby single-family home values can be expressed as,

$$\beta_{SF} = S + D$$

and

$$N\beta_{MF} = N * D,$$

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[10]Census Block Groups are the finest geographical unit for which the Census provides tabulations of the number of housing units by the number of units in the building where the unit is located.

where S represents the supply effect per unit of housing in foreclosure and D represents the dis-amenity effect per unit of housing in foreclosure. Thus,

$$S = \beta_{SF} - \beta_{MF} \tag{1}$$

and

$$D = \beta_{MF}. \tag{2}$$

Finally, under the assumption that single-family and multi-family housing markets are integrated, I interpret the effect of a multi-family apartment building foreclosure on nearby single-family home property values as being due to a composite effect of one additional unit of supply (the unit that could potentially become the new owner's home) and a dis-amenity effect of deferred maintenance or vacancy that is proportional to the number of units in the building. In the integration case,

$$\beta_{SF} = S + D$$

and

$$N\beta_{MF} = S + ND.$$

Thus,

$$S = \frac{N}{N-1}(\beta_{SF} - \beta_{MF}) \tag{3}$$

and

$$D = \frac{N}{N-1}\beta_{MF} - \frac{1}{N-1}\beta_{SF}. \tag{4}$$

Three assumptions are necessary in order to interpret my results in this manner. Under segmentation, the first assumption is that multi-family apartment building foreclosures do not add to the supply of single-family homes for sale. This assumption requires that potential buyers of single-family homes do not regard multi-family apartment buildings as substitutes and that sellers cannot quickly convert multi-family apartment buildings to condominiums and sell the units individually. Anecdotal evi-

dence from real estate brokers that I spoke with suggests that these assumptions hold in practice.[11] There is also evidence of demographic differences between single-family home owners and multi-family building owner-occupiers.[12]

While it is difficult to directly measure the degree to which potential buyers view a multi-family apartment building as a potential substitute for a single-family home, it is possible to assess the frequency with which multi-family apartment building fore-closures result in a renter-occupied building becoming owner-occupied. Data from the Cook County Tax Assessor on claims of the owner-occupied tax exemption for the years 2004 - 2007 reveal that only about 3.3 percent of multi-family buildings that experienced a foreclosure did not file an owner-occupied exemption in one year but did file an owner-occupied exemption in the next year. This suggests that entirely renter-occupied multi-family apartment buildings do not frequently switch to having an owner-occupied unit following a foreclosure. While I do not have direct evidence regarding the degree to which potential home-buyers regard currently owner-occupied multi-family apartment buildings as substitutes for single-family homes, it is clear that renter-occupied multi-family buildings in foreclosure are not commonly used as a sub-stitute for a buyer in the market for a single-family home. Otherwise, the new owner-occupier would claim the tax exemption, and the transition rate of renter-occupied to owner-occupied foreclosed multi-family apartment buildings would be higher than 3.3 percent. Finally, I also consider the case of integration of single-family and multi-family housing markets. In this case, the assumption is that potential buyers of single-family homes do regard multi-family apartment buildings as substitutes, but only one household of owner occupiers can live in a multi-family building and, again, that multi-family apartment buildings cannot be quickly converted to condominiums and sold as individual units.

The second assumption is that both single-family home foreclosures and multi-family apartment building foreclosures have the potential to create dis-amenities for neighboring single-family homes because of deferred maintenance or vacancy. While

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[11]Chris Young, Sales Associate, Coldwell Banker, Cambridge, MA says, "Rarely have crossover [between] owner-occupied MF and SF/Condo. During property searches, the parameters are sepa-rated Condo/SF/MF. Sometimes I get a buyer who's looking SF & Condo, but for the most part they stick with one type. Once they have one type in their head, they stay locked in."

[12]Data from the 2000 Census Public Use Microdata indicate that, after controlling for the Public Use Microdata Area of residence (the finest geographical area available), owner-occupiers of non-condominium multi-family buildings have 26 percent lower household income, on average, than owner-occupiers of single-family homes.

it is difficult to obtain historical vacancy status data for particular properties, the United States Postal Service has aggregated a number of measures of stocks and flows of vacancy by census tract at a quarterly frequency.[13] Table 3 presents estimates of the association between the number of different types of residential foreclosures and the number of residential addresses that have become vacant in the past three months. These estimates come from a regression of the number of newly vacant addresses in a census tract-quarter on a 4 quarter lag of the number of condominium foreclosure filings, single-family foreclosure filings, owner occupied multi-family foreclosure filings, and renter-occupied multi-family foreclosure filings. Year * quarter dummies are included to account for time trends in the number of new vacancies, and community area effects are included to account for differences in the number of new vacancies across neighborhoods. The data are for all census tracts in the City of Chicago and cover 2008Q1 through 2012Q2.

The estimate presented in the first row of Table 3 indicates that each additional condominium unit foreclosure filing is associated with 0.80 newly vacant units one year later. There is very clearly a positive correlation between foreclosure filings and the number of newly vacant addresses a year later. Furthermore, the coefficients on the number of single-family unit foreclosure filings and the number of multi-family renter-occupied unit foreclosure filings are 0.36 and 0.49, respectively and are not statistically different from each other at the 5 percent level.[14] This implies that single-family home foreclosures and multi-family (renter-occupied) apartment building foreclosures are associated with a similar number of newly vacant addresses on a per unit basis.

While it may seem counter-intuitive that lenders who are foreclosing on multi-family apartment buildings would move to evict rent-paying tenants, the primary motivation for eviction is that it resolves a potential informational problem faced by buyers. Knowing that a building is vacant may be more attractive to a buyer at a foreclosure auction who typically does not have a lot of information about the property and may not have enough time to examine lease contract terms and tenant credit history information. Furthermore, in the case that the lender's reservation

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[13]The data are available through the HUDuser website: http://www.huduser.org/portal/datasets/usps.html

[14]This result is robust to changing the lag of the explanatory variables to 3 or 5 quarters. Furthermore, the coefficient on renter-occupied multi-family unit filings does not change much and remains significant when either or both of the time dummies and the community area fixed effects are dropped.

price is not met at auction, ownership of the property will go to the lender, who may not have expertise in the property management business. Another possibility is that tenants may choose to move out if multi-family apartment buildings are not maintained properly during the foreclosure period.[15]

The final assumption is that the dis-amenity created by deferred maintenance or vacancy stemming from a multi-family building foreclosure is comparable to the dis-amenity created by deferred maintenance or vacancy stemming from a single-family foreclosure or that these two effects can be compared after controlling for the number of units in the multi-family apartment building.

Conditional on the assumptions outlined above, my analysis relies upon obtaining credible estimates of the effect of single-family home foreclosures and multi-family apartment building foreclosures on nearby property values. To achieve this I analyze the prices of non-foreclosure-related single-family home sales in Chicago from January of 2000 through May of 2011. I compute the number of single-family, renter-occupied multi-family, owner-occupied multi-family, and condominium foreclosures in distance-based rings surrounding each transaction. The specification that I use is similar to the specification used in Campbell et al. [2011]. I estimate a number of different variations of the following specification,

$$\ln P_{i,j,t} = \beta F_{i,j,t} + \Gamma X_i + \delta C_{j,t} + \varepsilon_{i,j,t} \tag{5}$$

where $\ln P_{i,j,t}$ is the log transaction price of single-family home i, located in geographical division j, in year t. $F_{i,j,t}$ is a vector of variables indicating the number of initial foreclosure filings within a certain time and distance of property i. Two of the variables contained in the vector $F_{i,j,t}$ are $f_{SF,i,j,t}$ and $f_{MF,i,j,t}$, the number of single-family housing units scheduled for foreclosure in the past year and the number of renter-occupied multi-family housing units scheduled for foreclosure in the past year, respectively. The coefficients corresponding to these two variables are β_{SF} and β_{MF} which are two components of the vector β. X_i is a vector of property specific characteristics. $C_{j,t}$ includes a vector of month indicator variables and either a vector of year indicators or a vector of geographical division indicators interacted with year indicators.

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[15]Been and Glashausser [2009] discuss the effect of foreclosures on tenants.

4 Results

In this section I present estimates of the effect of foreclosures on nearby property values using a number of different specifications. Estimating the effect of foreclosures on nearby property values is difficult due to the endogeneity of property price changes and foreclosure decisions. Falling prices erode home equity making default more beneficial from the perspective of the home-owner, thus increasing the likelihood of foreclosure. For this reason one would expect that neighborhood price declines would be correlated with foreclosures, even if foreclosures did not depress property values of nearby homes. Since I do not have an instrument for foreclosures, I employ strategies that other studies in the foreclosure literature have used to try to isolate the effect of a foreclosure on nearby prices that is not being driven by the impact of negative economic shocks. I do this by controlling for time varying unobserved factors that could influence home prices at an extremely fine scale of geography. I do this by including census block * year effects. The mean census block in Chicago contains less than 50 housing units. The trade-off involved in controlling for shocks at such a fine level is that it is hard to detect the effect of foreclosures that are not extremely close to the observed property sale. However, the benefit is that one can be much more confident that the price discounts associated with foreclosures are not being driven by unobserved shocks. I also show that once such fine geographic controls are used, including variables to control for the number of foreclosures that occur in the year following the property sale does not have a substantive impact on the results.

The specifications shown in Table 4 include increasingly fine geographic controls interacted by year to control for local economic shocks that might affect prices from the city-level to the census block-level. The last column of Table 4 switches from using mutually exclusive counts of foreclosures by distance to using the two inner-most mutually exclusive counts and the total number within 0.25 miles as a control. All specifications include month indicators to control for seasonality of the housing market. All specifications also include structure characteristics to control for differences in single-family home prices that are driven by age, size, number of bedrooms, and amenities such as garages, attics, and basements.[16]

Table 4 presents estimates of the effect of the foreclosure of all types of residences summed together (single-family, condominium, and multi-family) on nearby property

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[16]The structure characteristics are listed in the notes for Table 4.

values. For each transaction, variables containing counts of the number of initial foreclosure filings in the year prior to the transaction are computed for the area within 0.05 miles of the transacted home, and each of the mutually exclusive concentric areas: 0.05-0.10 miles, 0.10-0.15 miles, 0.15-0.20 miles, and 0.20-0.25 miles from the transacted home.

Column (1) of Table 4 includes controls for changes in housing prices over time and controls for the structure characteristics of the homes, but no control for variation in land prices across the city. Foreclosures at all measured distances are associated with lower home sales prices. The magnitude of the estimates drops almost monotonically as the distance to the foreclosure increases. Column (2) uses community area * year fixed effects instead of just year fixed effects. Controlling for possible community area-level economic shocks greatly reduces the magnitude of the estimate on all of the foreclosure count variables. For example, the estimate of the price reduction associated with each foreclosure within 0.05 miles goes from -1.26 percent to -0.39 percent. The estimates for all distances remain highly statistically significant, and drop monotonically in magnitude as distance increases. Columns (3) through (5) control at increasingly fine levels of geography for local economic shocks and spatial variation in housing prices. Controlling for tract * year shocks reduces the magnitude of all of the estimates. Only the coefficients on the two closest distance rings remain highly statistically significant. Controlling for block group * year or block * year shocks further reduces the coefficients on the distance rings on all but the innermost ring. Finally, the specification in column (6) keeps the block * year controls but changes from using 5 mutually exclusive foreclosure counts to using the two innermost mutually exclusive counts and a count of the total number of foreclosures within 0.25 miles. This change has very little effect on the coefficient and standard error on the count of foreclosures within 0.05 miles. After controlling for the possibility of extremely local economic shocks, it appears that each foreclosure within 0.05 miles is associated with about a 0.3 percent reduction in single-family home prices.

In order to assess the price change associated with different types of residential property foreclosures, Table 5 repeats the specification presented in column (6) of Table 4 but replaces the count of foreclosures in the innermost ring ($F_{0-0.05}$) with counts of single-family foreclosures ($SF_{0-0.05}$), the number of units in renter-occupied multi-family building foreclosures ($UMFRO_{0-0.05}$), the number of units in owner-occupied multi-family building foreclosures ($UMFOO_{0-0.05}$), and the number of condominium

unit foreclosures ($CONDO_{0-0.05}$). The total count of foreclosures 0.05 to 0.10 miles away ($F_{0.05-0.1}$) and the total count of foreclosures 0 - 0.25 miles ($F_{0-0.25}$) are still included, but the estimates of their coefficients remain similar to column (6) of Table 4 and thus are not reported in Table 5.

Column (1) of Table 5 reveals that a 1.3 percent drop in prices is associated with each nearby single-family foreclosure filing in the previous year. The price drops associated with the other types of foreclosures are smaller in magnitude and not statistically distinguishable from zero. One problem with the specification presented in Column (1) of Table 5 is that if foreclosures tend to occur in areas (within a census block) where property values have recently switched from rising to falling, then there is a potential that the recent drop in price may be causing the foreclosure rather than the foreclosure causing the drop in price. To get a better estimate of the true change in prices from the period just before to the period just after the foreclosure, the specification in column (2) adds controls for the number of foreclosure filings in the year following the observed single-family home sale. This strategy is employed by Campbell et al. [2011] and can be viewed as a kind of time-differencing.[17]

The estimates reported for each type of foreclosure in the bottom panel of column (2) are calculated by subtracting the estimate on the count of foreclosures in the following year from the estimate on the count of foreclosures in the previous year for the relevant foreclosure type.[18] It is worth noting that the coefficient on $SF_{0-0.05}$ barely changes and remains highly statistically significant. Furthermore, the coefficient on $SF_{0-0.05} - SF_{0-0.05}^{post}$ is not dramatically different form the coefficient on $SF_{0-0.05}$ and is also highly statistically significant. The other coefficients remain statistically indistinguishable from zero. Using either the spatial differencing technique implicit in controlling for the number of foreclosures within 0.25 miles or both the spatial and time-differencing techniques produces very similar conclusions. However, the standard errors on all coefficients increase quite a bit when also using time-differencing. My estimate of -1.33 percent in column (1) is very similar to the -1.3 percent implied by the preferred specification of Campbell et al. [2011].[19] It seems that once one con-

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[17]Campbell et al. [2011] attribute the inspiration for this strategy to Linden and Rockoff [2008].

[18]The point estimates and standard errors are computed using the formulas for the expectation and variance of linear combinations of random variables.

[19]Campbell et al. [2011] use a linear distance-weighted count of foreclosures from 0 to 0.1 miles. The -1.3 percent that I report above comes from multiplying their "close" estimate of -0.017 in column (4) of Table 5 by (0.1 - 0.025) / 0.1 since 0.025 is the midpoint of my innermost ring which extends to 0.05 miles.

trols for block * year economic shocks, the time-differencing strategy of controlling for subsequent foreclosures only serves to add noise to the estimate.[20] For this reason I do not use the time-differencing strategy in the remaining specifications.

Column (3) of Table 5 estimates the same specification as in column (1), but uses a different sample. Instead of using all single-family home transactions, column (3) uses all of the multi-family transactions. If the single-family and multi-family markets are segmented, then this specification provides a test. If single-family home foreclosures have a composite supply and dis-amenity effect on single-family home prices, but multi-family foreclosures have only a dis-amenity effect on single-family home prices, then it should be the case that multi-family foreclosures have a composite supply and dis-amenity effect on multi-family prices, but single-family foreclosures only have a dis-amenity effect on multi-family prices. While none of the coefficients in column (3) are statistically different from zero, it is worth noting that the sign on the coefficient for foreclosures of renter-occupied multi-family units is negative whereas the sign on foreclosures of single-family homes is not. While the results in column (3) are far too noisy to be conclusive, they are in line with the assumption that same property type foreclosures have a composite supply and dis-amenity effect, while different property type foreclosures have only a dis-amenity effect.[21]

4.1 Interpreting Results Assuming Segmentation of Single-Family and Multi-Family Markets

Column (1) of Table 6 presents estimates from the same specification as column (1) of Table 5. The first two rows of the bottom panel of Table 5 present estimates of the segmented market supply and dis-amenity effects. As shown in Equation 1, the supply effect is calculated by subtracting the estimated per-unit effect of a renter-occupied multi-family foreclosure from the effect of a single-family residence foreclosure. Thus, the supply effect shown in the first row is calculated by subtracting the multi-family effect from the single-family effect shown in the upper part of the table. Each extra unit of supply within 0.05 miles is associated with a discount of about 1.2 percent, although this estimate is not statistically distinguishable from zero.

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[20]It is also worth noting that it limits the endpoint of the transactions in my sample to be one year prior to the endpoint of the foreclosures in my sample. This is the reason that the number of observations in column (2) is smaller than in column (1).

[21]I would like to thank an anonymous referee for suggesting this test.

As shown in Equation 2, the dis-amenity effect is simply the estimated per-unit effect of renter-occupied multi-family foreclosures. Each foreclosure filing is associated with a dis-amenity effect of about -0.14 percent, which is statistically indistinguishable from zero.

Column (2) repeats the specification of column (1) but clusters the standard errors at the community area * year level.[22] The standard errors are even larger when clustered.

The specification shown in column (3) of Table 6 is almost the same as that shown in column (2), but the sample now includes both single-family and condominium transactions. The slight difference in specification comes from the inclusion of an indicator variable for condominium and setting the structure characteristic variables for condominiums equal to zero. I do this because the structure characteristics are not present for condominiums in the tax assessor data. The inclusion of condominium transactions reduces the standard errors markedly.[23] The point estimates on single-family foreclosures and the number of units of multi-family renter-occupied foreclosures are quite similar to those in column (2). The estimate of the supply effect shown in the first row of the bottom panel is now statistically different from zero at the 5 percent level. Even if the coefficient on the number of units of multi-family renter-occupied foreclosures were zero rather a positive 0.28, the supply effect would be -1.37 percent, and thus still be significant at the 5 percent level. This number is very similar to the -1.2 percent estimate of the supply effect shown in columns (1) and (2).

Column (4) of Table 6 presents a specification aimed at considering an alternative to the assumption that the dis-amenity effect depends on the number of units in foreclosures of multi-family buildings. Instead, the assumption is that the effect is the same regardless of the size of the building. This change has no impact on the coefficient on single-family foreclosures and only a small effect on the coefficient on multi-family foreclosures. However, the standard error on the multi-family term grows by more than a factor of two. I interpret the fact that the zero is more precisely estimated using units than buildings and the fact that the coefficient is smaller when

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[22]I experimented with various levels of clustering, including: community area, community area * year, tract, tract * year, block group, block group * year, block, and block * year. Community area * year produced the largest standard errors, but the standard errors were not much smaller using the other clustering options.

[23]I would like to thank an anonymous referee for suggesting this.

using buildings as evidence in favor of a very small dis-amenity effect that increases with the number of units.

4.2 Interpreting Results Assuming Integration of Single-Family and Multi-Family Markets

Although I find it reasonable to assume that the single-family and multi-family housing markets are segmented, it is informative to consider the case in which these markets are integrated in order to consider the impact that this would have on my estimates. The average number of units in a foreclosed multi-family building in Chicago during my sample is 2.6. If the single-family and multi-family markets were integrated, but multi-family buildings could not be converted to condominiums in the short run, then the effect of a multi-family building foreclosure would be to add one additional unit of supply to the combined single-family and owner-occupied multi-family market. With this assumption, Equations 3 and 4 can be used to calculate the supply and dis-amenity effects.

In this case, the supply effect would be about -1.9 percent within 0.05 miles (not statistically significant), and the dis-amenity effect is about 0.6 percent (not statistically significant) within 0.05 miles. These estimates are shown in the bottom two rows of cloumns (1) and (2). In summary, switching from an assumption of segmentation to integration of the single-family and multi-family housing markets changes my estimate of the supply effect from about -1.2 percent to about -1.9 percent and changes my estimate of the dis-amenity effect from about -0.14 percent to about 0.6 percent. The same calculation can be made for the specification shown in column (3), where condominiums are added to the sample. In this case, I estimate an integrated market supply effect of -2.7 percent (significant at the 5 percent level) and dis-amenity effect of 1.3 percent (not statistically different from zero). The bottom two rows of column (4) are empty because the supply and dis-amenity effects are not identified in the integrated markets case if the dis-amenity effect does not depend on the number of units in the multi-family building.

4.3 Robustness: Controlling for Numbers of Recent Foreclosure Auctions

Table 7 presents specifications demonstrating that the results of Table 6 column (2) are robust to adding controls for the number of foreclosure auctions in the past year (column 1), 6 months (column 2), and 3 months (column 3). The estimates shown in the first two rows are for exactly the same two explanatory variables shown in the first two rows of Table 6. The naming of the variables is to draw attention to the distinction between counts of foreclosure filings in the past year and counts of foreclosure auctions in the past year, 6 months, or 3 months. Including counts of the number of auctions in any of the three time windows does not have a marked effect on the estimate of the coefficients on single-family or multi-family foreclosure filings. The effect appears at the time of the foreclosure filing rather than at the time of the auction. The positive coefficients on auctions in the past 6 and 3 months imply that conditional on a foreclosure filing in the past year, the fact that there was an auction in the past 6 or 3 months is correlated with relatively high-price properties being located nearby.[24] I interpret this correlation as evidence of selection which could be brought about by banks bringing relatively higher priced properties to auction more quickly after the foreclosure filing.

5 Conclusion

In the face of falling housing prices and rising foreclosure rates, researchers have sought to determine the size and geographical extent of spillover effects from residential mortgage foreclosures. The main contribution of this paper is to decompose foreclosure spillover effects into effects that are operating through two distinct mechanisms: a supply shock mechanism and a dis-amenity mechanism.

After controlling for the possibility of extremely local economic shocks and variation in home prices, I find that each single-family foreclosure within 0.05 miles is associated with about a 1.3 percent drop in single-family home prices. In contrast, on a per-unit basis, multi-family building foreclosures are not associated with drops in nearby single-family home values. I interpret this as evidence that the supply effect

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[24]The coefficient reported in the bottom row of column (3) is for the indicator of whether the variable was Winsorized. This is due to the fact that the even at the 99th percentile, the number of multi-family renter-occupied units auctioned in the past 3 months is still equal to 0.

of foreclosures on nearby home values is roughly -1.2 percent per nearby foreclosure and the dis-amenity effect is about zero.

6 References

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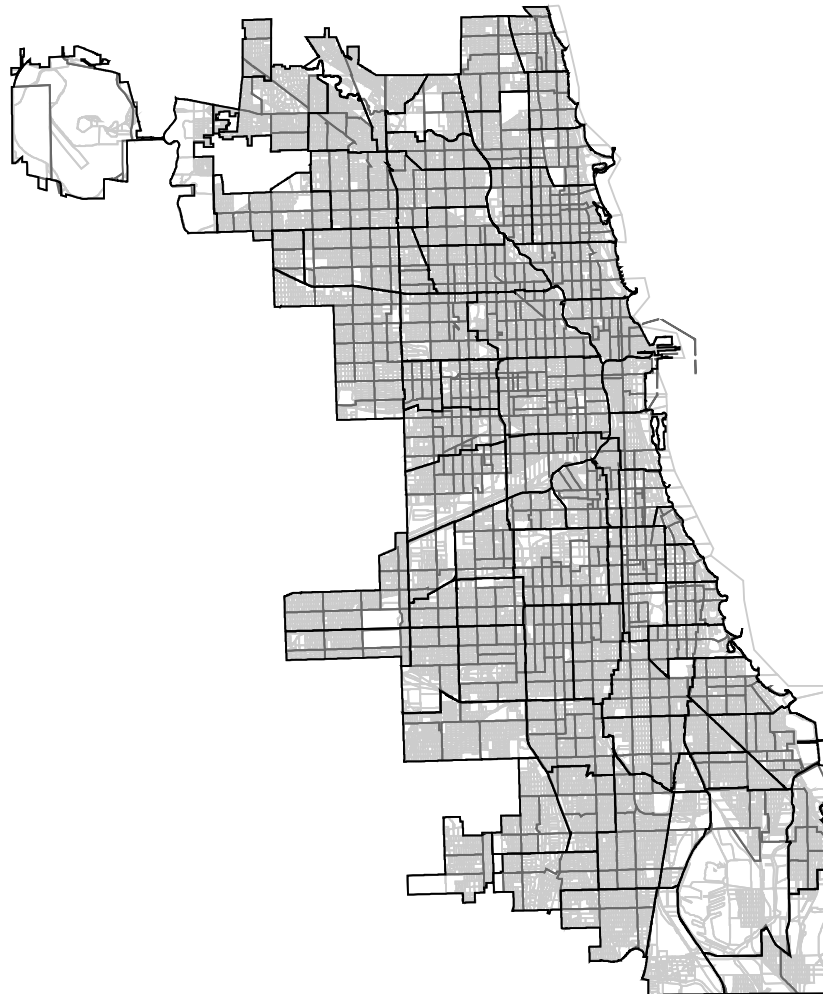
Figure 1: Geographical Divisions of Chicago: Community Areas (black), Census Tracts (dark gray), and Census Blocks (light gray)

Table 1: Descriptive Statistics for Single-Family Property Transactions

	Mean	S.D.	Min	Max
SF Filings (past year) 0 - 0.05 miles	0.32	0.70	0	3
SF Filings (past year) 0.05 - 0.10 miles	0.86	1.46	0	6
SF Filings (past year) 0.10 - 0.15 miles	1.49	2.31	0	9
SF Filings (past year) 0.15 - 0.20 miles	1.77	2.63	0	10
SF Filings (past year) 0.20 - 0.25 miles	2.08	3.06	0	12
UMFRO Filings (past year) 0 - 0.05 miles	0.10	0.50	0	4
UMFRO Filings (past year) 0.05 - 0.10 miles	0.28	1.05	0	7
UMFRO Filings (past year) 0.10 - 0.15 miles	0.53	1.71	0	11
UMFRO Filings (past year) 0.15 - 0.20 miles	0.65	1.96	0	12
UMFRO Filings (past year) 0.20 - 0.25 miles	0.79	2.28	0	14
UMFOO Filings (past year) 0 - 0.05 miles	0.03	0.25	0	2
UMFOO Filings (past year) 0.05 - 0.10 miles	0.11	0.55	0	4
UMFOO Filings (past year) 0.10 - 0.15 miles	0.21	0.80	0	5
UMFOO Filings (past year) 0.15 - 0.20 miles	0.26	0.94	0	6
UMFOO Filings (past year) 0.20 - 0.25 miles	0.32	1.10	0	7
Condo Filings (past year) 0 - 0.05 miles	0.02	0.25	0	9
Condo Filings (past year) 0.05 - 0.10 miles	0.08	0.57	0	11
Condo Filings (past year) 0.10 - 0.15 miles	0.13	0.78	0	13
Condo Filings (past year) 0.15 - 0.20 miles	0.19	1.05	0	17
Condo Filings (past year) 0.20 - 0.25 miles	0.24	1.25	0	20
Price	264,316	235,476	4,125	2,591,558
Land Square Footage	3,966	3,690	7	379,843
Building Square Footage	1,339	599	400	27,270
2 Bathrooms	0.30	0.46	0	1
3+ Bathrooms	0.13	0.33	0	1
Masonry Exterior	0.54	0.50	0	1
Frame / Masonry	0.09	0.28	0	1
Basement	0.81	0.39	0	1
Attic	0.42	0.49	0	1
Garage	0.75	0.43	0	1
Central Air	0.28	0.45	0	1
Fireplace	0.14	0.35	0	1
Age of Structure	69	32	1	188
Tract Median Household Income in 2000	55,538	18,141	3,186	254,951
Tract Median Home Value in 2000	188,402	96,003	12,746	861,094
Tract Median Rent in 2000	810	157	126	2,551
Tract Proportion African American in 2000	0.39	0.44	0	1
Tract Proportion College Grad in 2000	0.20	0.17	0	1
Tract Housing Vacancy Rate in 2000	0.06	0.05	0	0.57

Note: Table presents descriptive statistics of nearby foreclosures (top panel, Winsorized at the 99th percentile), property characteristics (middle panel) and Census Tract characteristics (bottom panel) for the sample of single-family property transactions. The sample covers single-family transaction in the City of Chicago from January 2000 through May 2011. There are 165,313 observations in the sample.

Table 2: Geographical Divisions of the City of Chicago

	City of Chicago	Community Area	Census Tract	Census Block Group	Census Block
N	1	77	873	2,496	25,611
Housing Units	1,173,352	15,238	1,344	470	46
Population	2,947,326	38,277	3,376	1,181	115

Note: This table illustrates the size of 5 increasingly fine geographical divisions of the City of Chicago from the 2000 Census. The first row shows the number of each type of geographical division, while the second and third row show the mean number of housing units and population in each division, respectively.

Table 3: Relationship Between Newly Vacant Addresses and Previous Foreclosure Filings

	# Newly Vacant Addresses in past 3 Months
Condo Unit Filings$_{t-4}$	0.80***
	(0.10)
Single-Family Home Filings$_{t-4}$	0.36***
	(0.04)
Owner-Occupied Multi Family Unit Filings$_{t-4}$	0.29***
	(0.06)
Renter-occupied Multi Family Unit Filings$_{t-4}$	0.49***
	(0.06)
R^2	0.20
N	15,696

Note: Table presents regression results documenting a correlation between the number of newly vacant addresses and the number of foreclosures four quarters in the past. The unit of observation is a census tract * quarter. The dependent variable is the number of newly vacant residential addresses in the current quarter. The explanatory variables are the 4 quarter lags of the number of each type of foreclosure filing in the tract. All Chicago census tracts are included. The time period is 2008Q1 through 2012Q4. Eicker-White standard errors clustered by tract are reported in parentheses. Community Area effects and year * quarter effects are included. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 4: Effects of Sum of all Nearby Foreclosure Types on Sale Price

	(1)	(2)	(3)	(4)	(5)	(6)
$F_{0-0.05}$	-1.26%***	-0.39%***	-0.24%***	-0.26%***	-0.31%**	-0.29%*
	(0.11%)	(0.08%)	(0.08%)	(0.08%)	(0.15%)	(0.16%)
$F_{0.05-0.1}$	-0.69%***	-0.24%***	-0.12%***	-0.08%*	-0.02%	-0.01%
	(0.06%)	(0.04%)	(0.04%)	(0.04%)	(0.08%)	(0.09%)
$F_{0.1-0.15}$	-0.58%***	-0.13%***	-0.05%*	-0.04%	-0.02%	
	(0.04%)	(0.03%)	(0.03%)	(0.03%)	(0.05%)	
$F_{0.15-0.2}$	-0.38%***	-0.09%***	-0.02%	-0.01%	-0.01%	
	(0.04%)	(0.03%)	(0.03%)	(0.03%)	(0.05%)	
$F_{0.2-0.25}$	-0.41%***	-0.07%***	0.00%	0.01%	-0.02%	
	(0.03%)	(0.02%)	(0.02%)	(0.02%)	(0.04%)	
$F_{0-0.25}$						-0.01%
						(0.02%)
Fixed Effect	Year	Community Area * Year	Tract * Year	Block Group * Year	Block * Year	Block * Year
R^2	0.41	0.72	0.77	0.81	0.90	0.90

Note: The specifications shown in columns (1) - (5) show regression results for log sales price on counts of all types of foreclosures in mutually exclusive concentric rings around the location of the transaction. The rings each have a width of 0.05 miles. The specifications use increasingly fine geographic controls. Column (6) keeps the 2 innermost concentric circles, but replaces the outer 3 with a count of all foreclosures within 0.25 miles of the transaction location. The sample used in all specifications include 165,313 single-family home transactions. Eicker-White standard errors in parentheses. All specifications include month of year indicators and the following structure characteristics: the log of land square-footage, the log of building square-footage, 14 roughly decadal structure age indicators, and indicator variables for the following characteristics: 2 bathrooms, 3 or more bathrooms, masonry exterior, frame and masonry exterior, basement, full basement, finished basement, attic, full attic, finished attic, garage, detached garage, 2 car or larger garage, air conditioning, fireplace. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 5: Effects of Each Type of Nearby Foreclosure on Sales Price

	(1)	(2)	(3)
$SF_{0-0.05}$	-1.33%***	-1.31%***	0.44%
	(0.38%)	(0.39%)	(0.80%)
$SF^{post}_{0-0.05}$		0.42%	
		(0.41%)	
$UMFRO_{0-0.05}$	-0.14%	-0.18%	-0.51%
	(0.67%)	(0.67%)	(0.65%)
$UMFRO^{post}_{0-0.05}$		1.02%	
		(1.07%)	
$UMFOO_{0-0.05}$	-0.72%	-0.90%	-2.44%
	(1.39%)	(1.44%)	(1.57%)
$UMFOO^{post}_{0-0.05}$		0.19%	
		(1.92%)	
$CONDO_{0-0.05}$	0.27%	0.79%	-0.92%
	(1.03%)	(1.17%)	(1.41%)
$CONDO^{post}_{0-0.05}$		-1.23%	
		(1.44%)	
Sample	Single-Family	Single-Family	Multi-Family
R^2	0.90	0.90	0.88
Obs	165,313	157,609	87,517
$SF_{0-0.05} - SF^{post}_{0-0.05}$		-1.74%***	
		(0.61%)	
$UMFRO_{0-0.05} - UMFRO^{post}_{0-0.05}$		-1.19%	
		(1.30%)	
$UMFOO_{0-0.05} - UMFOO^{post}_{0-0.05}$		-1.09%	
		(2.42%)	
$CONDO_{0-0.05} - CONDO^{post}_{0-0.05}$		2.02%	
		(2.12%)	

Note: Table presents regressions results of log sales price on each type of foreclosure within 0.05 miles in the past year. Controls include the sum of all types of foreclosures from 0.05 miles to 0.1 miles and the sum of all types of foreclosures from 0 miles to 0.25 miles that occurred in the year prior to the observation. Column (2) also includes these foreclosure sum variables for the year following the sale. Estimates of the difference between the coefficient on foreclosures that occurred in the past year minus the coefficient on foreclosures that occurred in the future year for each type of foreclosure are shown in the bottom panel. Column (3) estimates the same specification as column (1) on the sample multi-family property sales instead of single-family sales. Eicker-White standard errors in parentheses. All specifications include census block-year indicators, month of year indicators, and structure characteristics (see Table 4 for list). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 6: Effects of Each Type of Nearby Foreclosure on Sales Price and Supply and Dis-amenity Effects

	(1)	(2)	(3)	(4)
$SF_{0-0.05}$	-1.33%***	-1.33%***	-1.37%***	-1.37%***
	(0.38%)	(0.50%)	(0.39%)	(0.39%)
$UMFRO_{0-0.05}$	-0.14%	-0.14%	0.28%	
	(0.67%)	(0.81%)	(0.55%)	
$MFRO_{0-0.05}$				-0.07%
				(1.16%)
Clustering of standard errors	None	Community Area * Year	Community Area * Year	Community Area * Year
R^2	0.90	0.90	0.80	0.80
N	165,313	165,313	293,082	293,082
Sample	Single-Family	Single-Family	Single-Family and Condominium	Single-Family and Condominium
Supply Effect - Segmented Markets	-1.19%	-1.19%	-1.65%**	-1.30%
	(0.77%)	(0.96%)	(0.68%)	(1.24%)
Dis-amenity Effect - Segmented Markets	-0.14%	-0.14%	0.28%	-0.07%
	(0.67%)	(0.81%)	(0.55%)	(1.16%)
Supply Effect - Integrated Markets	-1.93%	-1.93%	-2.68%**	
	(1.25%)	(1.57%)	(1.11%)	
Dis-amenity Effect - Integrated Markets	0.60%	0.60%	1.31%	
	(1.11%)	(1.36%)	(0.94%)	

Note: Table presents estimates of the supply and dis-amenity effects. Column (1) repeats the specification shown in column (1) of Table 5. For simplicity, only the coefficients on single-family and multi-family renter occupied foreclosures are presented. Column (2) repeats the specification in column (1) except that it presents standard errors that are clustered at the community area * year level. Columns (3) and (4) broaden the sample to include condominium sales as well as single-family sales. Column (4) changes the specification slightly, using the number of multi-family renter-occupied buildings in foreclosure rather than the number of units in foreclosure. Eicker-White standard errors in parentheses. All specifications include controls for the number of foreclosure filings for condo and multi-family owner-occupied properties. All specifications include census block * year indicators, month of year indicators, and structure characteristics (see Table 4 for list). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 7: Effects of Each Type of Nearby Foreclosure on Sales Price: Robustness - Controlling for Auctions

	(1)	(2)	(3)
Filings in past year $SF_{0-0.05}$	-1.21%**	-1.52%***	-1.41%***
	(0.49%)	(0.51%)	(0.51%)
Filings in past year $UMFRO_{0-0.05}$	-0.23%	-0.23%	-0.20%
	(0.82%)	(0.81%)	(0.81%)
Auctions in past year $SF_{0-0.05}$	-0.27%		
	(0.77%)		
Auctions in past year $UMFRO_{0-0.05}$	0.01%		
	(1.76%)		
Auctions in past 6 months $SF_{0-0.05}$		2.71%**	
		(0.82%)	
Auctions in past 6 months $UMFRO_{0-0.05}$		6.08%	
		(6.28%)	
Auctions in past 3 months $SF_{0-0.05}$			1.40%
			(1.30%)
Indicator for any Auctions in past 3 months $UMFRO_{0-0.05}$			5.72%
			(4.74%)
R^2	0.90	0.90	0.90
N	165,313	165,313	165,313

Note: Table presents specifications demonstrating that the results presented in column (2) of Table 6 are robust to controlling for the number of foreclosure auctions in either the past year (column 1), the past 6 months (column 2), or the past 3 months (column 3). The coefficient shown in the last row of column (3) is for an indicator of whether any auctions of multi-family renter-occupied buildings occurred in the past 3 months since the 99th percentile value of this variable is zero. Since there is no variation in the Winsorized version of the variable, I present the coefficient on the indicator variable. Standard errors clustered at the community area * year level are shown in parentheses. All specifications include controls for the number of foreclosure filings for condo and multi-family owner-occupied properties. All specifications include census block * year indicators, month of year indicators, and structure characteristics (see Table 4 for list). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Inter-Regional Home Price Dynamics through the Foreclosure Crisis

Francisca G.-C. Richter and Youngme Seo

Inter-Regional Home Price Dynamics through the Foreclosure Crisis
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Overall regional conditions such as employment, geography, and amenities, favor the co-movement of housing prices in central cities and their suburbs. Simultaneously, over half a century of sprawl may induce a negative relation between suburban and central city home prices, with central city values falling relative to suburban home values. What happens to the relationship between subhousing markets when cities are shocked by the foreclosure crisis? This paper builds repeat-sales indices to explore home price dynamics before and after the foreclosure crisis in the Cleveland area, a market that in the aggregate had little home price appreciation prior to the crisis, but signif cant follow-up depreciation. The analysis f nds evidence that connectedness, expressed as the relative importance of neighboring housing market conditions in explaining city home prices, increases among submarkets even as they experience varying levels of foreclosure rates, and that foreclosure effects give little sign of receding in the near future. The analysis is relevant to the discussion of economic recovery among city and suburban communities as the nation faces high inventories of soon-to-be foreclosed properties.

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1 Introduction

Two distinct forces influence the relationship of sub or intra-urban housing markets within a metropolitan area. On the one hand, over half a century of sprawl can induce a negative relation between suburban and central city home prices, with central city values falling relative to suburban home values [3]. On the other hand, regional conditions such as employment, population trends, geography, as well as central city institutions and amenities would seem to favor the co-movement of housing prices in cities within an MSA. In a paper titled 'The Shared Fortunes of Cities and Suburbs' Rappaport [18] argues that cities and suburbs depend on each other for economic growth. His analysis finds that over the course of three decades (1970-2000) populations of central cities and their suburbs in the U.S. have more often grown or declined together, rather than at each other's expense. Haughwout and Inman [12] show that weak central city finances have a significant effect on the suburban economy, slowing the growth of suburban incomes and population, and depressing suburban home values.

For old industrial cities like Cleveland, Detroit, and Pittsburgh, that never fully recovered from the loss of manufacturing jobs in the seventies and have seen little to no population growth in the past decade, both effects -sprawl and deteriorating regional conditions- may have contributed to weaken their housing markets. But what happens to this sub-market connectivity when it is shocked by the foreclosure crisis? And more specifically, how is this interrelationship affected by the crisis in a market that did not experience a boom or bubble, but was nevertheless shocked by a sharp decline in home prices?[1] Foreclosures have the potential of influencing home prices in at least two different ways: At large enough rates, foreclosures can affect the value of surrounding homes by making them less attractive assets. Even in areas with lower rates of foreclosures, lower prices of foreclosed and surrounding homes may shift demand away from comparable homes in other neighborhoods, driving their home prices down. Both effects would seem to contribute to an increased positive relationship (connectivity) of home prices at the intra-regional level. At the same time, the fact that foreclosure rates vary considerably throughout sub-markets or cities within an MSA would seem to favor a disassociation of housing markets at the city level.

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[1]According to Abel and Deitz [1], a small cluster of Midwestern cities, including the Cleveland and Detroit MSAs fall into the 'Bust, No Boom' category, while others like Phoenix and Los Angeles experienced both a boom and a bust.

The extent by which homes nearby vacant or foreclosed properties depreciate in value has been documented and estimated in recent work for several housing markets. In the Columbus, OH market, Mikelbank finds that each vacant or abandoned property within a quarter mile of a house for sale lowers its value by 3.6 percent and each foreclosure does so by 2.1 percent[17]. Immergluck [13] obtains equivalent estimates for Chicago in 1999. He finds that property values within an eighth mile of a foreclosure are 1.1 percent lower than comparable properties out of a foreclosure ring. Both papers use hedonic models. Harding, Rosenblatt, and Yao [10] derive repeat sale home price indices that incorporate the effects of nearby distressed properties for seven MSAs. They find evidence of a diffusion or contagion effect of foreclosed properties to nearby homes, with discounts of up to about 1 percent per nearby foreclosed property. Hartley [11] separates the effects of foreclosures on the value of surrounding homes into what he calls disamenity and supply effects and finds evidence for both. The disamenity effect refers to homes becoming less attractive assets due to the presence of a nearby foreclosed home; this is the effect that Harding, Rosenblatt and Yao attempt to measure. On the other hand the supply effect lowers home prices of comparable assets due to the increased supply of housing contributed by the foreclosed home. But while the disamenity effect decreases as distance from the foreclosed home increases, the supply effect is not limited to nearby homes. Demand for comparable homes in neighborhood B may also be affected by the increased supply and lower prices of homes in nearby neighborhood A as a consequence of foreclosures in A. Both effects have the potential to increase the co-movement or connectedness of home prices in cities near each other.

The aforementioned body of work is valuable in that it provides a quantifiable estimate, at a certain point in time, of losses due to foreclosure externalities. The present analysis adds to the understanding of foreclosure effects by providing a qualitative assessment of possible changes taking place in the relationship of sub market home prices through time. Both types of analysis are relevant to the discussion of economic recovery among city and suburban communities. For exploratory purposes, we compare home price changes in zip codes most and least affected by foreclosures within an MSA. We then construct repeat sale price indices for 15 cities in the Cleveland

MSA, during the 1990-2009 period, for which sales data are available[2]. We test for stationarity of the city-to-MSA index ratio before the crisis and for the whole period as a measure of sub-market connectedness. We proceed to estimate a model for home prices over moving time periods to assess home price index responses to shocks from own and neighboring market distress. The measure of distress used is the percent of all sales that are sheriff sales, likely to be positively correlated to rates of foreclosure and recent vacancies. We find that, as of the fourth quarter of 2009, home price connectedness increases among sub-markets even as they face varying levels of foreclosure rates. While home prices are highly persistent from one period to the next, the relative importance of local and neighboring housing market conditions to city home prices seems to have increased in recent times. Furthermore, the influence of foreclosure effects on housing prices gives little sign of receding in the near future. The remaining of the paper is structured as follows. Section 2 presents the zip code level analysis of home prices and foreclosure rates; section 3 computes and describes the home price index estimates; section 4 analyzes sub-market connectedness through stationarity testing; section 5 develops the model and presents results, and section 6 concludes.

2   Home Price Changes in Areas More and Less Impacted by Foreclosures

To obtain a general idea of how home prices within an MSA have responded to the foreclosure crisis, we compare home price changes in zip codes, most and least affected by foreclosures within an MSA, for various MSAs in Ohio for which data are available[3]. We use quarterly data from 2006 to 2009 from the following sources: foreclosure rates from Lender Processing Services Inc.

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[2]Recall that CoreLogic provides repeat sales home prices at the zip code level for some zip codes in the County but there is not a clear zip to city correspondence.

[3]It is important to clarify that the comparison may exclude the most distressed areas in an MSA. In Cleveland, for instance, areas with the highest foreclosure rates in the available sample data (percent of foreclosures out of all active loans) coincide mainly with areas that in 2007 fell in the fourth *and* third quartile of actual foreclosure filing rates, as a percent of all estimated mortgaged units in the County (using data from the Cuyahoga County Common Pleas Court and Census 2000).

(LPS)[4], repeat sales CoreLogic home price indices (CHPI)[5], and home value indices from Zillow (ZHVI) [14][6]. The analysis is limited to MSAs with (1) at least 25 active loans per zip code in the LPS data set and with (2) at least 10 zip codes for which home price index data is available. The analysis using CHPI, while possibly more reliable than with ZHVI, is constrained to fewer MSAs. As it turns out, patterns are consistent irregardless of the home price -or value- data used, so we present only graphs derived with the CHPI data. Within each MSA, zip codes are ranked by their median foreclosure rates during the 2006Q1-2009Q4 period. Zip codes in the lowest quartile are classified as less impacted relative to the MSA, while those in the top quartile fall into the more impacted category within the MSA. The second and third quartiles are dropped from the analysis. Median foreclosure rates are averaged over all zip codes within each of these two categories for each MSA, and plotted in figure 1. Foreclosure rates in the hardest hit quartile are about twice or more those in the least hit quartile. Figure 2 shows the average compound annual CHPI growth rate for the top and bottom foreclosure quartiles[7]. The fact that most values scatter around the red, 45° angle line suggests that home price changes in the top and bottom foreclosure rate quartiles are not too different from each other. Overall, during the 2006-2009 period, zip codes in the data, most and least affected by foreclosures within their MSA have experienced relatively similar growth rates in home prices. Differences in CHPI growth rates would seem to be driven more by inter- as opposed to intra-sub-market differences in foreclosure rates.

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[4]LPS claims to cover roughly about 60% of the mortgage market, but with a higher proportion of prime loans as compared to the market.

[5]These are calculated using a weighted repeat sales methodology, for single family housing including distressed sales.

[6]According to Hagerty [9], Zillow Inc. reports that its so called Zestimates come from a proprietary computer program that takes into account sale prices for nearby, comparable homes Comparison is based on size and other physical attributes of the home, its past sales history and tax-assessment data. Zillow Inc. reports a 7.2% median margin of error on its estimate. The index for a certain geographic area is the median of all ZHVI's computed for the area, and it excludes foreclosed and REO properties [14]. A Wall Street Journal analysis of 1,000 recent home sales found that the median difference between the Zillow estimate and the actual price was 7.8% [9].

[7]For each zip code, the compound growth rate is $100 \left[\left(\frac{CHPI_{2009Q2}}{CHPI_{2006Q1}} \right)^{\frac{4}{13}} - 1 \right]$.

3 Data and Repeat Sale Index Estimation

Most static analysis of spillover effects in U.S. housing markets uses hedonic pricing models. Hedonic models allow researchers to estimate price indices for a standard home while controlling for variation in housing attributes. According to Case and Shiller [6] the hedonic approach requires large quantities of individual sales data and the accuracy of the indices depends on how well the model is able to estimate and control for the implicit value of each considered attribute. Repeat sales indices, on the other hand, more directly control for different attributes because same property, paired sales data are used to estimate the returns on housing. Still a property may have changed characteristics from one sale to the next, so paired sales data for which sale price differences are extreme, are usually excluded from the sample. Wang and Zorn [19] provide a clear and detailed presentation of the repeat sales methodology, first introduced by Bailey et al. in 1963 [2]. Returns on the value of homes are assumed to follow a particular growth path through time. Observed sales of homes in a market (cities, in our case) at any point in time can be seen as draws from a probability distribution of returns for that particular time period. Likewise, cumulative growth rates -with respect to a base year- for home values within the city may also be modeled as random variables at any fixed point in time. Viewed in this way, a population home price index at time t can be defined as a central tendency statistic of this distribution. But while the idealized population consists of returns for each home at each time period, in reality, one only observes returns when sales of previously sold homes occur. Therefore, sample index values for each city in each of T periods are obtained as parameter estimates of the following regression of log price relatives on an indicator vector for sale periods:

$$\frac{p_{i,j}}{p_{i,k}} = \frac{I_j}{I_k} u_{i,j,k} \text{ or}$$

$$\ln(\frac{p_{i,j}}{p_{i,k}}) = \ln(I_j) - \ln(I_k) + \ln(u_{i,j,k})$$

$$= D_i' L + \ln(u_{i,j,k}) \tag{1}$$

where $p_{i,j}$ is the sale price for home i at period j, I_j is the city home price index for period j, $L = [\ln(I_1), ..., \ln(I_T)]'$, and $u_{i,j,k}$ is an error term. $D_i = [d_{i,1}, ..., d_{i,T}]'$, where $d_{i,j} = -1$, $d_{i,k} = 1$, and $d_{i,t} = 0$ for all other t in $[1, ..., T]$.

Sample indices are the parameter estimates for I_t's computed to account for variance heterogeneity due to differences in length of time between sales. We follow the three stage process detailed by Case and Shiller in [6], and the resulting estimates are smoothed via a 4-period moving average to lessen seasonality effects. Using this methodology, we estimate quarterly repeat-sales indices for Cleveland and 14 neighboring cities, from 1976 to the fourth quarter of 2009 and use indices in the period of interest (1990Q1 to 2009Q4)[8]. The residential sales data includes arms-length transactions not only for single, but for two-family homes as well, excluding sheriff sales and quit claim deeds among other non-warranty sales.

The estimated home price indices are displayed in the top panel of figure 3, along with the reported Case-Shiller index for the Cleveland MSA. The Cleveland MSA encompasses five counties, Cuyahoga, Geauga, Lake, Lorain, and Medina. Cuyahoga is home to the central city and suburbs considered in this study was the county hardest hit by foreclosures and has even been called the epicenter of the crisis (see Coulton et al.[7] for a detailed account of the evolution of and local response to the crisis). Indices tend to peak between 2005 and 2006, with the outer ring suburbs, in the bottom row, taking a little longer to start their decline[9]. For most cities, our repeat sale indices tend to drop considerably more than the Case-Shiller MSA index in recent times, but this drop is consistent with trends in the (un-indexed) average sales prices per period (bottom panel of figure 3) and the fact that we are focusing on the worst off cities within the MSA. As an indicator of market trends, Case-Shiller assigns smaller weights to sale pairs with larger price change deviations from the average price change for the entire market. This index is also smoothed via a three period moving average. Unlike Case-Shiller's, our index does not use any weighting scheme. We exclude sales lower than \$20000 or greater than \$750000. If the per-quarter price change of a sales pair is greater than 20% or lower than -8% the pair is excluded. Even with these screening conditions, our index estimates seem to include more low value transactions that Case-Shiller's.

As a measure of city level housing market distress, we use sheriff sales as a percentage of all sales. Sheriff sales are obtained from the Cuyahoga County

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[8]We are interested in home prices since 1990, but using repeat sales from 1990 on, would limit the sales pairs in earlier years to homes bought and sold in very short periods of time. Expanding the time period to include the 1976-1989 period should reduce any possible bias due to small holding periods.

[9]These cities are Westlake, North Olmsted, Strongsville, and North Royalton.

Auditor and Recorder through Cleveland State University. Figure 4 displays 4 period moving averages of the percent of sales that are Sheriff sales for all cities and reflects a high variation in the foreclosure shock among cities. Hoping to capture suburbanization effects through changes in the population, we use city level data on the civil labor force from the Bureau if Labor Statistics (BLS). Unemployment trends at the regional level are from the BLS as well and mortgage interest rates are from Freddie Mac.

4 Sub-Housing Market Connectedness

Much of the work on the interconnectedness of housing markets has been applied to regions in the UK. Inter-regional diffusion or ripple effects (due to house price shocks) are hypothesized to spread throughout the country from one region to the next, but the evidence to support this hypothesis is mixed. Meen [16] argues that the stationarity of the ratio of regional to national home prices is suggestive of this interconnectedness as it reflects short-run deviations of sub-markets from the national market, but long-run co-movement of trends. In the U.S., Gupta and Miller [8] find support for ripple effects across metro areas in Southern California. Canarella, Miller and Pollard [5] study time series properties of several U.S. regional housing markets. Following Meen, they perform unit root tests (allowing for up to two structural breaks that capture recession periods in the early 1990's and 2000's) on the ratio of regional to national home price indices. They find some support for a weak segmentation of the U.S. housing market, where only East Coast metro areas exhibit ripple effects. Our interest, however, lies in exploring connectedness at the intra- as opposed to inter- regional level. Along those lines, Jones and Leishman [15] find that intra-regional migration contributes to the connectedness of sub markets in a sub region of Scotland. In the Cleveland MSA, intra-regional migration (manifested in part as sprawl) and decreased net immigration into the region have likely influenced city home price trends relative to the MSA.

Figure 5 shows that in all cities excepting the outer ring suburbs, the last 4 years exhibit a significant drop, clearly deviating from their long run trends. Up until the end of 2004, trends are much more supportive of a co-movement of indices for the inner ring suburbs as compared to the extended period. Applying Meen's method, we perform Dickey-Fuller unit root tests for each of

the log city-to-MSA home price index ratios for the pre-crisis period, through 2004, as well as for the whole 1990Q3-2009Q4 period. We find that, regardless of the time period, the unit root null hypotheses cannot be rejected in favor of stationarity of the log ratio of indices (see table 1). It is important to note, however, that Meen performs this test on simple price averages. Our smoothing of the price indices reduces noise in the data so that the test is able to capture relatively small price dispersions that would go unnoticed otherwise. In fact, performing the test on the non smoothed index leads to a rejection of the unit root null hypothesis for all cities in the first period. For the full time period, the stationarity hypothesis can no longer be supported for most inner ring suburbs.

It is likely that the abrupt change in the ratio starting in 2006 has to do in part with differences in screening the data used to calculate the Case-Shiller versus our repeat sale indices, but it is also due to our focusing on the county with the highest rates of non-prime lending, delinquencies, and foreclosure within the MSA. However, it is interesting to note that this discrepancy does not apply to outer-ring suburbs, that either continue with their long-run, slightly negative drift away from the MSA index, or marginally narrow this distance as the MSA index falls relative to the cities'.

5 A Spatial Dynamic Model of Intra-Regional Home Prices

Despite the lack of evidence for stationarity of the (log) city to MSA index ratios, for the most part, city indices do not deviate drastically from the MSA index until 2005, where a clear disruption takes place for central city and inner ring suburban home prices. We estimate a baseline spatial dynamic regression model of city home prices for the pre-crisis period that accounts for population changes, unemployment, the annual average interest rate for a 30 year fixed rate mortgage, and a measure of foreclosure-related distress. A similar model is presented by Brady [4], who analyzes diffusion patterns in monthly home prices for a dynamic panel of 31 California counties from 1995 through 2002. He estimates a county-fixed effects model of average single-family home sale prices. His right hand side variables besides the spatial and time lags of home prices include unemployment rate, population, and new construction that vary with time and county. Other explanatory variables

are U.S. level real national mortgage rate and an industrial production index. Our analysis does not aim to capture diffusion effects from a one period shock to home prices, but rather to assess any qualitative changes in intra-regional home price dynamics that may have occurred due to high levels of foreclosures persisting over several periods of time.

The following dynamic panel model with a spatial endogenous variable is estimated:

$$Y_t = \rho W Y_t + \beta_1 Y_{t-1} + \beta_2 S_t + \beta_3 U_t + \beta_4 P_t + \beta_5 r30_t + \delta + e_t \qquad (2)$$

where Y_t is a 15×1 vector of estimated repeat sales home price indices for the tth quarter, for the 15 cities used in the study, all within the Cleveland MSA. W is the 15×15 standardized spatial contiguity matrix among cities. The percent of sales that are sheriff sales is S_t. U_t is a vector of city unemployment rates, and P_t is adjusted civil labor force growth indexed to 1990[10] As with home price indices, a 4-period moving average is applied to sheriff sales percent, unemployment rates, and the adjusted civil labor force index. Finally, $r30_t$ is the annual average 30 year fixed rate and city fixed effects are represented by δ.

Clearly endogenous regressors are the time lag of hpi and its spatial lag. Unemployment and sheriff sales as a percent of all sales are possibly endogenous too. Changes in the percent of distressed sales are likely to affect the home prices of nearby houses, but it may also be the case that changes in home prices affect the percent of underwater borrowers, and thus, the percent of sheriff sales in the area. The model is estimated via two-stage least squares using as instruments the time lags of all endogenous regressors mentioned, as well as the spatial lags of sheriff sales, unemployment, and labor force, to instrument the spatial lag of home price index. This model is used to assess changes in the spatial and time persistence of foreclosure spillovers, via time varying parameters estimates. More explicitly, model 2 is estimated 40 times for the following sequence of time periods $[1990Q3 + t, 1999Q4 + t]_{t=0...40}$, where t refers to quarters, to see how and when changes in the model parameters take place.

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[10]Civil labor force estimates from the BLS are updated with Census data, which can lead to significant discontinuities in Census years. To address this issue, we adjust data points between the years 1990 and 2000 (40 quarters) as follows: $\hat{clf}_t = (1 - t/40)clf_t + (t/40)clf_{2000Q1}$ so that new data points are a weighted average of the original data point and the 2000Q1 value. The weights are such that the contribution of the 2000Q1 data point increases as t moves away from 1990Q1 and closer to 2000Q1.

Table 2 reports the parameter estimates for both periods: $1990Q3 - 2004Q4$ and $1990Q3 - 2009Q4$. Parameters of the rolling regression are presented in figure 6. The effect of distressed sales starts to change after 2005, and becomes clearly negative in late 2006, at the same time when spatial correlation among cities increases. For both periods, home price indices are highly persistent as can be seen through the size and significance of the time lag coefficient. Despite the fact that most of the variation in home prices is explained by the city's own time lag, it is interesting to note that the coefficient for the spatially lagged dependent variable in both periods is positive and significant while persistence through time is somewhat reduced. In other words, home prices in adjacent cities contribute to explain own city home prices and the size of this contribution seems to grow in recent times. So even as cities' have experienced foreclosure shocks of varying magnitudes, the connectivity between city home prices within the region has not weakened. Although one would expect loss of population as proxied by the adjusted change in civil labor force to relate to lower home prices, there is no significant contribution of this variable once the time and spatial lags are accounted. Similarly, unemployment and interest rate effects are estimated with very little precision. After 2005 the percent of home sales that are sheriff sales dramatically increases in all cities and its negative impact on city home prices becomes stronger.

6   Conclusions

Research supports the notion that central cities and their suburbs are tied together by their economic fate, growing or declining together, rather than at each other's expense. In particular, the weakening of central city institutions tends to have a negative effect on suburban home values. In this context, how does the foreclosure crisis affect the relationship between sub-housing markets around a central city strongly hit by such crisis? This paper explores home price dynamics before and after the foreclosure crisis for a group of cities in the Cleveland MSA, a market that in the aggregate experienced little home price appreciation prior to the crisis, but significant follow-up depreciation. The analysis includes inner and outer ring suburbs. Inter-regional connectedness, expressed as the relative importance of neighboring

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housing market conditions in explaining city home prices, has increased in the period following the crisis. This is the case even as home prices respond to different intensities of local distress as measured by the percent of home sales in the city that are sheriff sales. Possible factors that contribute to the increased connectedness of sub-housing markets besides overall regional conditions may be operating through the foreclosure disamenity and supply effects. While the disamenity effect is mainly localized around a relatively small distance from the foreclosed home, the supply effect has the potential to operate across neighborhoods, and thus, may add to the increased connectedness of home prices across cities. The analysis indicates that, as of the fourth quarter of 2009, inner ring suburbs have been the most hardly hit by the crisis and foreclosure effects on house price dynamics give little sign of receding in the near future.

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Table 1: Dickey-Fuller Unit Root Test Statistic for Log City-to-MSA Home Price Index Ratios

City		1990Q3-2004Q4	1990Q3-2009Q4
1	Cleveland	-1.443	0.096
2	Lakewood	-2.113	-0.516
3	Brook Park	-2.211	-0.692
4	Parma	-1.146	1.424
5	Garfield Heights	-3.565	3.958
6	Euclid	-1.846	3.040
7	East Cleveland	-1.839	0.144
8	Cleveland Heights	-1.115	0.386
9	South Euclid	-2.141	0.748
10	Shaker Heights	-1.846	0.798
11	Maple Heights	-1.912	0.227
12	Westlake	-1.239	-2.322
13	North Olmsted	-0.898	-0.765
14	Strongsville	-0.597	-1.446
15	North Royalton	-1.593	-2.181
	10% critical value	-2.596	-2.589

H1: ratio is AR(1) stationary in deviations from the mean.
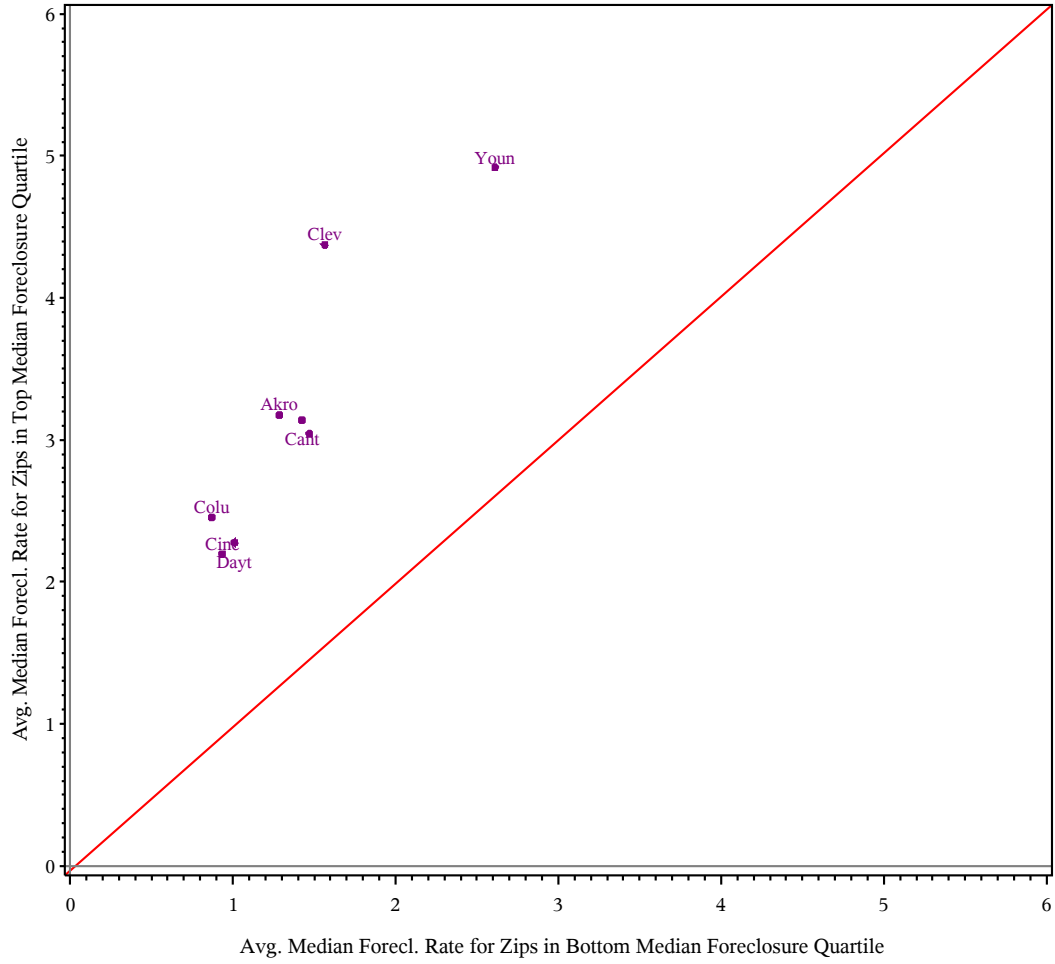
Figure 1: Average median foreclosure rates across zip codes in most and least distressed quartiles within MSAs. For each zip code, the median is taken over the period 2006Q1-2009Q4.
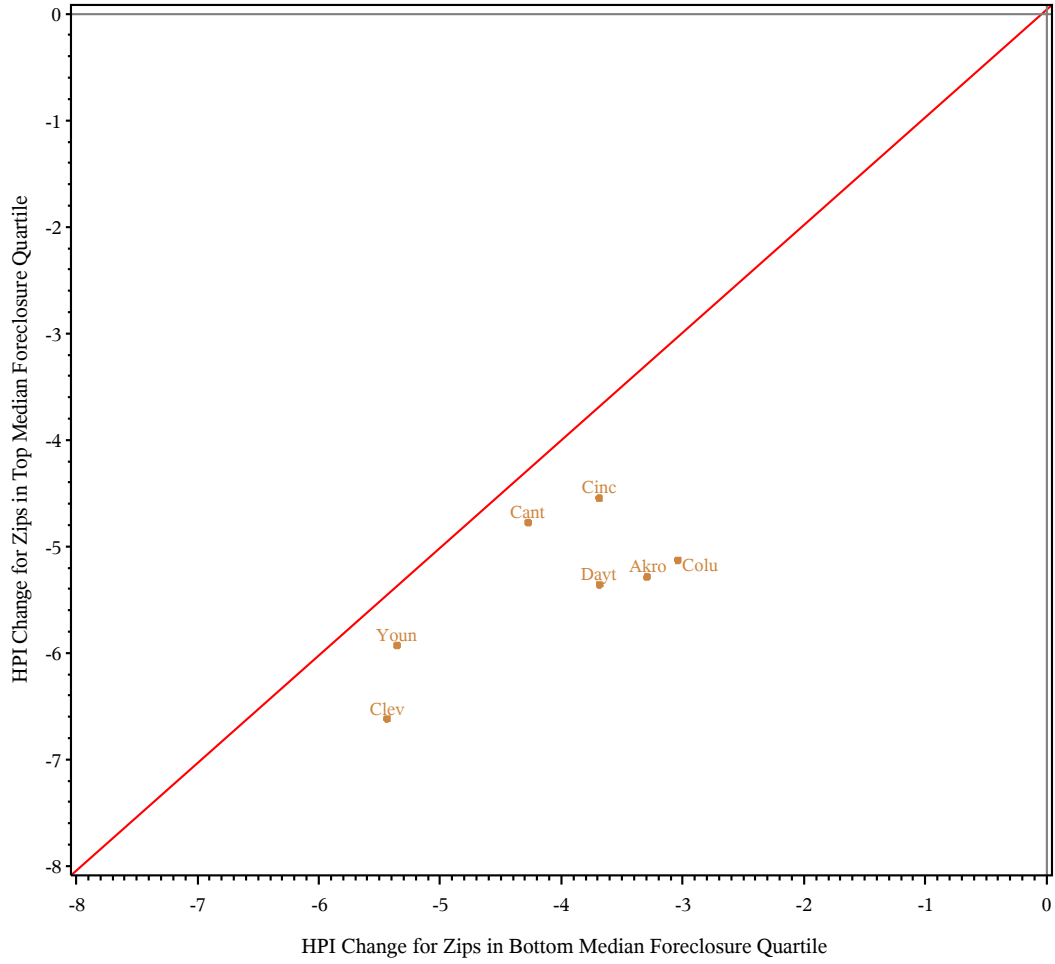
Figure 2: Average compound annual CoreLogic home price index growth rate in zip codes most and least hit by foreclosures within MSAs, over the period 2006Q1-2009Q2.

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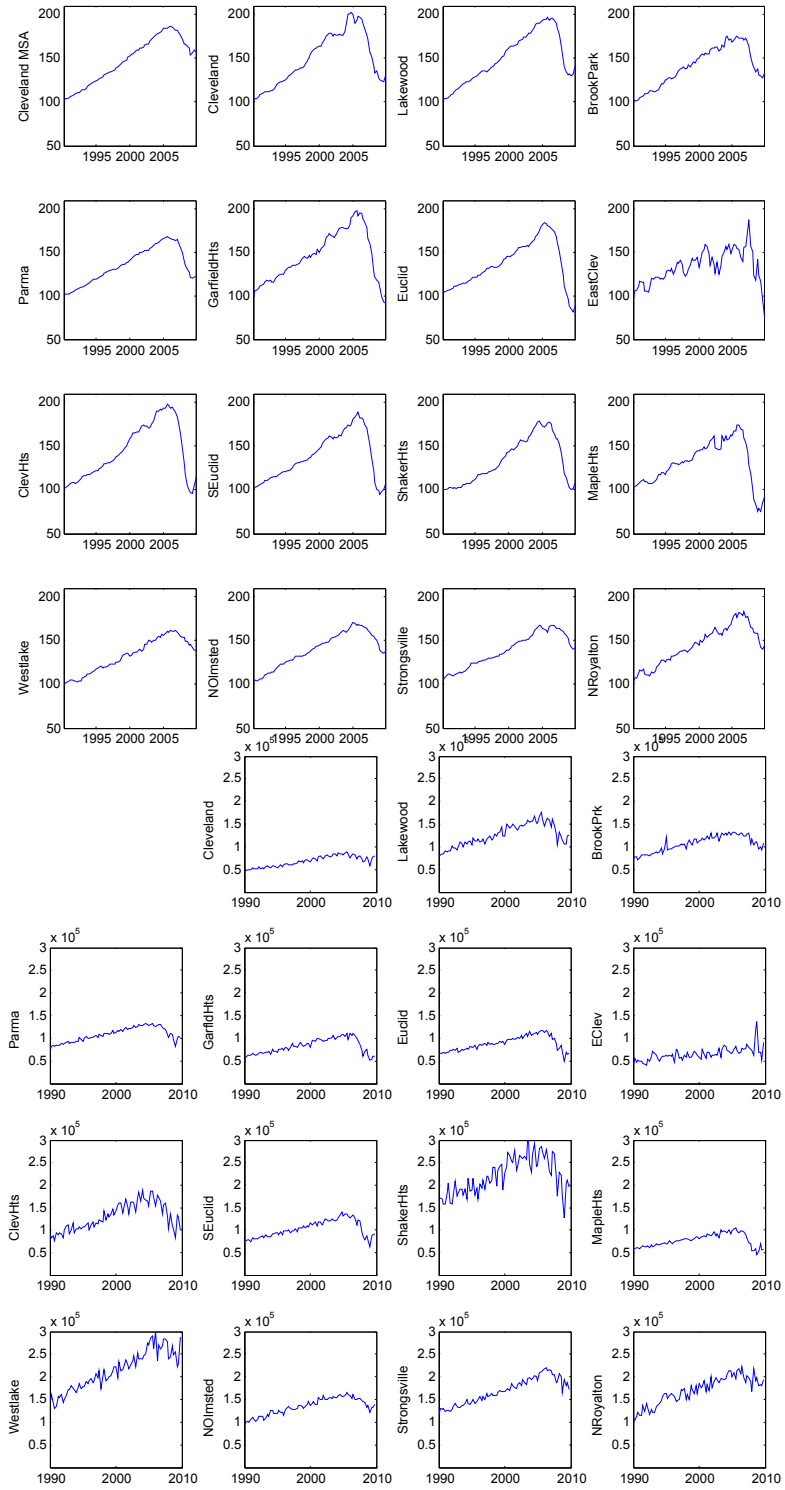
Figure 3: Estimated Repeat Sales HPIs (top) and Average Sales Price (bottom) for Screened Repeat Sales Pairs, 1990Q1-2009Q4
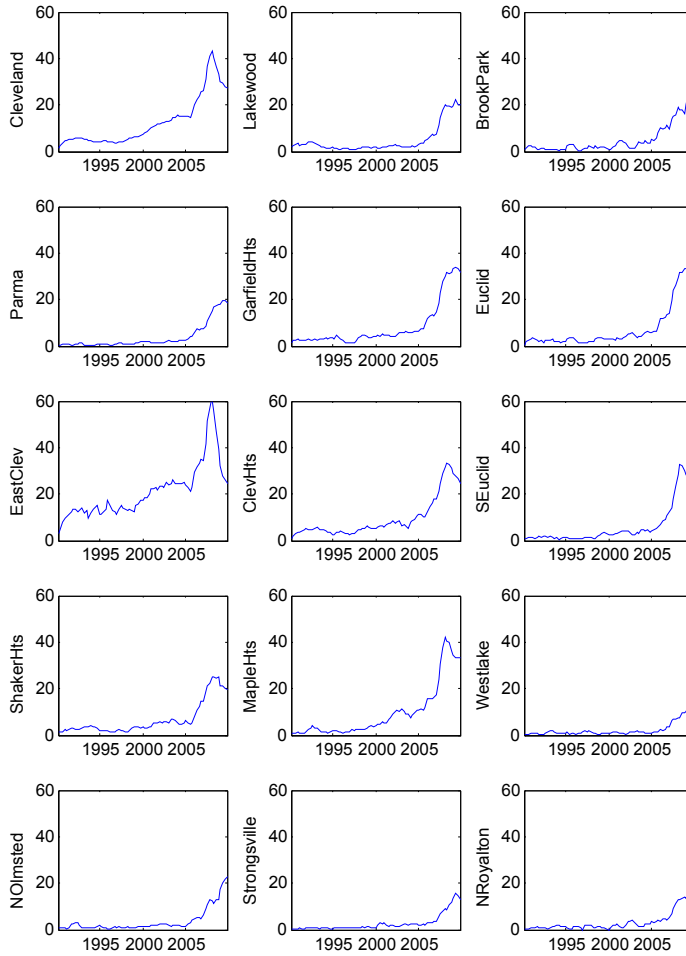
Figure 4: Four-Period Moving Average of the Percent of Home Sales that are Sheriff Sales, 1990Q1-2009Q4

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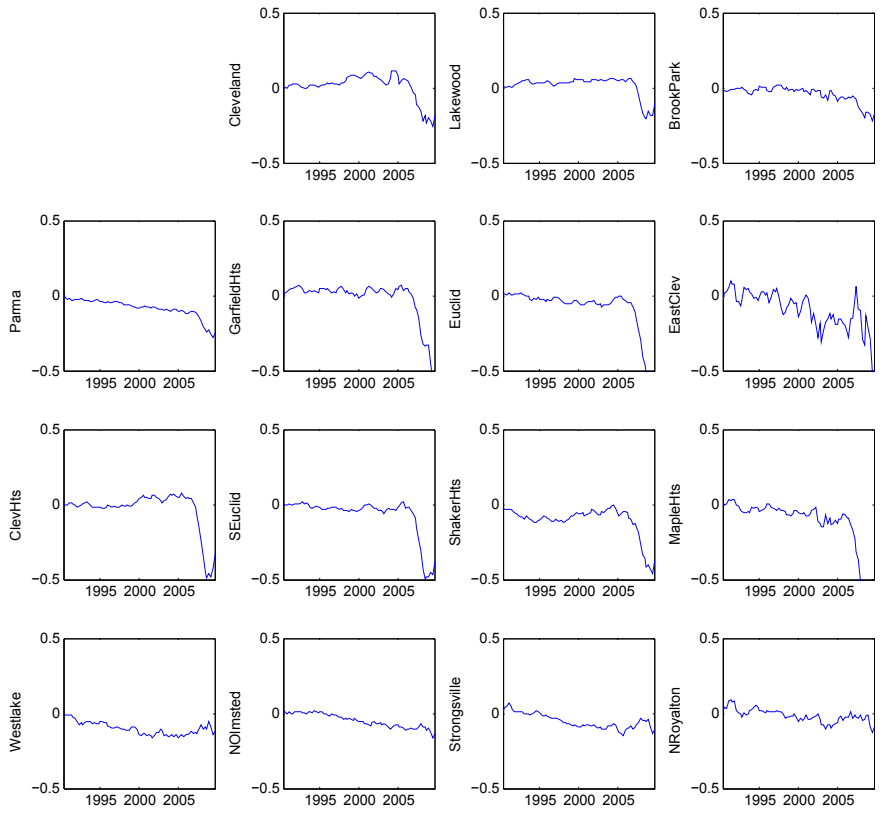
Figure 5: Estimated Log City-to-MSA Home Price Index Ratio for Period 1990Q1-2009Q4
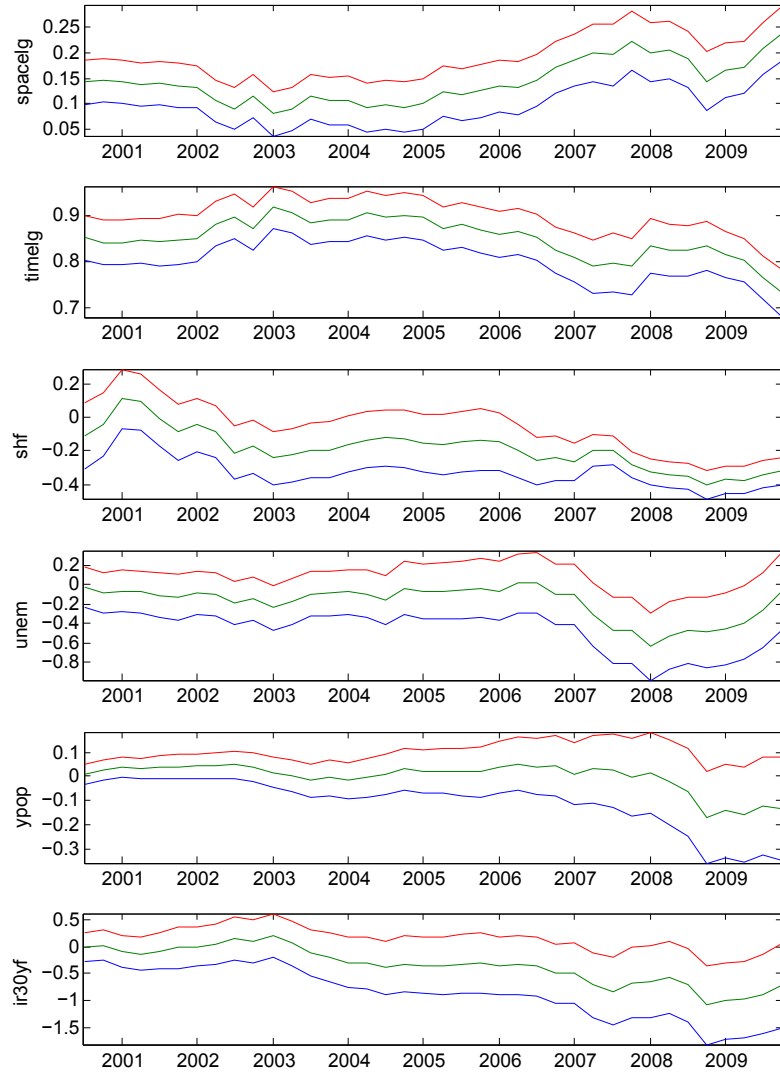
Figure 6: Time-varying Parameters for Model Sequentially Estimated Over the Period 1990Q3-2009Q4, with 40 Quarters each Time

Table 2: Spatial Dynamic Regression Model for 15 City Home Prices in the Cleveland MSA estimated via Two-Stage Least Squares

Variable	1990Q3-2004Q4			1990Q3-2009Q4		
	coeff.	t-val.	p-val.	coeff.	t-val.	p-val.
$w.y_{i,t}$: spatial lag of hpi	0.071	4.462	0.000	0.162	11.200	0.000
$y_{i,t-1}$: time lag of hpi	0.929	55.543	0.000	0.814	55.914	0.000
$shf_{i,t}$: % distressed sales	-0.122	-2.066	0.039	-0.280	-14.259	0.000
$unm_{i,t}$: % unemployment rate	-0.029	-0.391	0.696	-0.075	-0.985	0.325
$clf_{i,t}$: labor force change index	0.006	0.337	0.736	0.009	0.449	0.653
$r30_t$: annual avg. 30y fxd rate	-0.121	-0.790	0.430	-0.647	-4.129	0.000
City fixed effects	Yes			Yes		
Adj-R^2			0.988			0.981
σ^2			5.931			11.959
obs.			870			1170

Instruments: hpi_{t-2}, $unm_{i,t-1}$, $shf_{i,t-1}$, $w.y_{i,t-1}$, $w.shf_{i,t-1}$, $w.unm_{i,t}$, $w.clf_{i,t}$, where $w.$ stands for spatial lag.

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The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes

by Stephan Whitaker and Thomas J. Fitzpatrick IV

The Impact of Vacant, Tax-Delinquent, and Foreclosed Property on Sales Prices of Neighboring Homes

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In this empirical analysis, we estimate the impact of vacancy, neglect associated with property-tax delinquency, and foreclosures on the value of neighboring homes using parcel-level observations. Numerous studies have estimated the impact of foreclosures on neighboring properties, and these papers theorize that the foreclosure impact works partially through creating vacant and neglected homes. To our knowledge, this is only the second attempt to estimate the impact of vacancy itself and the f rst to estimate the impact of tax-delinquent properties on neighboring home sales. We link vacancy observations from Postal Service data with property-tax delinquency and sales data from Cuyahoga County (the county encompassing Cleveland, Ohio). We estimate hedonic price models with corrections for spatial autocorrelation. We f nd that an additional property within 500 feet that is vacant, delinquent, or both reduces the home's selling price by at least 1.3 percent. In low-poverty areas, tax-current foreclosed homes have large negative impacts of 4.6 percent. In high-poverty areas, we observe positive correlations of sale prices with tax-current foreclosures and negative correlations with tax-delinquent foreclosures. This may ref ect selective foreclosing on better-maintained properties or better maintenance by tax-paying foreclosure auction winners. The marginal medium-poverty census tracts display the largest negative responses to vacancy and delinquency in nearby nonforeclosed homes.

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1 Introduction

Recent events in housing markets are attracting much scholarly attention to foreclosures. One line of research that is developing rapidly focuses on the externalities associated with foreclosure, primarily a foreclosed home's impact on surrounding properties. There are two general deficiencies with this line of research: the nearly exclusive focus on robust housing markets, and the assumption that foreclosures themselves, rather than factors correlated with foreclosure, drive down surrounding housing prices. This paper attempts to fill the gaps in prior research in two ways. First, it focuses upon a less robust housing market: Cuyahoga County, Ohio (home to Cleveland). Second, it incorporates parcel-level vacancy and real property tax delinquency (as a measure of neglect) in addition to foreclosure. We are able to estimate the impact of vacant and tax-delinquent homes on neighboring properties and correct the estimates of the impact of foreclosures by directly controlling for nearby vacant and tax-delinquent homes. We demonstrate important differences in the impact of foreclosure in different submarkets. In high poverty areas, we find evidence of selective foreclosure in a positive relationship between tax-current foreclosure and neighboring home sales. Pooling these high-poverty observations with medium and low-poverty observations obscures the large negative impact of foreclosures that is measurable in mid-to-upper income areas. Finally, we are able to use the coincidence of vacancy, delinquency, and foreclosure as a measure of abandoned properties. This measure enables us to estimate of their impact on home values.

Foreclosure, vacancy, and tax delinquency differ in important ways, though they may all lower surrounding home values or indicate distress that lowers home values. Foreclosure occurs when a debtor fails to pay a debt secured by the debtor's home, and the creditor opts to seize and sell the property instead of continuing to seek payment from the debtor. During foreclosure, homeowners have little incentive to maintain their homes, as every dollar put into upkeep or

improvements will primarily benefit the foreclosing lender.[1] Thus, recently foreclosed homes are more likely to be distressed due to deferred maintenance than homes that have not recently been through a foreclosure. Additionally, foreclosure adds a unit of supply to a local housing market. Assuming a competitive housing market, this additional supply should put downward pressure on home values. Finally, foreclosure may lower surrounding home values when they are used as comparable properties by real estate appraisers or realtors to price non-foreclosed real estate. In light of the volume of properties recently moving through REO (real estate owned), lenders lower the sales prices of homes they own in order to sell them quickly, because the carrying costs of vacant properties are high. When appraisers or realtors determine the value of a home, they may select foreclosed homes as comparable properties without considering the eagerness of the seller.[2]

Vacancy is closely related to foreclosure, but distinct in important ways. A home that has been foreclosed upon will be vacant immediately after the foreclosure but the vacancy may be temporary, as the property is auctioned off to a new owner or to a bank or investor who usually attempts to find a new owner.[3] Vacancy is distinct from foreclosure in that a property is vacant when it is not being occupied, which is not a result of a foreclosure in the vast majority of cases (there are seven

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[1] In states that allow deficiency judgments, where the lender can pursue borrowers for the difference between the amount owed on the loan and the price paid for the home at foreclosure auction, homeowners may have more of an incentive to actively maintain homes. Historically, however, deficiency judgments are not commonly pursued for many reasons. For example, homeowners who have gone through foreclosure rarely have the ability to repay a deficiency judgment, and such judgments are more easily dischargeable in bankruptcy than secured debt.

[2] Real estate appraisal guidelines allow for some discretion when selecting comparable properties. See, e.g. Uniform Standards of Professional Appraisal Practice 2010-2011, Standards 1 & 2, available at http://www.uspap.org/USPAP/frwrd/uspap_toc.htm. Thus, foreclosure liquidations and REO sales may not be used when selecting comparable properties.

[3] Not all purchasers at foreclosure auctions seek to quickly fill the home. Some spend time rehabilitating it or marketing it to other property investors (Ergungor and Fitzpatrick 2011). Some homes remain vacant for years after a foreclosure, especially high-poverty areas (Whitaker 2011).

times more vacancies than foreclosures in our data).[4] Vacancy lowers surrounding property values in ways that closely resemble foreclosure. Each vacancy is another likely unit of supply on the market, which should put downward pressure on home values. Vacant properties are usually not maintained as well as occupied properties because no one is present on a daily basis to care for them. While they may be cared for by an owner living elsewhere, there is less incentive and opportunity to maintain them as often and as carefully as an owner-occupier would. This problem is exacerbated with long-term vacancy, which occurs naturally in less robust housing markets where there may not be sufficient demand to reoccupy vacant houses, and in colder-weather climates where a single winter can cause significant damage to a property that is not attentively maintained.

While vacancy and foreclosure intuitively put downward pressure on home values through supply and disamenity channels, real property-tax delinquency does not: it neither immediately creates additional supply nor is it easily observable by neighborhood residents.[5] Yet, certain levels of tax delinquency may signal the abandonment of property by its owner, because once a property becomes tax delinquent it may be taken from the owner through tax foreclosure. Property is abandoned at the point that property owners and inhabitants stop investing in the property with the intent of foregoing their ownership interests. Abandonment usually occurs when a property's carrying, operating, or rehabilitation costs are too high relative to the property's value. The condition of abandoned property deteriorates rapidly, as there is no one maintaining or improving it. The decision to abandon property is made subjectively, and cannot be directly observed. This has led previous researchers to use subjective municipal determinations of whether a property

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[4]We consider a property vacant if it is not legally occupied. In some sense this may over-count vacancies, as some may be occupied by squatters. But such occupants have little incentive to maintain, and virtually no incentive to improve, the property.

[5]A tax delinquency becomes a unit of supply if it is eventually subject to tax foreclosure. A tax-delinquent home might be on the market if the financially-distressed owner is trying to get out of an unsustainable financial situation.

has been abandoned (Mikelbank 2008). While the subjective assessments are not reproducible, these studies show that when the impact of foreclosed property on surrounding home values is not considered alongside vacant and abandoned property, it overstates the impact of foreclosure. We use combinations of reproducible, objective indicators as proxies for abandonment. If we find these indicators are informative, they may be a substitute for this difficult-to-measure status.

In the years following the rapid decline in housing values, hedonic price modeling has been applied to evaluate the impact of properties that have been through a foreclosure. Foreclosure sales are easily identified in county recorder or court records, so many studies have been conducted on the impact of foreclosures. Often these studies are motivated by suggesting the foreclosed properties are frequently vacant, abandoned, and blighted. However, foreclosure is a very noisy measure of the impact of vacancy and abandonment. A few of the studies have incorporated the impact of vacancy and abandonment, but this has been limited by the unavailability of parcel-level vacancy data (Mikelbank 2008, Hartley 2010). With data on vacancy, foreclosure, and tax-delinquency, we can begin to disentangle the impact of each status on the value of neighboring properties.

In order to better understand these dynamics, this analysis is the first application of hedonic price modeling to a panel data set, specifically representing vacancy and property-tax delinquency of residential properties. To the authors' knowledge, this is the first study to use property-tax delinquency as an objective indicator of abandonment. This study is the first to use the U.S. Postal Service's (USPS) administrative records of vacancy to identify vacant properties at the address level. The records are commercially available on a monthly basis, so homes can be observed moving into and out of vacancy. Also, the time variation in the data gives us both increased accuracy in the count of nearby vacant homes at the time of the sale, and it creates additional variation in the vacancy counts within neighborhoods. Focusing on within-neighborhood variation addresses some of the endogeneity issues that always challenge hedonic price analyses. We find that when

foreclosure, vacancy, and property-tax delinquency are all included, the impact of foreclosure on surrounding home values is reduced.

The rest of the paper proceeds in five sections. In the remainder of this section we review the relevant literature. In section two, we discuss the theory behind our modeling. In section three we discuss the data we use and provide descriptive statistics. In section four we discuss our results, and in section five we conclude and discuss policy implications of our findings.

1.1 Literature

Since housing prices cooled in 2007, policymakers are increasingly aware of the external costs of foreclosure, vacancy, and abandonment. Research has intensified over the past few years, but it primarily focuses upon foreclosure. While foreclosure may lower surrounding home values, vacancy and abandonment have long been recognized by practitioners as more important roadblocks to revitalizing distressed neighborhoods. Interest in vacancy and abandonment dates to well before the current crisis. For example, one early paper developed a theoretical model based upon New York City housing markets that approximated that owners would abandon property when the current level of rents in the neighborhood did not justify the rebuilding or renovation of a distressed property (White 1986). Yet this research has rarely made an attempt to quantify the impact of vacancy and abandonment on surrounding home values.

One gap in research on abandoned properties is the lack of a universal definition of "abandonment." Municipalities tend to use a period of vacancy as a proxy for abandoned structures, but the period they must be vacant to become abandoned varies widely (Pagano and Bowman 2000). A structure is generally considered abandoned when it is chronically vacant, uninhabitable, and the owner is taking no steps to improve the property (Cohen 2001). Unfortunately, to determine that a property is uninhabitable or in disrepair researchers rely upon an assessment from the municipality

itself, obtained through inspections (Cohen 2001, Mikelbank 2008). This data is often incomplete, because municipalities lack the resources to frequently survey all properties within their jurisdiction (Pagano and Bowman 2000). These inconsistent definitions make it impossible to accurately compare results across cities.

For the purposes of this study, we use vacancy, tax delinquency, and their coincidence as measures of distress and abandonment. Vacancy is nearly universal among abandoned properties, as by definition they are not being cared for by either owners or inhabitants. Tax delinquency has been referred to as "the most significant common denominator among vacant and abandoned properties," (Alexander 2005), and correlations exist between tax-delinquency rates and decreases in home sales prices (Simons, Quercia, and Maric 1998). This is logical, as owners who plan to retain ownership either pay property taxes or run the risk of losing the property in a tax foreclosure. Property owners with no interest in retaining ownership have no incentive to pay property taxes. Owners with no interest in retaining ownership also have no incentive to maintain their property, so where we find property tax delinquency, we would expect to find deferred maintenance.

Research ties widespread vacancy and abandonment to long-term population decline. The process of filtering, where the occupation of new, high quality residential construction results in old, low-quality residential vacancies has been analyzed for decades (Lowry 1960). Cities that self-report the largest supply of abandoned housing have experienced persistent population loss, suggesting that abandonment occurs in the later stages of a neighborhood's lifecycle (Cohen 2001). When building permits outpace household growth in a metropolitan area, filtering causes increased vacancy and abandonment in the city's urban core and inner-ring suburbs (Bier and Post 2003). The durable nature of housing results in a very slow adjustment of the housing stock to match the smaller population (Glaeser and Gyourko 2005). The lag manifests itself in vacancy and abandonment. Abandoned property is a significant, long-term problem in older industrial cities that have

experienced outmigration from their urban cores, but such filtering also leads to some abandonment in cities with generally robust housing markets.

Until recently, most research on the impact of urban decline has focused on foreclosures in robust housing markets. The most commonly cited study on the topic estimates that each mortgage foreclosure within one eighth of a mile (660 feet) of a single-family home lowered its value by about one percent, based on one year of home sales data from Chicago in the late 1990s (Immergluck and Smith 2006). In order to determine whether foreclosures create significant price declines to surrounding property or are simply a result of local housing trends, Harding, Rosenblatt and Yao examine the impact of nearby foreclosures on home sales in select zip codes across seven metropolitan areas over nearly 20 years, and factor in local price trends (2009).[6] They find that above local housing price trends, each foreclosure within 300 feet lowers a home's value by up to one percent, and each foreclosure from 300-500 feet lowers a home's value by about one half of one percent.

Schuetz, Been, and Ellen control for home prices prior to foreclosures and investigate the linearity of the relationship between the number of foreclosures and price discount on surrounding homes (2008). Using data from New York City from multiple years, they find that foreclosures within 250 feet of a home reduce its value by one to two percent. Outside of the 250 foot ring, a larger number of foreclosures is necessary to impact a home's value: three or more from 250-500 feet lowers a home's value by one to three percent, and six or more from 500-1000 feet lower a home's value by about three percent.

Campbell, Giglio, and Pathak look more broadly at the impact of forced sales on home prices (2011). They define forced sales as those resulting from bankruptcy, death, and foreclosure. Looking at housing data for Massachusetts over 20 years, they find that forced sales due to foreclosure have

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[6]The seven MSAs are Atlanta, Charlotte, Columbus, Las Vegas, Los Angeles, Memphis, and St. Louis.

much steeper price discounts than those due to bankruptcy or death. Controlling for the average level of voluntary sales prices, they find that a foreclosure within a twentieth of a mile (264 feet) lowers the value of a home by about 1 percent, and the closer the foreclosure to the home the larger the discount.

Lin, Rosenblatt, and Yao (2009) attempt to better understand why foreclosures lower surrounding home values. They used a theoretical model for home pricing using comparable properties, attempting to reproduce the effects of appraisers and realtors. They estimated that in Chicago, 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.[7]

Three foreclosure studies have been published making use of transaction and property characteristics data from the suburban county adjacent to St. Louis, Missouri (Rogers and Winter 2009, Rogers 2010, Groves and Rogers 2011). Rogers and Winter find evidence that the marginal impact of foreclosure declines with distance from the foreclosure, time since the sheriff sale, and the prevailing foreclosure rate (2009). Rogers' data reaches back to the years from 2000 to 2005, when foreclosures where far less common and exhibited larger impacts. A second study presents evidence that comparable marginal impacts were stronger in the earlier years of the data than in the later years (Rogers 2010). Most of the estimates are less than one percent per unit when measured at distances and time comparable to other studies, such as 200 yards and twelve months. The final study examines the ability of restrictive covenants to mitigate the externalities of foreclosures (Groves and Rogers 2011).

Only two studies look beyond foreclosure and incorporate vacancy into their analysis (Mikelbank 2008, Hartley 2010). One uses vacancy rates to classify neighborhoods into broad categories.

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[7]This model assumed that foreclosure liquidations of comparable properties are used by realtors when pricing a home. Anecdotally, realtors and appraisers in less robust housing markets report ignoring foreclosure liquidations when pricing comparable properties unless there are no other reasonable comparisons.

Hartley attempts to delineate between the "supply" and "disamenity" effects of foreclosures to determine how much of the price discount was due to each (2010). By looking at different types of foreclosed property in Chicago, Hartley decomposes the effects of foreclosure on nearby housing in census tracts with low and high vacancy rates. The explicit assumption in Hartley's work is that renter-occupied multi-family buildings are not substitutes for single-family homes, so a renter-occupied multi-family building foreclosure will not change the potential housing supply for persons seeking a single-family home, and vice versa. In census tracts with low vacancy rates, he finds that each foreclosed single-family home within 250 feet reduces a home's value by 1.6 percent due to an increase in supply, while the disamenity effect of the foreclosed multifamily buildings is near zero. In census tracts with high vacancy rates, he estimates the disamenity effect of a foreclosed multi-family home lowers surrounding single-family property values by about two percent, while the supply effect is near zero.

One issue common to all of these studies is that they all acknowledge that foreclosures likely lower surrounding home values by becoming disamenities or adding supply to the market, but fail to distinguish between foreclosures that are reoccupied quickly, foreclosures that sit vacant and are well maintained, and those that become abandoned. Hartley's results hint at the importance of this distinction by illustrating that neighborhood property values are lowered due to supply or disamenity, depending on the location (and likely the condition) of the property. Understanding the difference between foreclosed, vacant, and abandoned property is critical for policymakers who seek to understand how to address these issues. Mikelbank illustrates that estimating the impact of either vacant and abandoned property or residential foreclosures in isolation overstates the impact of both, based upon his empirical analysis of one year of housing sales in Columbus, Ohio (2008). In this paper, we build on the previous studies, focusing on the housing transactions in Cuyahoga County, Ohio, in an attempt to better understand the interplay between foreclosures, vacancies,

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abandoned properties and surrounding home values.

2 Theory

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 (see equation 1). P_i is a home sale price. z_{ij} are characteristics of the home and its location.

$$P_i \quad = \quad \alpha + \sum_{j=1}^{J} \beta_j z_{ij} + \varepsilon_i \tag{1}$$

The HP model relies on some standard assumptions which, nevertheless, could be violated in reality. It assumes the housing market is competitive and that both buyers and sellers are fully informed.[8] Using a linear specification suggests that the characteristics of the home can be costlessly repackaged. This is obviously not the case, so most applications employ a semi-log specification that implicitly interacts all the characteristic measures. In this specification, the coefficients are not interpreted as prices, but rather percentage changes in the price.

$$ln(P_i) \quad = \quad \alpha + \sum_{j=1}^{J} \beta_j z_{ij} + \varepsilon_i \tag{2}$$

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 has not controlled for (the possibilities are endless). The impact of these factors is also thought to vary with distance. A home closer to the amenity or disamenity

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[8]A significant number of homes in Cuyahoga County have been purchased by out-of-state investors over the internet. Homes are also purchased out of REO inventory blindly as part of a bulk sale at a pre-negotiated price. Full information is doubtful in these cases.

will have a larger price response. Omitting a distance-weighted indicator of the factor leaves its influence in the error term. Equation 3 is a hedonic price model that gives two options to address this (Anselin 1988).

$$P = \lambda W_1 P + ZB + \varepsilon \tag{3}$$

$$\varepsilon = \rho W_2 \varepsilon + \mu \tag{4}$$

$$\mu \sim N(0, \sigma^2 I) \tag{5}$$

Equations 1 and 2 used summation notation to emphasize the contribution of multiple character-istics to the sale price. We switch to matrix notation (following the literature) here because the spatial models center on a spatial weight matrix. W_1 is a spatial weighting matrix that gives large weight to the prices of nearby homes and small weight to the prices of far away homes. Multiplying the price vector (P) by W_1 creates a vector of weighted averages of nearby home prices. Including these averages as a control removes the gradient between high-price and low-price neighborhoods.[9] The remaining variation within neighborhoods tells us approximately how much sale prices would change if we could add or remove distressed properties. λ relates the distance-weighted mean sell-ing price of the other homes to the specific observation. If λ is significant and non-zero, the prices are said to be spatially dependent. 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 correla-tion, which would be caused by unobserved amenities and disamenities contributing to the error terms of nearby homes. μ is the normal error remaining after the spatial error has been modeled. Unfortunately, ρ, λ, W_1, and 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. Both W_1 and W_2 can be estimated in the same model, if the

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[9]The negative correlation between vacancy and price is very obvious in maps (figures 2 and 1), but it is not the relationship we are attempting to estimate.

theory suggests a specific error structure that differs from the relationship between the prices. In this analysis, we do not have a theoretical reason to use a W_2 different from W_1, and using the same spatial weight matrix can introduce collinearity issues. We will refer to the correction involving W_1 as the spatial-lag correction and the correction employing W_2 as the spatial-error correction.

In specifying the spatial models, we use a weight matrix based on inverse distances up to one kilometer. Closer sales are given larger weights and further homes are down-weighted. The weights are row-normalized to sum to one, so the product of weight matrices and the price vector or error vector are all in the same units. In the results below, several other spatial corrections are presented and the consistency of the results gives us confidence that our weight matrices are reasonable and effective at removing the spatial autocorrelation bias.

The estimates presented in the results tables apply a spatial-error correction. The spatial-lag estimates, which are very similar, can be found among the robustness checks. Wald tests confirm either model is significantly better than a model without a spatial structure. The test statistics suggest the spatial-error model is a better fit in each of our three main models. In our main results, (table 4), the ρ values reflect the extent to which the model's errors are geographically correlated. The values are between .46 and .68 and are highly significant. This parameter is primarily of interest as a control, with the high, significant value suggesting that it is absorbing unobserved correlation in the error structure and leading to coefficients on the treatment variables that can more plausibly be interpreted as causal. We report ρ in the other models, without further discussion, for confirmation of the models' appropriateness.

If a distressed home decreases the price of a home, that home decreases the prices of homes nearby, and the prices of the homes nearby decrease the price of that 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

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the neighboring home prices and then fed back into the original home sale observation (Drukker, Prucha, and Raciborski 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.

Two additional concerns are raised in the literature and should be kept in mind when considering this analysis. The causality between foreclosures and falling home prices can run in both directions. When home prices are falling, households in economic distress may not be able to sell their home and downsize or shift to renting. If the recent price downturn has been severe, or if the homeowner put little money down on the home, they may owe more than the home could sell for. Even if they can sell the home, they cannot repay the mortgage unless they have other assets. If a housing market is in the self-reinforcing cycle of falling prices and rising foreclosures, these trends will bias the estimated impact of foreclosed homes. Somewhat parallel arguments could be made that falling house prices increase vacancy and tax delinquency. In our data set, we do not anticipate this being a significant problem because our time period is only fifteen months. Over those fifteen months, the stocks of vacant, delinquent, and foreclosed (within the past twelve months) homes change only modestly with no pronounced trend. Likewise, the time period is not long enough to fully reflect year-over-year price declines. We include indicators for the month of sale in all estimates. These indicators are intended to adjust for the strong seasonality in cold-weather real estate markets, but they could also capture a secular trend. Other studies employing ten years or more of data must take additional steps to account for appreciation or depreciation over that period.

The second 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.

Most regional economists and policymakers would agree that a data set that covers an entire urbanized county, as ours does, represents several separate housing markets, rather than one. For an average buyer, many high-cost neighborhoods would offer no options within their budget constraint. Likewise, high-income buyers would not consider a home of any type or price if it is in a low-performing school district or high-crime neighborhood. When the models are estimated on a pooled data set, the coefficients are an average across all types of buyers. It is useful to know how the impact of a distressed home differs in high-income verses low-income neighborhoods, so we estimate our models on several submarkets.

The specification of our model is motivated by some practical considerations. First, we are interested in helping policymakers identify types of distressed homes that have the greatest negative impact on neighboring property values. Therefore, we are dividing the homes into counts based on which markers of distress they exhibit, and not allowing them to contribute to multiple counts. While many papers in the literature use multiple buffers to demonstrate the distance decay of the impacts of a disamenity, we primarily report the impacts within one buffer.[10] We chose the 500 foot buffer based on findings in previous studies that suggest at 500 feet, the impact of a foreclosure is still significant. A smaller buffer will show a larger impact, but it misses many of the sales that are treated. We are reporting coefficients for five counts in three submarkets, which is challenging to interpret. Multiplying the number of coefficients by additional buffers would make the results

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[10]We present one set of results with two buffers in Table 6

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much more difficult to relay to policymakers and is not justified by the additional information in this situation.

To briefly review, we expect each indicator of distress – vacancy, delinquency, and foreclosure – to be associated with lower sales prices for nearby homes after controlling for prevailing neighborhood prices and observable characteristics. Vacant homes do not contribute to the vibrancy or security of a neighborhood. In many cases, no one is attending to their appearance daily, so grass is mowed less frequently, snow is not cleared, leaves are not raked, etc. Some of this may be offset if the home is on the market and the sellers have invested in "curb appeal" cosmetic improvements. Unless the home is vacant because it is undergoing major renovations, or awaiting a rental tenant, then the home is either a unit on the market or part of the shadow inventory. The shadow inventory consists of homes owned by individuals or institutions that want to sell, but are not actively marketing because they are hoping the market will improve. When a single lender owns many delinquent loans secured by properties in close proximity to one another, and in markets where there is relatively weak housing demand, the lender may deliberately pace the marketing of foreclosed properties. In either case, these vacant homes (which are often easy to identify in person) signal to buyers that the market is flush with inventory and shadow inventory, and therefore they can bargain for low prices.

The case of delinquency is more subtle. One can reasonably say that it is not visible on the street and very few people look up the tax delinquency status of neighboring homes.[11] For homes that only have tax delinquency, we believe it serves as an objective measure of distress for the property. If the homeowner is unwilling or unable to pay their property taxes, which eventually results in tax-foreclosure, it is very likely that they are unable or unwilling to maintain the property. Poor

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[11]While we a referring to the data as tax delinquency data, it does include some uncollected code violation and nuisance abatement fines as described in section 3. Since these vary widely between jurisdictions, we attempt to exclude them from the analysis. In many cases, code violations are visible from the street.

maintenance of neighboring properties is visible to home purchasers if any exterior or landscaping work is needed.

The impact of foreclosure is more direct, and therefore, we might expect its per unit impact to be larger. With the exception of strategic defaults, every household that went through a foreclosure has experienced financial distress. When the homeowner accepts that they will likely or certainly lose the home, they no longer have an incentive to invest anything in maintenance. In our data, foreclosures are indicated after the sheriff sale, so the purchasers may have paid off the property's tax delinquency. If no third party investor bids above the lending institution's auction reserve, the reserve is recorded as the sale price and the lender takes possession of the property. In many cases, these homes are back on the market or being held as shadow inventory by the lender (Whitaker 2011). If the home is sold out of REO, a second transaction has been recorded at a discounted price. The direct link between these foreclosure-related sales and other sales is the comparables or appraisal process. The foreclosed homes will be considered by sellers, purchasers, and lenders in determining the value of a nearby non-foreclosure property.

We begin with separate counts of each combination of distress because we think homes in different stages of the process will have very different impacts on nearby homes. When past studies have estimated the impact of foreclosures, they are rolling together homes that were just auctioned and are bank owned, homes sold out of REO to speculators that are vacant and delinquent, and homes sold to families that have paid the property taxes and occupied the home. Our parcel-level data with all three measures will reveal if certain combinations of distress indicators matter more than others.

3 Data

The bulk of the data used in our analysis is an administrative dataset maintained to track property transactions, property-tax delinquency, and assessed values for taxation. These data contain a rich set of characteristics for all residences in the county. The records are used in property tax assessments and are updated triennially and with permit data.[12] We include measures or indicators of the following as controls: bedrooms, bathrooms, vintage, style (Cape Cod, Colonial, etc.), lot size, condition, construction quality, exterior material, heat 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. The vacancy, delinquency, and foreclosure status of the property itself is included as a control. The vacancy and delinquency measures have large, highly-significant influences on the sale prices, and they improve our model over others that could only control for the foreclosure status.

The county fiscal officer also maintains records of all sales with the key elements of dollar amount, date, seller, and purchaser. Data on tax-delinquency is updated semiannually. We use two tax-delinquency files. The first is a list of parcels that were delinquent anytime in 2010, and the second is a list of properties that were delinquent at any time between January and June 2011. 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 enter or exit delinquency are not available, so these data are static within one year or the other. We identified in the dataset 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

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

accounting errors (there are hundreds of delinquencies of a few dollars or cents) and the 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.[13]

One novel dataset that is being used for the first time (to the best of our knowledge) is the USPS vacancy data. This dataset is created when postal carriers observe that a home has been vacant for 90 days and 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 continuously being sorted into the route's load and carried back at the end of the day. The address database, including vacancy status, is routinely audited and maintained at an accuracy level above 95 percent. To further increase efficiency, the USPS makes this 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. For our research purposes, 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.

For this analysis, we use the fifteen months of sales data that we have been able to link to complete vacancy data. This covers 11,361 sales in Cuyahoga County between April 1, 2010 and June 30, 2011. 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 properties is recorded for each property in the transaction. In these cases, it is not clear what

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

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 the vacancy, delinquency, and foreclosure 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. Apartments generally pay taxes via one parcel number while condo parcels must be grouped by building to determine if the building has over 75 percent delinquent units, and thus adds to the delinquency counts of neighboring home sales.

3.1 Descriptive Statistics

In this section, and in the results, we will present descriptive statistics and models estimated separately in high-, medium-, and low-poverty submarkets. By comparing the results from the submarkets with pooled results, it is evident that pooling hides important differences. Table 1 summarizes the monthly counts of distressed properties.[14] Note that delinquencies are the most common indicator of distress, with vacancy the next most common. The counts of distressed properties in the 500 foot buffers around the home sales are described in Table 2. The (pooled) average home sells with four vacancies, eight delinquencies and one foreclosure within 500 feet. Not surprisingly, all counts are higher in high-poverty census tracts and lower in low-poverty census tracts. To place the counts in context, we need to think about the distribution of neighboring parcels. A home in a low-density exurb may only have a handful of neighbors within 500 feet that could impact its value. In contrast, a home in the densest tract can have over 200 neighbors. The mean number of parcels in a home's 500 foot buffer is 98 and the standard deviation is 45.

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[14]More extensive descriptive statistics with standard deviations, maximums, minimums, cross tabulations, and correlations are available from the authors upon request.

Maps of one month's vacancies and median sales prices (figures 1 and 2) illustrate that the distribution of vacancies is different in low-price versus high-price areas. Maps of delinquencies and foreclosures have similar patterns. The counts of the different types of distressed homes are positively correlated with one another. Most of the observations of the counts are in the low single digits, and zeros are common. However, there are homes in distressed neighborhoods that are treated by very high counts of all types of distressed properties.

4   Results

Table 3 presents the results of the three submarket models, and a pooled model, each with seven separate distress counts.[15] The coefficients on the property characteristics and month indicators (not shown) are significant in most cases and have the expected signs.[16] Counts of vacant (only) and delinquent (only) homes have negative impacts between 1.1 and 2.1 percent in each submarket, with five of the six estimates being statistically significant.

Homes that have been abandoned without going through a recent foreclosure should be counted in the vacant-delinquent category. It seems logical that vacant-delinquent homes would have at least as large an impact as a home with only one of the markers of distress. This hypothesis is supported in the medium-poverty market, but does not hold in the other two. Vacant-delinquent homes are quite common in high-poverty neighborhoods, as indicated by an average count of 4.29 VD homes near a sale in a high-poverty neighborhood (see Table 2). However, the counts of delinquent homes are even higher, and there is a correlation of .75 between the two counts. While a significant negative impact of 1 percent per additional unit is ascribed to vacant-delinquent homes in high-

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[15]To calculate the estimates reported here, we use a recently released routine from StataCorp. The package, called *sppack*, creates spatial weight matrices and estimates spatial models using a maximum likelihood routine (Drukker, Peng, Prucha, and Raciborski 2011, Drukker, Prucha, and Raciborski 2011).

[16]A full set of coefficients are available from the authors upon request.

poverty tracts, the counts of delinquent homes explain more of the variation. In low-poverty areas, vacant-delinquent homes and tax-current foreclosures are present in similar numbers. In these areas, vacant-delinquent homes are certainly distressed, but probably not completely abandoned. The contrast between the large negative impact of the recent foreclosures and the smaller, insignificant result for vacant-delinquent homes may reflect the influence of foreclosures through the recording of discounted sales. Of the four measures involving foreclosure, vacant-foreclosures (tax-current) have the most significant coefficients. Some of the foreclosure coefficients are positive, which is not in keeping with the literature, and begs further exploration.

When all seven distress counts are included for three submarkets, this requires presenting twenty-one coefficients of interest. Results this complex are challenging to interpret and extremely difficult to convey to a general audience, so we considered more parsimonious models that could maintain the important disaggregations.[17] Also, if one takes a treatment with a significant impact, such as foreclosures, and divides its counts by a less important categorization, such as vacancy, there is a possibility of attenuating the coefficients by introducing multicollinearity and measurement error. Throughout the remainder of the presentation of the results, most of the models are estimated with the distressed property counts placed in five categories.[18] Within the foreclosed home counts, we combined the counts divided by vacancy, but maintained the distinction based on tax-delinquency. The tax status of foreclosed homes proves to be a very informative distinction in high-poverty neighborhoods. In each case where the counts are combined, the resulting coefficient is

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[17]We estimated a seven-treatment equivalent of every model for which it is possible. These estimates are available from the authors upon request.

[18]We formally tested if the coefficients for vacant and occupied (tax-current) foreclosures were significantly different from one another. Likewise, we tested if the vacant and occupied delinquent-foreclosure coefficients were different. In both tests within all three submarkets, the coefficients were not significantly different from one another. If the coefficients were significantly different from one another, combining the counts would less appealing.

a combination of the two impacts, weighted by the frequency of the distressed property treatments.

Our main results appear in table 4. The model suggests that an additional vacant property within 500 feet reduces the sales price of a home by 1.7 percent in low-poverty neighborhoods and 2.1 percent in medium-poverty neighborhoods. Tax delinquent properties have very similar impacts on a per-unit basis (1.8 and 1.9 percent respectively), but these coefficients would be multiplied by higher counts because delinquent properties are roughly twice as numerous than vacancies. In medium- and low-poverty neighborhoods, having a recent foreclosure near a sale has a large negative impact on the sale price, as expected. A recent foreclosure within 500 feet decreases the sale price by 2.7 percent in medium-poverty tracts and 4.6 percent in low-poverty tracts. Delinquent-foreclosure counts in medium- and low-poverty neighborhoods have small to modest positive coefficients, but much larger standard errors.

Foreclosed homes in high-poverty census tracts display a completely different phenomenon. In poor neighborhoods, recent foreclosures display a marginally significant, positive relationship with nearby sales prices. While it is not plausible that buyers actually value buying near a recent foreclosure, this positive correlation is consistent with selective foreclosure by mortgage holders. In these census tracts, where home values are often lower than transaction and maintenance costs (under \$10,000), only homes that are in relatively good condition and on relatively desirable blocks will resell for a value high enough to justify the cost of foreclosure. In this way, a recent foreclosure is associated with higher home values among near-neighbor homes. In contrast, the impact of a tax-delinquent recent foreclosure is -7.6 percent in high-poverty neighborhoods. After the sheriff sale, if either the mortgage holder or the investor that purchased the property has decided not to pay the property taxes, it is very likely that they have abandoned the property. This result suggests that municipalities could identify the most damaging distressed properties in poor areas with two pieces of data they already have in hand, namely recent sheriff sales and the tax status of those

parcels.

The contrast between the submarket results and the pooled results demonstrates the need for different approaches in different areas. Disregarding market differences with pooled results leads to the erroneous conclusion that tax-current foreclosures have no impact at all! It is also evident that tax-delinquent foreclosures in high-poverty areas are driving the negative impact that appears in the pooled results. Focusing only on tax-delinquent foreclosures in medium- and low-poverty areas would not be an effective strategy.

4.1 Comparison to Previous Studies

In the submarket estimates, we report three large, significant negative impacts from recently foreclosed homes. These range from 2.7 percent for a tax-current foreclosure in a medium-poverty tract to 7.6 percent for a tax-delinquent foreclosure in a high-poverty tract. Our findings are in the higher end of the range of negative impacts from a neighboring foreclosed home that were found in the previous studies discussed in section 1.1. The large coefficients on the foreclosure counts may reflect a weak housing market, deep into the housing bust. In 2010 and 2011, Cuyahoga County had a very high inventory of homes for sale. Prices had been declining for several years and showed minimal indications of recovering. Home prices are usually sticky because sellers need to repay their mortgages, and they anchor their perception of their home's value based on the price they paid. However, by 2010, many owners were capitulating and accepting lower prices. Most of the previous foreclosure impact studies were looking for lowering of values in markets with various upward pressures.

One of the contributions we promised was to correct the estimate of the impact of foreclosures by taking into account other distressed properties in the neighborhood and properties with multiple indicators of distress. In table 5, we present the results of models estimated with each of the counts

alone (models I-III) and foreclosures divided by tax-status alone (model IV). Contrasting these models with the main model (V), or a non-exclusive count model (VI) demonstrates that the impact of foreclosure may be overstated in the absence of vacancy and delinquency measures.[19] Even after dividing the sample into submarkets and controlling for spatial correlation, part of the estimated foreclosure impact is via its serving as a proxy for nearby vacant and delinquent properties. The contrast between model III and model VI gives the best illustration of how the results of previous studies might change if they incorporated vacancy and delinquency data. In areas with relatively strong housing demand, the estimate of the impact of a recent foreclosure declines by 31 percent in the presence of other distress measures.

It is common in the literature to report the results in several different distance buffers to demonstrate the rate of distance decay in the impact of the distressed property. Table 6 shows the results of estimating the model with two exclusive counts in a small (<250ft) and large (250-1000ft) buffer. Our results are consistent with previous research. The negative impacts of distressed properties are generally larger when the properties are closer to the sale. There is an alternate interpretation of these results like these that is made by researchers who emphasize the endogeniety of foreclosure. If falling home prices cause foreclosures and foreclosures lower home prices, then spatial controls may not be sufficient. The later data will feature higher foreclosure counts and lower prices relative to the earlier data, and the coefficient on foreclosure will be overstated because it reflects both impacts. Similar processes could be at work with vacancy and tax delinquency. Some studies include foreclosure counts in an outer ring around the sold home to control for the prevailing frequency of foreclosure in the area. The coefficients on the inner-buffer counts are presented as having reduced bias from the endogeneity of foreclosures. In this interpretation of table 6, there

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[19]By "non-exclusive" we mean the distress counts are made separately. A home with multiple markers of distress contributes to more than one count. For example, a delinquent-foreclosed house is counted along with all other foreclosures, and the same house also adds one to the delinquency count.

are significant negative impacts from neighboring vacant homes in medium- and low-poverty areas, at -3.5 and -2.5 percent respectively. Delinquent homes have significant negative impacts in high- and low-poverty tracts. The coefficients on tax-current foreclosures are of consequential magnitude, but neither approaches significance. The other coefficients are a mixture of insignificant results. If we hold to this spatial interpretation of the results, we would have to conclude that vacancy and delinquency have large impacts on property values, but foreclosure has no measurable impact.

4.2 Non-Arm's Length Sales

As discussed in section 3, we excluded sales in which the lender was reclaiming a property used as collateral for a mortgage. Before this exclusion, at least 15 percent of the sales in our data involved an institutional buyer, seller, or both. If we return those sales to the dataset, and estimate the models with an indicator for an institutional buyer or seller, we see that the treatment coefficients (table 7) are similar to those of the main model. Controlling for characteristics of the homes, the discounts recorded for homes entering and exiting REO status are enormous. When a bank or federal agency reclaims a home at a sheriff sale, they set auction reserves between 34 and 56 percent (depending on the neighborhood) less than the sale price for an equivalent property in an ordinary sale. The discount for homes coming out of REO is even steeper in high-poverty areas, at 81 percent. The repossessors appear to be recovering some value in the low-poverty areas, but taking losses in high-poverty areas. Investors, in sharp contrast, buy at a 40 to 55 percent discount and sell near the average market price. For non-profit "buyers," the estimates return nonsensical coefficients below -1. This is because non-profit are given homes more often than they actually purchase them, and prices far outside the rest of the price distribution are recorded (such as $10 or $100).

4.3 Other submarket definitions

In table 8, we present model estimates with the observations grouped by different definitions of submarkets. The first grouping is by central city, inner-ring and outer-ring suburbs. From this arrangement, we learn that the inner-ring suburbs have the strongest price penalty for a home being near a delinquent-foreclosed property. The positive correlation between foreclosure sales prices is larger in the central city model than in the high-poverty model, and it is significant at the five percent level. Tax-delinquent homes have large negative impacts in all areas (1.1 to 2.1 percent).

The next two sets of models sort census tracts by vacancy rates and the pre-existing (2006-2009) median home prices. The cut-points are selected to place approximately a third of the sales into each category. Vacancy is positively correlated with poverty, and home prices are negatively correlated with poverty. However, the correlations are not exact, so each change in the submarket definition shifts dozens of census tracts up and down. It is worth noting that submarkets defined by vacancy levels feature reduced variation of this independent variable of interest, just as defining sub-markets by price will narrow the distributions of the dependent variable.

The basic pattern of the main results is visible in both alternate market definitions. With census tracts grouped by vacancy rate, several of the coefficients are smaller than their equivalent with the poverty-level grouping. The estimated impact of vacancies, delinquencies, and foreclosures are all lower in neighborhoods defined by low vacancy compared to a sub-sample defined by low poverty. Vacant-delinquent homes have a larger negative impact if the sample is defined by medium-vacancy rather than medium-poverty.

When pre-existing home prices are used to group the census tracts, the most of the coefficients are larger in magnitude than their equivalent in the main models. The positive coefficient on foreclosures is large and significant in low-price areas, and the negative coefficients on foreclosures

in medium- and high-price areas are also larger than their comparable figures from the poverty submarket (main) results. The coefficient on vacancies in medium-priced areas is surprisingly small, and the coefficient on delinquent-foreclosed homes in low-priced areas is not significant.

4.4 Robustness Checks

As discussed in section 2, there are several options for addressing the spatial correlation between home prices. We attempted five alternate spatial corrections and two corrections for the skewness of the distressed property counts. For the sake of brevity, we have summarized the coefficients in figure 4, rather than seven additional tables.[20] In the graph, a letter corresponding to the model is placed along a line corresponding to one of the five treatments within the three submarkets. If the coefficient is significant at the five percent level, it is placed above the line. If it is marginally significant ($.05 < p < .1$), it is placed on the line, and if it is not significant, it is placed below.

Model B is an OLS estimate with no spatial correction to the coefficients. As we would expect, the coefficients are larger than the spatially corrected models in 11 of the 15 cases because they are letting the distress counts reflect the variation of other distressed properties. In section 2, we discussed the spatial lag model and the results of that estimate are represented by C. The differences between the spatial-lag (C) and the spatial-error models (A) are minor with the exception of the negative impact of vacant-delinquent homes in medium-poverty areas. The spatial lag model gives an estimate of -4.4 percent, 1.7 points above the spatial-error model estimate.

Model D uses census tract fixed effects to capture unobserved local amenities and disamenities. In high-poverty areas, the estimate with census tract indicators (D) suggests a larger role for vacant homes, while decreasing the estimated impact of delinquent and vacant-delinquent homes relative to their main (A) model coefficients. Forcing the model to use only the variation within census tracts

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[20]The coefficients of all the robustness check models are available from the authors upon request.

is quite limiting. Approximately one quarter of the high-poverty census tracts have five or fewer sales observed. The poor neighborhoods are also usually denser, which means distressed properties treat more sales within the geographically smaller tracts. Of the seven significant coefficients in the medium- and low-poverty models, only one (vacant-delinquent in medium-poverty) becomes insignificant with tract fixed effects. The coefficients on delinquencies in medium-poverty markets and foreclosures in low-poverty markets are reduced, but remain at least marginally significant.

The data can locate each sold home in a jurisdiction, and it is reasonable to think the jurisdiction has important effects on the home price. Thus, an indicator of the jurisdiction should capture a lot of important unobserved spatial heterogeneity. In Cuyahoga County, cities correspond to significant differences in property taxes and provide very different levels of city services. They are usually grouped with one or two similar cities into school districts. Property taxes and school districts are known to have large impacts on home values (Oates 1969, Downes and Zabel 2002). When city indicators are included in the model without a spatial error correction (E), most of the results persist in magnitude and significance. Adding a city-specific time trend (F) changes the results only slightly.

The counts of vacancies, delinquencies, vacant-delinquencies, and tax-current foreclosures are skewed. Most of the counts are below five, with a handful of homes being sold near 20 or even 50 distressed properties. Model G includes an indicator for observations that are above the 95th percentile for any of these four counts. The indicator is interacted with the counts to allow for a different slope at high levels. Model H excludes the observations with the high counts.[21] In models G and H, the significant estimated impacts of vacancy, delinquency and foreclosure all maintain at least marginal significance. These results suggest it is safe to say that a few unusually high

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[21] These estimates also exclude observations with delinquent-foreclosures above 2. DF counts above 2 are only found in high-poverty areas, so we do not try to address them in model H. Doing so would require including additional indicator and interaction terms in one submarket, but not the other two.

observations are not driving the findings. In the cases of vacant-delinquencies, foreclosures, and delinquent foreclosures in high-poverty areas, and foreclosures in low-poverty areas, the coefficients are larger when the highest counts are interacted or removed. This suggests the marginal impact of the first few distressed properties in these counts are underestimated when a linear fits combines their effect with the lower marginal impact of additional units in a high count.

The groupings of significant coefficients suggest that the estimated impact of vacancy and delinquency in medium- and low-poverty submarkets are very robust. In high-poverty tracts, the estimated impacts of vacancy are tightly grouped, but not significant. The high-poverty coefficients on delinquency are all similar except when census-tract fixed effects are included (D). On the foreclosure measures, all of the models agree that there is a positive correlation between tax-current foreclosures and sale prices in high-poverty neighborhoods. This result is at least marginally significant in the presence of any spatial correction. In low-poverty areas, the estimates of the negative impact of foreclosures are sensitive to the corrections for spatial correlation, but they are always negative and significant. In medium-poverty areas, the estimates of foreclosure are tightly grouped and at least marginally significant in all but one model.

5 Policy Implications

5.1 Removing Blight

Using our main model, we attempted a simple experiment to estimate the potential benefit from eliminating some of the distressed properties. We returned to our model and re-predicted the sale prices four times, each time setting the counts on one of the distressed property types to zero. We sum the increase in the predicted values and divide it by the average number of units with the marker of distress in a month. This gives a predicted per-unit increase in transaction values. The

values are implicitly weighted by the sales activity the distressed properties actually influenced, but they suggest a proportional increase in property values of unsold homes as well. This benefit could be weighed against the cost of a program that alleviates distress on properties.

Table 9 presents the results of the experiment. To place the table in context, the total value of all home transactions in the dataset is $1.4 billion. In per-unit terms, foreclosures lead to the largest losses of value at $4,665 for tax-current foreclosures in medium-poverty neighborhoods to $9,489 per tax-current foreclosure in low-poverty neighborhoods. The total values, before dividing by the units, tell a different story. The total value lost to sellers due to homes that are vacant, delinquent, or both is estimated at $90 million versus $12.7 million lost due to foreclosures.

If our model is correct, attempting to eliminate the approximately 3,000 foreclosures that affect the high-poverty tracts would be as fruitless as it would be overwhelming. Putting a laser focus on the approximately 300 homes that are foreclosed and delinquent in high-poverty neighborhoods is more feasible. Recovering $1.5 million of value for sellers might not justify the expense of a program, but when the increased value of nearby homes is taken into consideration, the benefits would be much larger. A successful program would have the indirect effect of stabilizing the property tax base. In medium- and low-poverty areas, preventing foreclosures could salvage some of the $11 million lost to sellers near foreclosed homes.

In this experiment, we are assuming a targeting by type of distress and type of neighborhood. Targeting would have to take into account equity concerns because preventing a foreclosure in a neighborhood where homes sell for $300,000 may have a larger percentage and dollar benefit than preventing a foreclosure in a neighborhood with $50,000 homes, but such assistance is rarely targeted to high-income neighborhoods.

While it is simple in a dataset to remove vacancy or delinquency observations, designing a program to successfully eliminate these conditions in actual homes is very challenging. In the case

of delinquency, policymakers should bear in mind that it is unlikely that property tax delinquency itself that lowers property values, but rather the neglect associated with property tax-delinquency. Forgiving delinquent property taxes does not change the fact that the homeowner is unable or unwilling to invest in his or her property. Likewise, eliminating vacancies in homes that are not candidates for demolition would require attracting migration to the region or stimulating household formation.

Finally, if lenders are strategically foreclosing on the few desirable properties in highly distressed areas, there is no easy way for policymakers to obtain the properties that are mortgaged and in default. In these cases, lenders maintain their first-position security interests, which encumber properties and prevent redevelopment. In such cases, creative ways to encourage foreclosure or the surrender of the lenders' leans would need to be pursued before the property could be eliminated.

5.2 Housing Market Interventions

Since the foreclosure crisis began, state and federal governments have spent billions of dollars on various foreclosure prevention programs, in part to combat the negative externalities prior research has associated with foreclosure. Our research suggests that vacancy and abandonment in less robust housing markets should be receiving at least as much attention as foreclosures. Indeed, this has long been recognized by community development practitioners, who are often more concerned with the vacancy and abandonment that sometimes results from foreclosure than the foreclosures themselves.

Foreclosures are currently a serious problem across the United States, but they are not long-term problems like vacancy and abandonment. As the economy improves and borrowers are better able to service their debt, the number of foreclosures will drop. In the meantime, some foreclosures are quickly reoccupied by owners or purchased by an attentive landlord who rents the property out.

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Thus, not every prevented foreclosure will mitigate the externalities associated with vacancy and abandonment. But as long as policy remains focused on the construction of new housing over the maintenance of older ones, vacancy and abandonment will persist. To date, there have not been many policy responses aimed specifically at vacancy and abandonment, and most are untested.

For example, vacancy registration ordinances have arisen in municipalities across the United States. They usually require a property to be registered within a specific number of days of becoming vacant, and subject the property to additional housing code inspections while registered or at the point of sale. While they do not remediate distressed property, they may incentivize property owners to reoccupy vacant property to avoid registration, or to take better care of the property in light of the additional inspections. To date, there has been no research done on the effectiveness of these programs.

When combating vacancy and abandonment, modern land banking is one strategy that shows promise. Modern land banks are public or quasi-public entities charged with acquiring, remediating, and placing vacant and abandoned homes back into productive use (Fitzpatrick 2010). The most intriguing modern land banks are organized under Ohio law, with statutorily defined public missions, stable funding mechanisms, and significantly more power and flexibility than other modern and historic land banks. In less-robust markets like Genesee County, MI and Cuyahoga County, OH, land banks often focus upon the demolition and repurposing of older, distressed housing stock. Like studies of vacancy ordinances, evaluations of modern land banks have been very limited (Griswold and Norris 2007).

Finally, our results illustrate the difficult decisions that must be made when deciding how to allocate resources to combat vacancy and abandonment. It appears that the benefits of each marginal dollar spent on mitigating vacancy and abandonment would be higher in medium- and low-poverty areas. However, the incidence of vacancy and abandonment is highest in high-poverty

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areas. The question of whether to focus resources in low-poverty areas in order to reap the largest immediate benefits or high-poverty areas to address the largest manifestation of the problem does not have a clear answer.

6   Conclusions

Using our unique data on parcel-level vacancies, and incorporating tax delinquency data, we have a richer understanding of the impact of distressed properties. In high-poverty neighborhoods, the sale price of a home is 1.5 percent lower with each additional delinquent home within 500 feet. Medium-poverty areas display negative impacts of 2.1 percent due to a vacant home, 1.9 percent due to a delinquent home, and 2.7 percent if a nearby home is both vacant and delinquent. The impacts of vacant and delinquent homes are similar in low-poverty neighborhoods, reducing sales prices by 1.7 to 1.8 percent per distressed property. In all areas, delinquent homes are two to three times more common than vacancies, which makes the effect of delinquent homes greater even though the per-unit coefficients are similar.

The impact of recent foreclosures is more complex than previous studies suggested. In low- and medium-poverty tracts, we find negative impacts around 4.6 and 2.7 percent, respectively, for recent foreclosures that are not tax delinquent. In high-poverty areas, tax-current foreclosures are positively correlated with home sale prices. This could reflect selective foreclosure by lenders on homes that are in better condition or in slightly better locations. Also, the homes' tax-current state indicates that it's owner that has some financial resources and a desire to prevent a tax foreclosure. In sharp contrast, tax-delinquent foreclosed homes have large, negative effects on neighboring sale prices in high-poverty areas. We observe a discount of 7.6 percent in the presence of these likely-abandoned properties.

Homes that are vacant can lower surrounding property values, even if they have not been

through a recent foreclosure and presumably have an attentive owner. Likewise, homes that are occupied by a financially-distressed household, that cannot pay its property taxes, also pull down neighboring home values. Given the high counts of vacant and delinquent homes, we estimate that these properties are doing more than foreclosures to lower surrounding property values. However, when it comes to policy responses, concentration on foreclosures with additional distress characteristics would return a far greater benefit per unit improved. The other half of the equation, the costs of improving a vacant-delinquent or delinquent-foreclosed home must be weighed once effective policies for eliminating the impact of these properties have been designed, measured, and tested.

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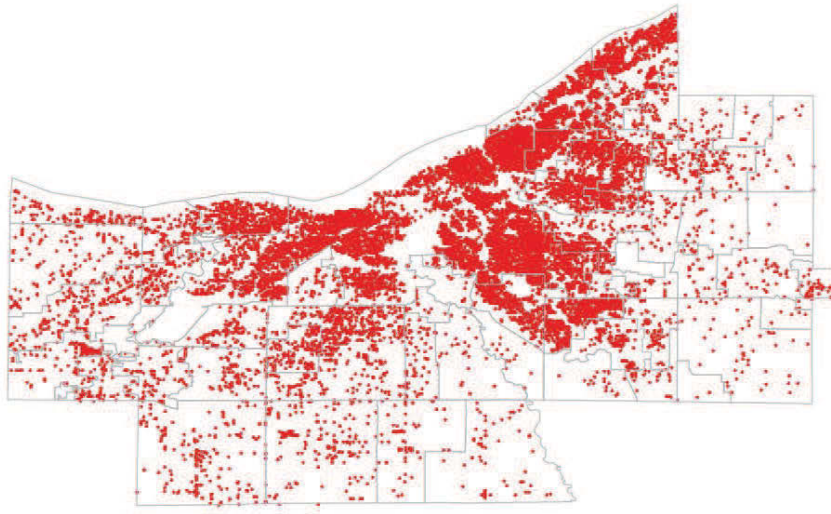
Figure 1: Residential Property Vacancies in Cuyahoga County, June 2010. Vacancy data are from the US Postal Service. Properties were recorded as vacant if they have been unoccupied for 90 days or more as of 30 June, 2010.
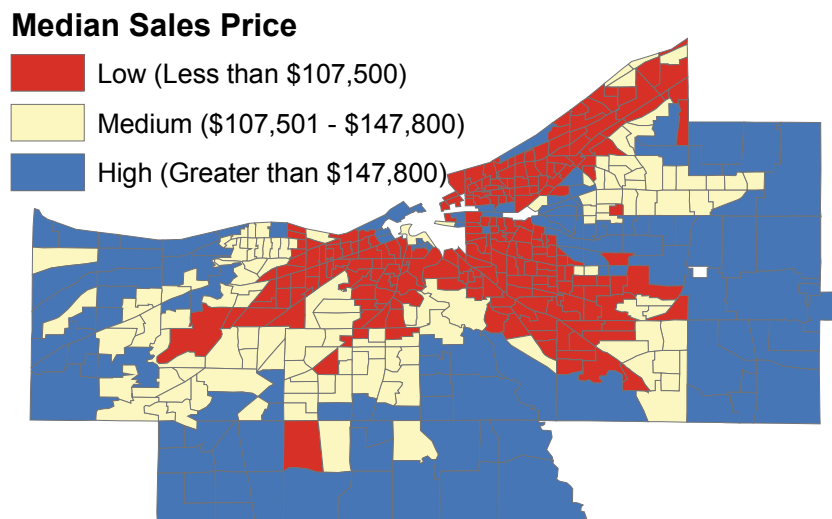
Figure 2: Median home sale price by census tract in Cuyahoga County, 2006-2009. Data are from county property transaction records.

Poverty Rates

■ Low (0.0% - 5.4%)

■ Medium (5.5% - 12.0%)

■ High (Greater than 12.0%)
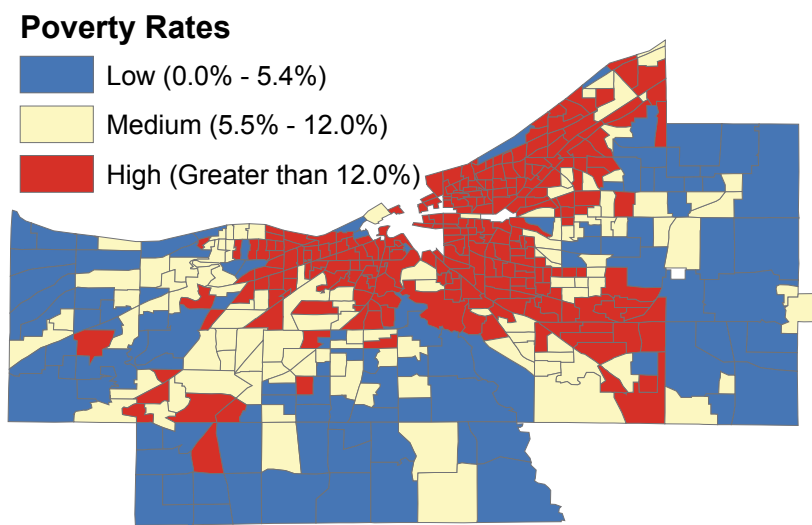
Figure 3: Poverty rate by census tract, Cuyahoga County, 2005-2009. Data are from the American Community Survey.

	High Poverty	Medium Poverty	Low Poverty	Total
Vacancies	16,478	4,633	2,839	23,950
Delinquencies	34,371	7,765	4,684	46,820
Foreclosures	3,161	1,262	663	5,087
Single-Distress Properties				
Vacant Only	6,778	3,168	2,258	12,204
Delinquent Only	25,636	6,774	4,316	36,726
Foreclosed Only	1,751	622	371	2,744
Multiple-Distress Properties				
Vac and Del	8,451	881	319	9,650
Vac and For	1,125	530	243	1,898
Del and For	160	56	30	247
Vac, Del and For	124	54	19	197
Total Distressed Properties	44,025	12,086	7,556	63,666

Table 1: Descriptive Statistics - Average Monthly Totals of Distressed Properties. The counts are within groups of census tracts categorized by their poverty rate as measured by the 2005 to 2009 American Community Surveys. The first three rows are frequencies of each marker of distress. In the single- and multiple-distress frequencies, a property is only counted in one category, as determined by its markers of distress. The distressed counts were calculated for each month between April 2010 and June 2011, and then averaged over the fifteen months. Vacant properties are identified in the US Postal Service database if they have been unoccupied for 90 days or more, as of the last day of the month. Tax delinquencies are properties that have missed at least one half-year property tax payment within the last year. Recently foreclosed properties are those that have been sold at a sheriff sale within the last twelve months. Tax and sales data are from Cuyahoga County administrative databases.

	High Poverty	Medium Poverty	Low Poverty
Median Log Sale Price	10.44	11.51	11.98
Median Sale Price	34,200	100,000	160,000
Mean counts in buffers	High Poverty	Medium Poverty	Low Poverty
Vacant	3.63	2.00	0.87
Delinquent	12.27	3.95	1.55
Foreclosure	0.88	0.39	0.15
Vac and Del	4.29	0.57	0.12
Vac and Fore	0.67	0.37	0.11
Del and Fore	0.10	0.04	0.01
Vac, Del and Fore	0.07	0.04	0.01

Table 2: Descriptive Statistics - Prices and Distress counts in 500 ft. Buffers around Sales. The counts are averaged within groups of census tracts categorized by their poverty rate as measured by the 2005 to 2009 American Community Surveys. The counts are the number of properties within 500 feet of a sold home that have the row-labeled marker(s) of distress. All data represent Cuyahoga County properties between April 2010 and June 2011. Vacant properties are identified in the US Postal Service database if they have been unoccupied for 90 days or more, as of the last day of the month. Tax delinquencies are properties that have missed at least one half-year property tax payment within the last year. Recently foreclosed properties are those that have been sold at a sheriff sale within the last twelve months. Tax and sales data are from Cuyahoga County administrative databases.

	High Poverty	Medium Poverty	Low Poverty	Pooled
Vacancies	-0.011	$-0.021***$	$-0.017**$	$-0.013***$
	(0.007)	(0.005)	(0.005)	(0.004)
Delinquencies	$-0.015***$	$-0.019***$	$-0.018***$	$-0.017***$
	(0.003)	(0.003)	(0.004)	(0.002)
Foreclosures	0.015	-0.017	$-0.039**$	0.001
	(0.017)	(0.013)	(0.015)	(0.009)
Vac and Del	$-0.010*$	$-0.027*$	-0.009	$-0.013***$
	(0.005)	(0.011)	(0.017)	(0.003)
Vac and For	$0.035+$	$-0.038**$	$-0.057**$	0.005
	(0.020)	(0.013)	(0.018)	(0.010)
Del and For	-0.061	0.040	0.026	-0.034
	(0.044)	(0.045)	(0.054)	(0.026)
Vac, Del and For	-0.094	-0.008	-0.033	-0.047
	(0.064)	(0.041)	(0.066)	(0.034)
Property Char.	Yes	Yes	Yes	Yes
Month Indicators	Yes	Yes	Yes	Yes
Constant	$10.703***$	$11.399***$	$11.338***$	$11.014***$
	(0.140)	(0.097)	(0.080)	(0.064)
ρ	$0.461***$	$0.559***$	$0.494***$	$0.683***$
	(0.044)	(0.038)	(0.031)	(0.024)
N	$3,875$	$3,719$	$3,767$	$11,361$
Log Likelihood	-5588.798	-2702.994	-1434.135	-12158.538
χ^2	2172.063	3298.377	6006.176	8842.213

Table 3: Disaggregated-Treatment Hedonic Price Models with Spatially-correlated Errors. Notes: This table reports coefficients and standard errors, in parentheses, from ML regressions of home sale prices on counts of distressed properties within 500 feet. Data represent sales of single family homes in Cuyahoga County from April 2010 through June 2011. Data are from Cuyahoga County administrative records, the USPS, and the American Community Survey. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.

	High Poverty	Medium Poverty	Low Poverty	Pooled
Vacancies	-0.011	$-0.021{*}{*}{*}$	$-0.017{*}{*}$	$-0.013{*}{*}{*}$
	(0.007)	(0.005)	(0.005)	(0.004)
Delinquencies	$-0.015{*}{*}{*}$	$-0.019{*}{*}{*}$	$-0.018{*}{*}{*}$	$-0.017{*}{*}{*}$
	(0.003)	(0.003)	(0.004)	(0.002)
Vac and Del	$-0.010{*}$	$-0.027{*}$	-0.009	$-0.013{*}{*}{*}$
	(0.005)	(0.011)	(0.017)	(0.003)
Foreclosures	$0.024+$	$-0.027{*}{*}$	$-0.046{*}{*}{*}$	0.003
	(0.012)	(0.009)	(0.012)	(0.007)
Del and For	$-0.073{*}$	0.012	0.002	$-0.039+$
	(0.036)	(0.031)	(0.042)	(0.021)
Property Char.	Yes	Yes	Yes	Yes
Month Indicators	Yes	Yes	Yes	Yes
Constant	$10.705{*}{*}{*}$	$11.399{*}{*}{*}$	$11.340{*}{*}{*}$	$11.014{*}{*}{*}$
	(0.140)	(0.097)	(0.080)	(0.064)
ρ	$0.461{*}{*}{*}$	$0.562{*}{*}{*}$	$0.493{*}{*}{*}$	$0.683{*}{*}{*}$
	(0.044)	(0.037)	(0.031)	(0.024)
N	$3,875$	$3,719$	$3,767$	$11,361$
Log Likelihood	-5589.162	-2703.950	-1434.682	-12158.624
χ^2	2169.453	3288.544	6006.131	8839.487

Table 4: Hedonic Price Models with Spatially-correlated Errors. Notes: This table reports coefficients and standard errors, in parentheses, from ML regressions of home sale prices on counts of distressed properties within 500 feet. Data represent sales of single family homes in Cuyahoga County from April 2010 through June 2011. Data are from Cuyahoga County administrative records, the USPS, and the American Community Survey. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.

Model	Distress Counts	High Poverty	Medium Poverty	Low Poverty	Pooled
I	Vacancies	$-0.016***$	$-0.028***$	$-0.023***$	$-0.020***$
		(0.003)	(0.004)	(0.005)	(0.002)
II	Delinquencies	$-0.014***$	$-0.022***$	$-0.021***$	$-0.017***$
		(0.002)	(0.003)	(0.004)	(0.001)
III	Foreclosures	-0.005	$-0.033***$	$-0.052***$	$-0.018**$
		(0.011)	(0.009)	(0.011)	(0.006)
IV	Foreclosures	0.006	$-0.037***$	$-0.056***$	$-0.014*$
		(0.012)	(0.009)	(0.012)	(0.007)
	Del and For	$-0.081*$	0.003	0.001	$-0.050*$
		(0.037)	(0.031)	(0.042)	(0.021)
V (Main)	Vacancies	-0.011	$-0.021***$	$-0.017**$	$-0.013***$
		(0.007)	(0.005)	(0.005)	(0.004)
	Delinquencies	$-0.015***$	$-0.019***$	$-0.018***$	$-0.017***$
		(0.003)	(0.003)	(0.004)	(0.002)
	Vac and Del	$-0.010*$	$-0.027*$	-0.009	$-0.013***$
		(0.005)	(0.011)	(0.017)	(0.003)
	Foreclosures	$0.024+$	$-0.027**$	$-0.046***$	0.003
		(0.012)	(0.009)	(0.012)	(0.007)
	Del and For	$-0.073*$	0.012	0.002	$-0.039+$
		(0.036)	(0.031)	(0.042)	(0.021)
VI	Vacancies	-0.001	$-0.019***$	$-0.015**$	$-0.005+$
		(0.004)	(0.004)	(0.005)	(0.003)
	Delinquencies	$-0.014***$	$-0.017***$	$-0.016***$	$-0.015***$
		(0.003)	(0.003)	(0.004)	(0.002)
	Foreclosures	0.012	-0.013	$-0.036**$	0.001
		(0.011)	(0.009)	(0.012)	(0.006)

Table 5: Separate Distress Counts Hedonic Price Models. Notes: This table reports coefficients and standard errors, in parentheses, from ML regressions of home sale prices on counts of distressed properties within 500 feet. Data represent sales of single family homes in Cuyahoga County from April 2010 through June 2011. Data are from Cuyahoga County administrative records, the USPS, and the American Community Survey. All models include controls for property characteristics and indicators of month of sale. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.

	High Poverty	Medium Poverty	Low Poverty	Pooled
Vacancies 0-250ft	−0.021	−0.035 ∗∗	−0.025∗	−0.021 ∗∗
	(0.016)	(0.011)	(0.012)	(0.008)
Delinquencies 0-250ft	−0.025 ∗∗	−0.011	−0.037∗∗∗	−0.024∗∗∗
	(0.008)	(0.008)	(0.009)	(0.005)
Vac and Del 0-250ft	−0.010	0.010	0.005	−0.007
	(0.012)	(0.021)	(0.034)	(0.008)
Foreclosures 0-250ft	0.026	−0.010	−0.037	0.011
	(0.025)	(0.019)	(0.023)	(0.013)
Del and For 0-250ft	0.006	0.002	−0.040	0.018
	(0.054)	(0.056)	(0.060)	(0.032)
Vacancies 250-1000ft	0.004	−0.006∗	−0.010∗∗∗	−0.001
	(0.003)	(0.002)	(0.003)	(0.002)
Delinquencies 250-1000ft	−0.004 ∗∗	−0.005∗∗∗	−0.009∗∗∗	−0.004∗∗∗
	(0.001)	(0.001)	(0.002)	(0.001)
Vac and Del 250-1000ft	−0.003	−0.030∗∗∗	0.003	−0.004 ∗∗
	(0.002)	(0.005)	(0.009)	(0.001)
Foreclosures 250-1000ft	−0.001	−0.012∗	−0.017 ∗∗	−0.007+
	(0.007)	(0.005)	(0.006)	(0.004)
Del and For 250-1000ft	−0.020	0.011	−0.028	−0.012
	(0.023)	(0.017)	(0.025)	(0.013)
Property Char.	Yes	Yes	Yes	Yes
Month Indicators	Yes	Yes	Yes	Yes
Constant	10.726∗∗∗	11.523∗∗∗	11.397∗∗∗	11.069∗∗∗
	(0.142)	(0.094)	(0.078)	(0.064)
ρ	0.437∗∗∗	0.469∗∗∗	0.435∗∗∗	0.657∗∗∗
	(0.045)	(0.042)	(0.033)	(0.025)
N	3875	3719	3767	11361
Log Likelihood	−5588.547	−2663.947	−1407.935	−12144.641
χ^2	2226.920	3745.375	6541.740	9234.228

Table 6: Distance Decay Hedonic Price Models. Notes: This table reports coefficients and standard errors, in parentheses, from ML regressions of home sale prices on counts of distressed properties within 0 to 250 feet and 250 to 1000 feet. Data represent sales of single family homes in Cuyahoga County from April 2010 through June 2011. Data are from Cuyahoga County administrative records, the USPS, and the American Community Survey. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.

	High Poverty	Medium Poverty	Low Poverty	Pooled
Vacancies	−0.004	−0.024∗∗∗	−0.017∗∗∗	−0.012∗∗∗
	(0.007)	(0.005)	(0.005)	(0.004)
Delinquencies	−0.017∗∗∗	−0.023∗∗∗	−0.024∗∗∗	−0.019∗∗∗
	(0.003)	(0.003)	(0.004)	(0.002)
Vac and Del	−0.010∗	−0.047∗∗∗	−0.011	−0.012∗∗∗
	(0.004)	(0.010)	(0.013)	(0.003)
Foreclosures	0.032 ∗ ∗	−0.022∗	−0.030 ∗ ∗	0.011+
	(0.012)	(0.009)	(0.010)	(0.006)
Del and For	−0.081∗	−0.045	−0.021	−0.053 ∗ ∗
	(0.034)	(0.030)	(0.037)	(0.020)
Buyer - Bank	−0.401∗∗∗	−0.596∗∗∗	−0.388∗∗∗	−0.442∗∗∗
	(0.053)	(0.033)	(0.026)	(0.024)
Buyer - Investor	−0.476∗∗∗	−0.571∗∗∗	−0.424∗∗∗	−0.512∗∗∗
	(0.046)	(0.036)	(0.032)	(0.024)
Buyer - Non-Profit	−1.921∗∗∗	−1.850∗∗∗	0.027	−1.734∗∗∗
	(0.161)	(0.100)	(0.140)	(0.080)
Buyer - Federal Agency	−0.403∗∗∗	−0.335∗∗∗	−0.458∗∗∗	−0.358∗∗∗
	(0.065)	(0.048)	(0.040)	(0.033)
Seller - Bank	−0.810∗∗∗	−0.561∗∗∗	−0.295∗∗∗	−0.623∗∗∗
	(0.068)	(0.046)	(0.035)	(0.032)
Seller - Investor	−0.068	−0.040	−0.006	−0.043+
	(0.049)	(0.037)	(0.029)	(0.025)
Seller - Non-profit	−0.424∗∗∗	−0.623∗∗∗	−0.256∗	−0.344∗∗∗
	(0.102)	(0.155)	(0.123)	(0.064)
Seller - Federal Agency	−0.801∗∗∗	−0.500∗∗∗	−0.254∗∗∗	−0.578∗∗∗
	(0.088)	(0.050)	(0.039)	(0.038)
Property Char.	Yes	Yes	Yes	Yes
Month Indicators	Yes	Yes	Yes	Yes
Constant	10.721∗∗∗	11.451∗∗∗	11.361∗∗∗	10.994∗∗∗
	(0.134)	(0.094)	(0.074)	(0.060)
ρ	0.413∗∗∗	0.305∗∗∗	0.573∗∗∗	0.625∗∗∗
	(0.045)	(0.046)	(0.029)	(0.026)
N	4520.000	4421.000	4494.000	13435.000
Log Likelihood	−6642.236	−3975.410	−1884.044	−15114.872
χ^2	2801.377	5309.763	7158.449	11690.649

Table 7: Institutional-Sales-Included Hedonic Price Models. Notes: This table reports coefficients and standard errors, in parentheses, from ML regressions of home sale prices on counts of distressed properties within 500 feet. Data represent sales of single family homes in Cuyahoga County from April 2010 through June 2011. Data are from Cuyahoga County administrative records, the USPS, and the American Community Survey. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.

	Central City	Inner Suburbs	Outer Suburbs
Vacancies	−0.008	−0.008	−0.011∗
	(0.009)	(0.005)	(0.005)
Delinquencies	−0.011 ∗ ∗	−0.016∗∗∗	−0.021∗∗∗
	(0.004)	(0.004)	(0.004)
Vac and Del	−0.023∗∗∗	−0.010∗	−0.011
	(0.007)	(0.004)	(0.015)
Foreclosures	0.035∗	−0.014	−0.029∗
	(0.014)	(0.010)	(0.012)
Del and For	−0.052	−0.072∗	0.029
	(0.042)	(0.032)	(0.036)
N	2808	3875	4678

	High Vacancy	Medium Vacancy	Low Vacancy
Vacancies	−0.007	−0.007	−0.013∗
	(0.007)	(0.005)	(0.006)
Delinquencies	−0.012∗∗∗	−0.019∗∗∗	−0.003
	(0.003)	(0.004)	(0.005)
Vac and Del	−0.010∗	−0.051∗∗∗	0.015
	(0.005)	(0.013)	(0.021)
Foreclosures	0.023+	−0.020∗	−0.036∗
	(0.012)	(0.009)	(0.014)
Del and For	−0.046	−0.021	0.038
	(0.035)	(0.034)	(0.049)
N	3862	3761	3738

	Low Price	Medium Price	High Price
Vacancies	−0.012+	−0.005	−0.018 ∗ ∗
	(0.007)	(0.005)	(0.006)
Delinquencies	−0.011∗∗∗	−0.027∗∗∗	−0.022∗∗∗
	(0.003)	(0.004)	(0.004)
Vac and Del	−0.011∗	−0.039∗∗∗	−0.032∗
	(0.005)	(0.011)	(0.016)
Foreclosures	0.034 ∗ ∗	−0.039∗∗∗	−0.066∗∗∗
	(0.012)	(0.010)	(0.013)
Del and For	−0.054	−0.021	−0.009
	(0.035)	(0.035)	(0.043)
N	3798	3701	3862

Table 8: Alternative Submarket Hedonic Price Models. Notes: This table reports coefficients and standard errors, in parentheses, from ML regressions of home sale prices on counts of distressed properties within 500 feet. Data represent sales of single family homes in Cuyahoga County from April 2010 through June 2011. Data are from Cuyahoga County administrative records, the USPS, and the American Community Survey. The vacancy measure is the ratio of vacant residential properties to total residential properties within each census tract, averaged over the fifteen month period. The home price measure is the census tracts' median home sale price among all sales from 2006 through 2009. The cut points were selected so that roughly one third of the sales are in each category. Significance key: + for p<.1, * for p<.05, ** for p<.01, and *** for p<.001.
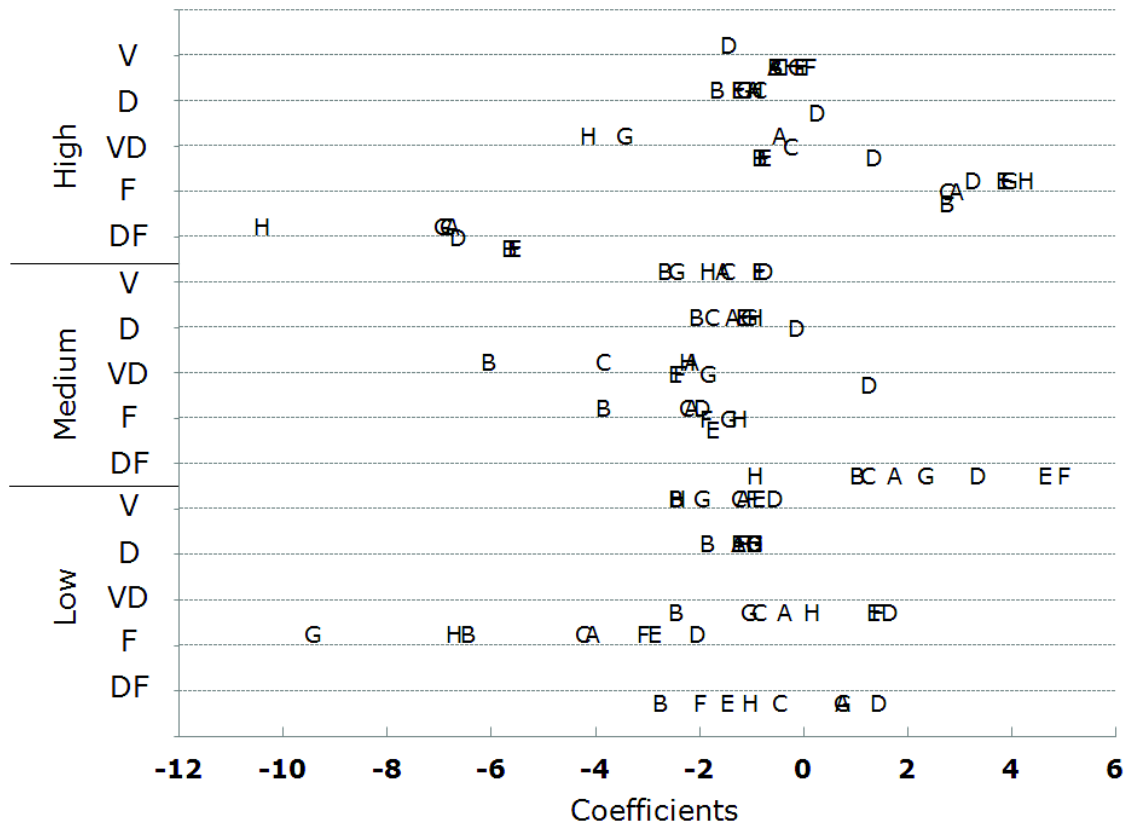
Figure 4: Coefficients from alternate specifications. This table reports coefficients from ML or OLS regressions of home sale prices on counts of distressed properties within 500 feet. Letters which appear above the line for their treatment indicate significance at the 5 percent level or greater (p< .05). Letters on the line are marginally significant (.05 < p < .1). Letters below the line indicate coefficients that are not statistically significant. Key:

A - Main model (Table 4)
B - Errors clustered by census tract
C - Spatial lag model
D - Census tract fixed effects
E - City fixed effects
F - City fixed effects and city-specific time trends
G - Including indicators and interactions of high distress counts ($\geq$ 95th percentile)
H - Excluding observations with high distress counts ($\geq$ 95th percentile)

All models include controls for property characteristics and indicators of month of sale. Data represent sales of single family homes in Cuyahoga County from April 2010 through June 2011. Data are from Cuyahoga County administrative records, the USPS, and the American Community Survey.

	Benefit to Sellers (T)	Average Units Per Month	Per Unit Benefit
High Poverty			
Vacancies	$4,772	6778	$704
Delinquencies	$19,123	25636	$746
Vac and Del	$3,092	8451	$366
Del and Foreclosed	$1,788	284	$6,285
Medium Poverty			
Vacancies	$12,493	3168	$3,943
Delinquencies	$22,057	6774	$3,256
Vac and Del	$3,523	881	$3,999
Foreclosures	$5,391	1153	$4,678
Low Poverty			
Vacancies	$7,794	2258	$3,452
Delinquencies	$16,523	4316	$3,828
Vac and Del	$498	319	$1,563
Foreclosures	$5,846	614	$9,529

Table 9: Policy Simulation. "Benefit to sellers" is the sum of the differences between the predicted prices from the main model (table 4) using the original data and using data with the row-labeled type of distressed-home counts set to zero. The benefits and benefits per unit represent the increase in sales prices which the model suggests would be realized if a policy could eliminate the distressed properties.

The Relationship between City Center Density and Urban Growth or Decline

Kyle Fee and Daniel Hartley

The Relationship between City Center Density
and Urban Growth or Decline
Kyle Fee and Daniel Hartley

In this paper we contrast the spatial patterns of population density and other demographic changes in growing versus shrinking MSAs from 1980 to 2010. We f nd that, on average, shrinking MSAs show the steepest drop in population density near the Central Business District (CBD). Motivated by this fact, we explore the connection between changes in population density at the core of the MSA and MSA productivity. We f nd that changes in near-CBD population density are positively associated with per capita income growth at the MSA-level.

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Introduction

One striking characteristic of shrinking MSAs, such as Detroit and Cleveland, is the amount of vacant land and number of abandoned buildings in close proximity to the Central Business Districts (CBDs) of their central cities. This lies in stark contrast to growing MSAs, such as New York City, Chicago, San Francisco, or Boston. Yet, in many shrinking MSAs, as in Detroit and Cleveland, one can find suburbs that do not show the same signs of decline as can be seen within the city limits of the central city. The spatial patterns of population decline observed in Detroit and Cleveland are typical of MSAs that experience net population loss: of the 345 Metropolitan Statistical Areas (MSAs) we studied, the thirty-six MSAs that experienced population loss from 1980 to 2010 showed, on average, the steepest drop in population density in areas close to the CBD.

This paper compares demographic changes within growing cities to those within declining cities and explores the relationship between population density near the CBD and MSA-level income growth. We assemble a constant MSA boundary and constant census tract boundary data set for the years 1980, 1990, 2000, and 2010 and perform the first part of our analysis, documenting how population density and other demographic variables evolved as a function of distance to the CBD in growing versus shrinking MSAs. In the second part of our analysis, we construct MSA-level variables by summing and taking weighted means of the tract-level data to aggregate the variables of interest to MSA-level variables. We find that from 1980 to 2010, changes in population density near the CBD are positively associated with MSA-level income growth, while controlling for changes in population density for the MSA as a whole and initial characteristics of the MSA. This result points to a connection between MSA-level productivity growth and changes in population density near the CBD.

The first part of our analysis, which looks at within-MSA changes in population density and demographics in shrinking and growing cities, relates to a large body of literature on urban growth and suburbanization. Several examples include Rappaport (2003), Glaeser and Kahn (2001), Boustan and Shertzer (2010), and Baum-Snow (2007). Our work also relates to a set of recent papers that examine spatial patterns within cities such as Guerrieri, Hartley and Hurst (2011), Glaeser, Gottlieb and Tobio (2012), and Guerrieri, Hartley and Hurst (2012).

The second part of our analysis concerns the question of whether the drop in population density that we observe in shrinking cities might act to reinforce the negative shock that is the root cause of the MSA's decline. This question is related to a large body of literature on economies of agglomeration.[2] As Elvery and Sveikauskas (2010) point out, much of the recent empirical evidence on agglomeration points toward agglomeration effects that are present at short distances.[3] These short distance effects point in the direction of the importance of the exchange and diffusion of ideas as opposed to benefits purely driven by forces that are likely to operate at greater distances, such as labor market pooling and supply linkages. A dense CBD may serve as a coordination mechanism by guiding people and firms to a place where these exchanges are most likely to happen. While poly-centric MSAs may provide this as well, it

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[2] For recent reviews of this literature see Duranton and Puga (2004), Rosenthal and Strange (2004), and Puga (2010).

[3] Rosenthal and Strange (2003), van Soest, Gerking, and van Oort (2006), Fu (2007), Arzaghi and Henderson (2008) are examples of this work. Elvery and Sveikauskas (2010) find the strongest agglomeration effects at longer distances (ten, twenty, or twenty-five miles), but also show that short distance effects (within two-and-a-half miles) tend to be stronger when the workforce is more educated and belonging to similar occupational categories, suggesting the importance of the exchange of ideas for short distance agglomerative effects.

seems plausible that having many diffuse areas of economic activity would make it harder for these informational spillovers to occur.

Given the importance of short distance agglomeration effects, we run OLS regressions of growth in MSA-level income on changes in population density near the CBD and changes in population density for the entire CBD and a host of initial-year MSA-level controls. We find that increases in population density near the CBD are associated with higher MSA-level income growth while increases in population density for the entire MSA are associated with lower income growth. This evidence points to a connection between density near the CBD and agglomerative benefits.

Methodology

In order to take a detailed look at within-MSA changes in population density and other demographics, we use the Neighborhood Change Database (NCDB) in conjunction with the Longitudinal Tract Database (LTDB) to construct measures of population and demographic variables for the years 1980, 1990, 2000, and 2010 that conform to 2010 census tract boundaries, and 2008 MSA boundaries. The use of constant geographical boundaries is especially important when considering growing MSAs, which may appear to lose population density as less populated counties farther from the CBD are developed and become part of the MSA.

For each MSA or Metropolitan Division (in cases when an MSA is broken into Metropolitan Divisions we use the Metropolitan Divisions rather than the entire MSA) we identify the latitude and longitude of the Central Business District (CBD) by taking the collection of census tracts listed in the 1982 Census of Retail Trade[4] for the central city of the MSA (the

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[4] Available here: http://www.census.gov/geo/tiger/cbdct.pdf

city in the MSA with the largest population) and finding the centroid of that cluster of census tracts. We identify the CBD latitude and longitude for 268 MSAs in this manner. For the remaining 117 MSAs, whose central city was not listed in the 1982 Census of Retail Trade, we use the latitude and longitude found by geocoding the MSA's central city found using ArcGIS's 10.0 North American Geocoding Service. ArcGIS returns points that are, on average, very close to the CBDs from the Census of Retail Trade; for the 268 cities for which we have both, the mean distance between the two is 0.39 miles. One of the MSAs with the largest distances between the two is New York City, for which The Census of Retail Trade CBD corresponds to midtown, while ArcGIS returns a point in Lower Manhattan (on Chambers halfway between Broadway and Church). When calculating distance to CBD, we calculate the distance from the centroid of each 2010 census tract in the MSA to our central city CBD point.

Our sample consists of all census tracts in the continental United States that were part of a MSA in 2008 and that were fully covered by census tracts in 1980. To construct our sample, we start with the Neighborhood Change Database (NCDB) produced by Geolytics. The NCDB provides census tract level summary variables similar to those that can be found in US Census tract level summary files for 1980, 1990, and 2000. The benefit of the NCDB is that the data from years prior to 2000 (1970, 1980, and 1990) have been normalized to the year 2000 tract boundaries. Dropping observations associated with MSAs that were not completely covered by census tracts in 1980 eliminates 1,776 tracts (about 3.4 percent of the total); we begin with 1980 rather than 1970 because if we began in 1970 and dropped observations associated with MSAs that were not percent covered by census tracts in 1970, we would have had to drop about 15 percent of the sample.

Next, we convert the 1980, 1990, and 2000 tract level tabulation variables to Census

2010 tract boundaries using the 2000 to 2010 tract conversion tool discussed in Logan, Xu, and

Stults (2012).[5] The conversion tool uses population and land area weighting to reweight count or

mean variables to adjust for census tracts that have changed from 2000 to 2010. After

converting the NCDB data to 2010 tract boundaries, we merge it with census tract population,

race, and age tabulations from the 2010 census and education, income, and poverty rate census

tract estimates from the 2006 – 2010 American Community Surveys (ACS). We limit our

sample to 345 MSAs in the continental United States for which we have at least ten census tracts.

Our final sample contains a set of consistently defined variables for 1980, 1990, 2000, and 2010

for 57,403 consistently defined census tracts in 345 MSAs. It is important to note that our MSAs

are defined using the 2008 MSA definitions and the boundaries we use do not change over time.

The Relationship between Growth and City Center Density and Other Demographics

We break our sample of 345 MSAs into three groups. The first group consists of the 36

MSAs that lost population between 1980 and 2010 (see Table 1 for the list of these MSAs), the

second group consists of the 272 MSAs with population growth between 0 and 100 percent from

1980 to 2010, and the third group consists of the 37 MSAs whose populations grew in excess of

100 percent over the same period (see Table 2 for the list of these MSAs). We refer to these

groups as shrinking, moderate growth, and fast growth MSAs, respectively, throughout the

chapter.

We find that shrinking MSAs display markedly different patterns in population density

and demographic changes near their CBDs compared to the moderate and fast growth MSAs. In

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[5]Available here: http://www.s4.brown.edu/us2010/Researcher/Bridging.htm.

particular, from 1980 to 2010, shrinking MSAs lost about a third of their population density near the CBD, on average. In contrast, moderate growth and fast growth MSAs had slight gains in population density near the CBD. In conjunction with the loss of population density, compared to growing MSAs, tracts near the CBD in shrinking cities also experienced smaller gains in educational attainment, less growth in average household income, greater increases in poverty rates, and an increase in the fraction of the population that is African American.

Figure 1 presents plots of locally weighted mean population densities (census tract population per square mile) in 1980 and 2010. In each plot (and in all subsequent figures), the line with short dashes indicates the mean for the group of shrinking MSAs, the solid line indicates the mean for the group of moderate growth MSAs, and the line with long dashes and dots indicates the mean for the group of fast growth MSAs.

Figure 2 shows mean changes in population density for each of the three groups of MSAs. The figure displays plots of population changes for 1980-1990, 1990-2000, 2000-2010, and for the entire period: 1980-2010.

A number of features of these plots are worth noting. First, in each decade, and as a result for the period as a whole, population density in the group of shrinking MSAs fell the most near the CBD, and fell very little or not at all 30 miles away from the CBD. In contrast, population density in moderate growth cities grew slightly at all distances from the CBD, and population density of fast growth MSAs grew the most ten to fifteen miles from the CBD. Second, while the shrinking MSAs were higher density than the growing MSAs in 1980, by 2010 growing and shrinking MSAs have very similar density versus distance to CBD profiles. Third, while the 1980s and 2000s saw big drops in center city density for shrinking cities, the 1990s also saw a drop in density near the CBD for shrinking MSAs in the 1990s, but it was smaller.

Given the marked differences in density changes, we next investigate how the spatial patterns have changed for a series of variables related to urban growth literature. Figure 3 contains a different variable in each column. The left column shows the fraction of the population with a Bachelor's or higher degree in 1980, in 2010, and the change in that fraction from 1980 to 2010. The right column shows the fraction of the population aged twenty-five to thirty-four for the same time period.

Several interesting features stand out in the education plots. First, in 1980, the group of MSAs that subsequently shrink already have much lower levels of educational attainment at all distances than the MSAs that subsequently grow. This is particularly true at distances within five miles of the CBD. By 2010, educational attainment in the moderate growth cities was the highest of the three groups at most distances. It is also interesting that between five and fifteen miles from the CBD, educational attainment in the shrinking cities caught up with that of the fast growing cities by 2010. However, at distances farther than fifteen miles from the CBD and also between zero and five miles of the CBD, the growing MSAs had higher educational attainment in 2010 than the shrinking MSAs. In fact, near the CBD, the gap in educational attainment between the shrinking and growing MSAs widened from about ten percentage points in 1980 to about fifteen percentage points in 2010 as shrinking MSAs only saw increases of ten percentage points near the CBD compared to increases of roughly seventeen percentage points for both types of growing MSAs.

The right column of Figure 3 shows how the fraction of the population aged twenty-five to thirty-four varies with distance to the CBD in 1980, in 2010, and how that has changed from 1980 to 2010. The plots for 1980 and 2010 reveal a gap near the CBD between the growing and shrinking MSAs in the fraction of people aged twenty-five to thirty-four. This gap stayed fairly

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constant between 1980 and 2010. The striking feature of the plots is that in all three groups of MSAs, the fraction of the population aged twenty-five to thirty-four has fallen more in tracts that are farther from the CBD.

Figure 4 shows the log of mean household income (real, in terms of 2010 dollars) in the right column and the poverty rate in the left column. Average household income and poverty rates were similar in the three groups of MSAs in 1980. For all three groups of MSAs, income rose with distance to the CBD and poverty rates fell with distance to CBD. The same patterns held in 2010 except that while average household income rose by about 0.3 log points in the growing MSAs, the growth was much lower in shrinking MSAs. In fact, close to the CBD shrinking cities experienced roughly zero growth in average household income from 1980 to 2010. While poverty rates in all three groups of cities rose from 1980 to 2010, the largest increase was among the shrinking MSAs. This pattern of lower income and higher poverty levels could potentially be a problem for shrinking MSAs as tax bases decline and the need for services increases as poverty levels increase.

Figure 5 shows how the fraction of African American (left column) and Hispanic (right column) residents vary with distance to the CBD in 1980, in 2010, and how that has changed over the period. In 1980, the fraction of residents that were African American was around 30 percent near the CBD for the shrinking MSAs. In contrast African Americans made up closer to 20 percent or less of the population near the CBD in the moderate and fast growth MSAs. This is likely a legacy of the African American migration into northern factory towns and the subsequent decline of the manufacturing industry over the past thirty years as our shrinking MSAs list has a large share of rust belt cities. From 1980 to 2010 the fraction of residents that are African-American rose the most within ten miles of the CBD for shrinking MSAs, rising 5 to

10 percentage points. For the fast growth MSAs the fraction of residents that are African American fell within two miles of the CBD, but rose farther from the CBD.

The Hispanic share of the population was greatest in the fast growth MSAs in 1980 and increased the most in the fast growth MSAs from 1980 to 2010, expanding by at least 10 percentage points at all distances from the CBD. The moderate growth MSAs also saw substantial increases in the Hispanic population over this period. The shrinking MSAs had the least growth in the fraction of the population that is Hispanic, increasing by less than 5 percentage points at all distances from the CBD. It is also interesting to note that, in 1980, shrinking MSAs possessed a lower fraction of Hispanics at all distances from the CBD compared to the growing cities. Lack of existing social networks and lack of economic opportunity may both play a role in explaining the slower growth of Hispanic population in shrinking MSAs compared to growing MSAs.

Changes in City Center Density and MSA Income Growth

The first part of our analysis focused on differences in population density and demographic changes as a function of distance to the CBD between shrinking, moderate growth, and fast growth MSAs from 1980 to 2010. A natural question that arises from this analysis is whether changes in population density and other demographics near the CBD are associated with broader MSA-wide changes. In this section we examine the relationship between the growth of average MSA household income and changes in population density near the CBD. The question we would like to answer is whether increases in near-CBD population density are related to MSA income growth above and beyond the relationship of MSA income growth to MSA population (or population density) growth. To address this question, we analyze an MSA-level

dataset created from the constant geography tract-level data described above. Specifically, we run OLS regressions of MSA income growth on changes in population density near the CBD and changes in population density for the MSA as a whole while controlling for the initial demographic and occupational characteristics of the MSA.

Table 3 presents summary statistics for the variables of interest: MSA income growth and changes in population density as well as the initial year demographic controls. The first row reveals that the mean growth rate of real per capita income from 1980 to 2010 for our sample of 345 MSAs was 2.78, meaning that per capita income almost tripled over the period. The standard deviation was 0.66. The next three rows show the mean population density within 2.5, 5, and 7.5 miles of the CBD, respectively. These measures are constructed by dividing the total population (measured in thousands of people) living in census tracts with centroids within the boundary by the total land area (measured in square miles) within those census tracts. Rows 2 through 4 show that the mean population density for our sample of MSAs within 2.5, 5, and 7.5 miles of the CBD, was 4.22, 2.57, and 1.77 thousand people per square mile, respectively. The standard deviations of these near CBD population densities reveal a large amount of variation, each standard deviation larger than its respective mean. The fifth row reveals that the mean population density for the MSAs in our sample was 2.58 thousand people per square mile in 1980, with a similar sized standard deviation of 2.65.

The next four rows of Table 3 show the mean changes in the same four population density measures from 1980 to 2010. On average, the increase in population density within 2.5 miles of the CBD was only about 20 people per square mile. However, the mean masks a large amount of variation revealed by the standard deviation, which is 1.25 thousand people per square mile. The mean changes in population density increase as the area considered increases from

within 2.5 miles of the CBD up to the whole MSA. The standard deviations of these changes are all large compared to the means. The last four rows of Table 3 show the means and standard deviations of the initial year (1980) MSA demographic characteristics used as controls: log population, per capita income, fraction of population with a Bachelor's or higher degree. In addition to these controls, our preferred specification also includes MSA occupational shares. These shares are defined as the fraction of employed people sixteen years and older that work in the following occupations: 1. Professional and technical occupations; 2. Sales workers; 3. Administrative support and clerical workers; 4. Precision production, craft, and repair workers; 5. Operators, assemblers, transportation, and material moving workers; 6. Service workers; 7. Nonfarm laborers . (Farm, forestry, and fishing workers are the omitted share.)

Table 4 presents the results of OLS regressions of MSA income growth on changes in population density near the CBD and changes in population density for the MSA as a whole. Column 1 presents the simplest specification: a regression of MSA per capita income growth on the change in population density within 5 miles of the CBD and the change in population density in the MSA as whole. All three variables are defined over the period from 1980 to 2010. The coefficient on change in population density within 5 miles of the CBD is positive and statistically significantly different from zero. The value of 0.171 implies that a one standard deviation increase in population density within 5 miles of the CBD (0.84 thousand more people per square mile) is, on average, associated with 14 percentage points more in income growth over the 30 year period, which translates to about 5 percent higher income growth compared to the mean of 278 percentage points. In contrast, the coefficient on the change in population density for the MSA as a whole is negative and statistically different from zero. The value of -0.116 implies that a one standard deviation increase in population density at the MSA level (0.86 thousand

people per square mile) is associated with a 10 percentage point decrease in per capita income growth, or a 3.6 percent reduction in the growth rate of income per capita.

Column 2 of Table 4 presents the results of a similar specification except that controls for initial year (1980) population density (within 5 miles of the CBD and MSA-level), and log population have been added. The coefficients on the change in population density near the CBD and the change in population density for the MSA as a whole increase slightly in magnitude and remain statistically different from zero. The coefficients on the initial population controls are not statistically different from zero. Column 3 adds additional initial year demographic controls: log 1980 per capita income, and the fraction of the population with a Bachelor's or higher degree, both defined for the entire MSA. The addition of these controls reduces the magnitude of change in population density near the CBD, though it remains statistically different from zero. With the addition of these controls, initial log population is now positively associated with per capita income growth. The new controls, log initial income and the fraction of the population with a Bachelor or higher degree, are significantly negatively and positively associated with per capita income growth, respectively. The addition of these controls helps explain a lot more of the variation in income growth. The R-squared increases from 0.02 to in columns 1 and 2 to 0.37 in column 3.

Column 4 of Table 4 adds the eight occupational share variables mentioned in the discussion of the summary statistics. The addition of these variables does not have much of an impact on the coefficient on population density near the CBD, but does increase the magnitude of the coefficient on the change in the population density of the MSA as a whole. This is our preferred specification. The aim is to see how changes in near CBD population density and overall MSA population density correlate with MSA income growth while controlling for a

number of initial year differences in demographics and occupational structures that might be correlated with subsequent income growth. The coefficients imply that after controlling for all of these initial year demographic and occupational factors, a one standard deviation increase in near CBD population density is associated with about a 12 percentage point increase in income per capita, which is roughly 4 percent of the mean growth in per capita income. The coefficient on MSA-level change in population density implies that a one standard deviation increase is associated with a 17 percentage point decrease in per capita income, or roughly 6 percent of mean income growth.

Columns 5 and 6 present estimates of the same specification as column 4, except that instead of defining near the CBD as within 5 miles, near is defined as within 2.5 miles and within 7.5 miles of the CBD in columns 5 and 6, respectively. While the coefficient on the change in population density near the CBD is smaller in magnitude that it is in column 4, it is still significantly different from zero, and a one standard deviation increase in population density near the CBD still implies about the same 12 percentage point increase in income growth as it did in column 4. However, changing the definition of "near the CBD" to "within 7.5 miles" (in column 6) results in a coefficient harder to distinguish from zero and implies that a one standard deviation increase in population density near the CBD is associated with less than a 9 percentage point increase in per capita income at the MSA level.

Discussion

We find that growth in population density near the CBD is positively associated with income growth at the MSA level. While this finding appears to be robust to adding a number of initial year demographic controls and to some variation in the definition of proximity to the

CBD, it is unclear what mechanisms may underlie this relationship. One explanation is that loss of density near the CBD might adversely affect MSA-level income growth by decreasing short distance agglomerative benefits, such as the exchange of ideas and information. An alternative explanation is that the causality runs in the opposite direction. It could be the case that rising income, especially at the upper end of the income distribution, results in a segment of the population who value a short commute so much that they trade the space available in the suburbs for the reduced commute of the area near the CBD. If the market responds by adding residential housing units near the CBD, then population density near the CBD could increase.[6]

A desire to differentiate between these two possible scenarios led us to consider potential instruments that might be correlated with near CBD population density and which would not be expected to influence MSA-level income growth except by way of their influence on near CBD population density. One potential instrument is the measure of area (land or water) unavailable for development within fifty kilometers of the CBD as calculated in Saiz (2010). This fraction of the area within fifty kilometers of the CBD that is unavailable for development is associated with increases in population density within 2.5 miles of the CBD. Taking our column 5 specification, and altering it so that changes in population density within 2.5 miles of the CBD is instrumented with the fraction undevelopable variable and dropping the initial year population density variables, results in a first stage F statistic of 10.37 and a t statistic on the unavailable variable of

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[6] Leroy and Sonstelie (1983) show how a pattern of high income people moving back to the CBD from the suburbs could occur when modes of transportation such as the car are adopted first by high income people and then by low income people. Lin (2002) provides empirical support for this hypothesis. Brueckner, Thisse, and Zenou (1999) posit that variation in amenity levels may explain variation across cities in the degree to which high income households tend to be concentrate in the suburbs versus near the CBD.

3.22. However, including the initial population density measures using the 5 or 7.5 mile definitions of "near the CBD" result in much lower first stage F and t statistics.

The other issue is whether it is plausible that the fraction of area unavailable for development within fifty kilometers of the CBD could influence MSA-level income growth in some manner other than by way of population density near the CBD. Saiz (2010) discusses why one would expect productivity to be correlated with the fraction of area unavailable for development: with many possible places to develop a city, places where development is more costly must have some natural advantage in productivity or amenity. Higher productivity could result in a correlation between area unavailable for development and income levels. However, it is unclear whether one would expect area unavailable to have an effect on income growth. For these reasons, we do not put much emphasis on the IV results.[7] However, we find the robustness of the association between changes in population density near the CBD and MSA-level income growth interesting. We think that exploring the mechanisms that may link changes in population density near the CBD to MSA-level productivity is an area for future policy-oriented research. If core density is important for productivity then policymakers across the entire MSA might want to consider measures aimed at keeping the center city densely populated.

Conclusion

Anecdotal evidence from Detroit and Cleveland suggests that shrinking MSAs have lost the most population density near their CBDs. We find that, on average, this is true for the 36 MSAs that have lost population from 1980 to 2010. We find steep drops in population density

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[7] For the curious reader two-stage least squares results from the specification noted above with an F of 10.37 yield a coefficient on change in population density near the CBD of 0.527 and with a standard error of 0.182.

for shrinking cities close to the CBD which die off as distance from the CBD increases. This pattern is not evident in growing MSAs. In conjunction with the drops in population density near the CBDs of shrinking MSAs, we find less of an increase in educational attainment than in places farther away from the CBD in shrinking MSAs, and less of an increase in educational attainment than in places near the CBD in growing cities. On average, shrinking MSAs also have lower increases in income, higher increases in poverty rates, and more of an increase in the fraction of the population that is African American near the CBD than do growing MSAs. Changes in the fraction of the population that is Hispanic are larger in growing MSAs than in shrinking MSAs but these changes do not display much of a relationship with distance to the CBD in either type of MSA. Finally, the fraction of the population that is between the ages of twenty-five and thirty-four falls more as distance to the CBD increases. This pattern is very similar in growing and shrinking MSAs.

In the second part of our analysis we turn to the question of whether changes in population density near the CBD are related to changes in MSA-level productivity that are reflected in the growth of income per capita in the MSA. In OLS regressions we find a positive partial correlation between changes in population density near the CBD and MSA-level income growth from 1980 to 2010 while controlling for changes in overall MSA-level population density over the same period and controlling for a number of initial-year (1980) MSA characteristics. We explore a potential instrument for changes in population density but are not convinced that it is a strong enough instrument. We hope that further research uncovers the mechanisms that underlie the positive association between changes in population density near the CBD and MSA-level income growth, allowing leaders to craft informed policies to build stronger and more resilient cities.

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Table 1

MSAs that shrank (in population) 1980-2010
Anderson, IN Metropolitan Statistical Area
Battle Creek, MI Metropolitan Statistical Area
Bay City, MI Metropolitan Statistical Area
Binghamton, NY Metropolitan Statistical Area
Buffalo-Niagara Falls, NY Metropolitan Statistical Area
Cleveland-Elyria-Mentor, OH Metropolitan Statistical Area
Danville, IL Metropolitan Statistical Area
Danville, VA Metropolitan Statistical Area
Davenport-Moline-Rock Island, IA-IL Metropolitan Statistical Area
Decatur, IL Metropolitan Statistical Area
Detroit-Livonia-Dearborn, MI Metropolitan Division
Dubuque, IA Metropolitan Statistical Area
Duluth, MN-WI Metropolitan Statistical Area
Elmira, NY Metropolitan Statistical Area
Flint, MI Metropolitan Statistical Area
Huntington-Ashland, WV-KY-OH Metropolitan Statistical Area
Johnstown, PA Metropolitan Statistical Area
Kokomo, IN Metropolitan Statistical Area
Lima, OH Metropolitan Statistical Area
Mansfield, OH Metropolitan Statistical Area
Muncie, IN Metropolitan Statistical Area
New Orleans-Metairie-Kenner, LA Metropolitan Statistical Area
Niles-Benton Harbor, MI Metropolitan Statistical Area
Parkersburg-Marietta-Vienna, WV-OH Metropolitan Statistical Area
Peoria, IL Metropolitan Statistical Area
Pine Bluff, AR Metropolitan Statistical Area
Pittsburgh, PA Metropolitan Statistical Area
Pittsfield, MA Metropolitan Statistical Area
Saginaw-Saginaw Township North, MI Metropolitan Statistical Area
Springfield, OH Metropolitan Statistical Area
Toledo, OH Metropolitan Statistical Area
Utica-Rome, NY Metropolitan Statistical Area
Waterloo-Cedar Falls, IA Metropolitan Statistical Area
Weirton-Steubenville, WV-OH Metropolitan Statistical Area
Wheeling, WV-OH Metropolitan Statistical Area
Youngstown-Warren-Boardman, OH-PA Metropolitan Statistical Area

Table 2

MSAs that Grew by more than 100% (in population) 1980-2010
Athens-Clarke County, GA Metropolitan Statistical Area
Atlanta-Sandy Springs-Marietta, GA Metropolitan Statistical Area
Austin-Round Rock-San Marcos, TX Metropolitan Statistical Area
Bakersfield-Delano, CA Metropolitan Statistical Area
Blacksburg-Christiansburg-Radford, VA Metropolitan Statistical Area
Boise City-Nampa, ID Metropolitan Statistical Area
Bradenton-Sarasota-Venice, FL Metropolitan Statistical Area
Cape Coral-Fort Myers, FL Metropolitan Statistical Area
Charlotte-Gastonia-Rock Hill, NC-SC Metropolitan Statistical Area
Charlottesville, VA Metropolitan Statistical Area
College Station-Bryan, TX Metropolitan Statistical Area
Colorado Springs, CO Metropolitan Statistical Area
Dallas-Plano-Irving, TX Metropolitan Division
Fayetteville-Springdale-Rogers, AR-MO Metropolitan Statistical Area
Fort Collins-Loveland, CO Metropolitan Statistical Area
Fort Worth-Arlington, TX Metropolitan Division
Greeley, CO Metropolitan Statistical Area
Hanford-Corcoran, CA Metropolitan Statistical Area
Laredo, TX Metropolitan Statistical Area
Las Cruces, NM Metropolitan Statistical Area
Las Vegas-Paradise, NV Metropolitan Statistical Area
Madera-Chowchilla, CA Metropolitan Statistical Area
McAllen-Edinburg-Mission, TX Metropolitan Statistical Area
Naples-Marco Island, FL Metropolitan Statistical Area
Ocala, FL Metropolitan Statistical Area
Olympia, WA Metropolitan Statistical Area
Orlando-Kissimmee-Sanford, FL Metropolitan Statistical Area
Phoenix-Mesa-Glendale, AZ Metropolitan Statistical Area
Port St. Lucie, FL Metropolitan Statistical Area
Provo-Orem, UT Metropolitan Statistical Area
Raleigh-Cary, NC Metropolitan Statistical Area
Reno-Sparks, NV Metropolitan Statistical Area
Riverside-San Bernardino-Ontario, CA Metropolitan Statistical Area
Sebastian-Vero Beach, FL Metropolitan Statistical Area
West Palm Beach-Boca Raton-Boynton Beach, FL Metropolitan Division
Wilmington, NC Metropolitan Statistical Area
Yuma, AZ Metropolitan Statistical Area

Table 3

	Mean	Std Dev.
Growth of Average Per Capita Income 1980-2010	2.78	0.66
Population Density w/in 2.5 miles of CBD 1980 (population density measured in 1000s of people per sq. mi.)	4.22	4.31
Population Density w/in 5 miles of CBD 1980 (population density measured in 1000s of people per sq. mi.)	2.57	3.11
Population Density w/in 7.5 miles of CBD 1980 (population density measured in 1000s of people per sq. mi.)	1.77	2.58
MSA Population Density 1980 (population density measured in 1000s of people per sq. mi.)	2.58	2.65
Change in Population Density w/in 2.5 miles of CBD 1980-2010 (population density measured in 1000s of people per sq. mi.)	0.02	1.25
Change in Population Density w/in 5 miles of CBD 1980-2010 (population density measured in 1000s of people per sq. mi.)	0.19	0.84
Change in Population Density w/in 7.5 miles of CBD 1980-2010 (population density measured in 1000s of people per sq. mi.)	0.23	0.64
Change in MSA Population Density 1980-2010 (population density measured in 1000s of people per sq. mi.)	0.35	0.86
Log MSA Population 1980	12.47	1.03
Log MSA Per Capita Income 1980	8.78	0.18
Fraction of Population with Bachelor or Higher Degree 1980	0.16	0.06

Table 4

Dependent Variable: Growth of Per Capita Income 1980-2010

	(1)	(2)	(3)	(4)	(5)	(6)
Definition of Near CBD (radius)	5 Miles	5 Miles	5 Miles	5 Miles	2.5 Miles	7.5 Miles
Change in Population Density Near CBD 1980-2010	0.171	0.203	0.144	0.143	0.102	0.135
(population density measured in 1000s of people per sq. mi.)	(0.060)	(0.087)	(0.071)	(0.065)	(0.041)	(0.085)
Change in MSA Population Density 1980-2010	-0.116	-0.147	-0.142	-0.195	-0.182	-0.168
(population density measured in 1000s of people per sq. mi.)	(0.049)	(0.066)	(0.062)	(0.061)	(0.059)	(0.063)
Population Density Near CBD 1980		0.029	-0.010	-0.024	0.032	-0.011
		(0.041)	(0.028)	(0.026)	(0.019)	(0.032)
Population Density in MSA 1980		-0.026	0.018	0.035	-0.038	0.026
		(0.047)	(0.029)	(0.027)	(0.032)	(0.028)
Log MSA Population 1980		-0.006	0.178	0.199	0.158	0.167
		(0.040)	(0.077)	(0.077)	(0.069)	(0.077)
Log MSA Per Capita Income 1980			-2.375	-3.041	-3.025	-3.031
			(0.800)	(0.861)	(0.857)	(0.880)
Fraction of Population with Bachelor or Higher Degree 1980			4.327	4.453	4.174	4.431
			(0.762)	(2.020)	(1.966)	(2.006)
Occupational Shares 1980	No	No	No	Yes	Yes	Yes
R-squared	0.02	0.02	0.37	0.48	0.48	0.47
Observations	345	345	345	345	345	345

Figure 1

Distance to CBD (Miles)

Figure 2

Figure 3

Fraction Bachelor Degree or Higher (Left) Aged 25-34 (Right)

Distance to CBD (Miles)

Figure 4

Log Average Household Income (Left) Poverty Rate (Right)

Distance to CBD (Miles)

Figure 5

Fraction African-American (Left) Hispanic (Right)

Distance to CBD (Miles)