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The Role of Non-Owner-Occupied Homes
in the Current Housing and Foreclosure Cycle

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Abstract

Non-occupant homeowners differ from owner occupants in that they tend to have lower-risk credit characteristics, such as higher credit scores, but may also have weaker incentives to maintain mortgage payments when housing values fall. During the recent housing boom, the share of mortgage borrowing by non-occupant owners was relatively high in states where home values appreciated relatively rapidly. After the housing boom, foreclosures on non-occupant mortgages in several Midwestern and Northeastern states reflected primarily a high rate of foreclosure per mortgage, not a high volume of mortgages to non-occupants. The reverse held true in some coastal and mountain states. Nevada and Florida have experienced the greatest impact overall, because they have both a high volume of mortgages to non-occupant owners and a high rate of foreclosure on those mortgages.

Key words: Non-owner occupants, foreclosures

JEL Classification: D10, G01

I. Introduction

The past decade's business cycle was accompanied by a dramatic boom and bust in the housing market. As illustrated in Figure 1, the housing cycle, in turn, was marked by a disproportionate rise and fall in home buying and mortgage borrowing by non-occupant owners, by which we mean individuals who own housing units other than their primary residence. Examples include investors in residential property and owners of vacation homes. As the housing prices declined, foreclosures on properties owned by non-occupants reached high levels in some areas too. In this study, we provide background information on the role that non-occupant homeowners played in the recent housing cycle and foreclosure crisis. We show that the foreclosure rate has been similar for both owner-occupants and non-occupant owners. Nonetheless, non-occupant owners make up a distinct market segment whose activity was associated with regional differences in housing appreciation and foreclosure impacts.

We also find that the factors underlying the impact of non-occupant foreclosures vary among states. For example, the high incidence of foreclosures on non-occupant mortgages in Michigan, Indiana and some other states in the Midwest and Northeast primarily reflects a high rate of foreclosure per non-occupant mortgage, not a high volume of mortgages to non-occupants. By contrast, in Hawaii, Idaho, and some other coastal and mountain states, foreclosures on non-owner-occupied homes have been prominent even though the foreclosure rate on non-occupant mortgages has been relatively low. In those states, unlike Michigan or Indiana, the importance of foreclosures on non-owner-occupied properties stems from the high volume of non-owner-occupied mortgages issued. Nevada and Florida stand out because both states experienced a very high volume of mortgages on non-owner-occupied properties and a very high foreclosure rate.

II. What Do We Mean by Non-Occupant Owners, and Why Do We Care?

Policymakers and journalists have asked whether "investors"—those who buy houses not to live in but primarily for expected profits from income and capital gains—have played a disproportionate role in the current housing cycle. However, because it is often difficult to measure investor activity in the housing and mortgage market, we focus instead on the broader concept of non-occupant owners of single-family homes. A single family home is defined as a detached structure with one to four residents or a townhouse and a condominium contained in a larger building but available for sale separately. For the purposes of this study, we will ignore investments in multifamily rental housing, defined here as structures with five or more housing units intended for renters.[1]

Decisions about how to analyze non-occupant owners are often driven by data limitations. For example, data collected under the Home Mortgage Disclosure Act (HMDA) distinguish between mortgages on owner-occupied and non-owner-occupied properties but provide no additional information as to whether a non-owner-occupied property is a vacation home, an investment property, or something else. However, data obtained from Lender Processing Services (LPS) allow the non-owner-occupied category to be segmented into two groups; second homes and other (or

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[1] Multifamily housing played a relatively small role in the recent housing cycle. Between 2000 and 2005, the number of multifamily rental housing starts increased by 4 percent, far less than the 38 percent rise in starts of one- to four-unit homes. Between 2005 and 2008, multifamily starts fell by 15 percent, compared to the 64 percent drop in starts of one- to four-unit homes.

"investor" properties).[2] S*econd home* is defined as a non-primary residence purchased mostly for recreational use or as an occasional or seasonal residence. Although the accuracy of this additional information is unclear, we make some use of it to shed additional light on the role of non-occupant owners in the recent cycle.[3]

Why should we care about the role non-occupant homeowners played in the current mortgage crisis? One reason is to have a better understanding of housing cycles in general and the recent foreclosure crisis in particular. Given the still very high rate of mortgage defaults in 2010, a better understanding of the role of non-owner-occupied homeowners might also help direct policymakers in their efforts to reduce foreclosures. Current foreclosure mitigation efforts have been used to address the needs of owner-occupiers rather than other owners, but cities struggling to contain the negative spillover effects of vacant properties might benefit from a better understanding of the local prevalence and implications of non-owner-occupant foreclosures. Finally, efforts to improve the future supervision and regulation of housing and mortgage markets will require an accurate assessment of what led to the current crisis.

Although much of the current interest in non-owner-occupied homes focuses on the problems that profit-oriented investors may have caused in bidding up home prices or triggering foreclosures, it is worth noting that many non-occupant owners play a beneficial role in the single-family housing market. According to a Harvard University Joint Center for Housing Studies analysis of the 2003 American Housing Survey, 35 percent of American renters live in single-unit properties and another 21 percent live in two- to four-unit structures.[4] That is, non-occupant owners of single-family housing provided about half of the rental units in the U.S. in 2003.

III. Non-Occupant Owners Are a Distinct Market Segment

Non-occupant owners are likely to have different motives, characteristics, and behaviors than owner-occupants. Below, we discuss these differences conceptually and validate the differences in characteristics and behaviors using data from mortgage and foreclosure records.

Motives. Homeowners derive two distinct benefits from owning a home, the value associated with consumption and the potential financial benefits that we will call profit. Homeowners derive consumption value by occupying the home and enjoying the direct benefits from its use. Homeowners can also gain financially if their home appreciates or if they rent out all or a portion of the home. Depending on how the homeowner plans to use the home will determine how much value and the type of value that homeowner will derive from the home. At one extreme, owner-occupants would put a relatively high value on the consumption value of home ownership since

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[2] We use LPS's mortgage data for much of the analysis in this paper, partly because they provide the only information we have on mortgage performance. In Appendix 2, we consider how the LPS data compare to alternative national and local data sources on mortgages. The results indicate that the LPS data cover only about 60 percent as many mortgages as the HMDA data include and may undercount the ratio of mortgages to non-occupants slightly when compared with the HMDA data. Nonetheless, we also find that the LPS data provide fairly reliable measures of useful ratios and relationships, such as foreclosure rates and rankings of regional outcomes.

[3] In Appendix 3, we use the LPS data to examine the differences between residential mortgages to second-home and investor borrowers. In most states, investor borrowers outnumber second-home borrowers by three-to-one or more, but second-home mortgages become more significant in a few high-amenity states like Hawaii. Both HMDA and LPS depend on homeowners to self-report the occupancy status of the home, and LPS also relies on self-reporting to distinguish second homes from investment properties. Because of differences in underwriting based on the occupancy and usage of the home, borrowers have an incentive to misreport their true intentions.

[4] We calculated these percentages from the more detailed data presented in Figure 8-1 of Apgar and Narasimhan (2008). Their figures also include information on single-unit homes including manufactured housing units.

they are able to use and modify the home to meet their needs. At the other extreme are owners who do not reside in the home and therefore consume very little of the non-monetary benefits of homeownership. These owners place a higher value of the current and future cash flows that may be generated from the home in the form of rental income and capital gains, net of costs. Owners of vacation homes or rental properties who occupy them only occasionally would fall somewhere in between these two extremes.

Characteristics and Risk Factors. It makes sense that non-occupant owners would have different financial characteristics than owner-occupants, given the capital and credit needed to purchase an investment or vacation property.[5] As shown in Figures 2, 3, and 4, data from mortgage applications validate this supposition. Using HMDA data, Figure 2 shows that non-occupants tend to have noticeably higher incomes than owner-occupants. In the typical state, the median income of non-occupant home purchasers rose from just over $100,000 in 2004 to close to $125,000 in 2007. By contrast, in the typical state the mean income of owner-occupant borrowers was about $60,000 to $65,000. The incomes of borrowers who refinanced exhibited similar patterns by occupancy status.

Using LPS data, figures 3a to 3c show that, by common underwriting standards, non-occupant borrowers have a lower risk profile than owner-occupants. Figure 3a shows that non-occupant homeowners have higher credit scores when compared to owner-occupants. This is especially true of vacation-home buyers, whose average FICO score in a typical state is about 740, compared with about 720–730 for investors and 700 for owner-occupants.

Another measure of credit risk is the loan-to-value (LTV) ratio.[6] Figure 3b shows that LTV ratios on investor-owned mortgages tended to be comparable to or somewhat lower than LTV ratios on loans to owner-occupants. The lowest LTV ratios were on mortgages on vacation homes. Overall, then, non-occupant mortgage holders have less risky LTV ratios.

Mortgage applicants' total debt relative to their income is another common risk measure. Figure 3c shows that the debt-to-income (DTI) ratio for non-occupants tends to be on par with or lower than the DTI ratio for owner-occupants. Compared with owner-occupants, investors had lower DTI ratios on mortgages originated in 2004-2005 and comparable ratios in 2006-2007. DTI ratios on second-home mortgages were lower in all four years shown. Overall, compared with owner-occupants over 2004-2007, non-occupants tended to have higher credit scores and comparable or lower LTV and DTI ratios.

Although the higher incomes and superior credit scores of non-occupant borrowers could give them access to larger amounts of mortgage credit, Figure 4a shows that non-occupant mortgages are slightly smaller in size. When combined with non-occupants' substantially higher incomes, these lower loan amounts imply significantly lower loan-to-income ratios for non-occupants. The HMDA and LPS data confirm that non-occupants do indeed have lower loan-to-income ratios, another

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[5] We also looked at the racial, ethnic, and gender differences between owner-occupants and non-occupant owners, using HMDA data for the primary loan applicant. In most states the primary applicant on non-occupant mortgages was more likely to be male. Racial and ethnic differences between occupant and non-occupant primary applicants were generally small with the largest difference between Latino owner-occupants and non-owner occupants in states like Arizona, California, Florida, New Mexico, Nevada, and Texas.

[6] The data for loan-to-value is derived at the time the loan is originated. However, the LTV figure maybe different from the original amount if the loan amount or appraisal is updated while the loan is being serviced. As a result, it is possible that some unknown percentage of the mortgages in the sample may have appraisal values that are provided after the loan was originated. As a result, if the non-occupant property values have fallen more (less) rapidly than the value of owner-occupant properties, then data would exaggerate (underestimate) the relative ex ante risk investors.

indicator of lower credit risk.[7] In short, standard criteria used to underwrite mortgages indicate that non-occupants should be better credit risks than owner-occupants.

Behavior. Despite their apparently superior risk credentials, non-occupant owners are often no more likely than owner-occupants to make their mortgage payments. In deciding whether to pay, both non-occupant owners and owner-occupants consider the foreclosure option, whereby their mortgage debt is extinguished and the property's title is conveyed to the lender. However, non-occupant owners may be freer to take advantage of the profit opportunities this option creates. Both know that the foreclosure option limits their direct financial loss to the equity they have invested in the home, primarily their down payment.[8] Because the homeowner has limited liability, the value of the foreclosure option rises as the owner's equity (the difference between the value of the home and the amount owed on the mortgage) declines or turns negative. The relationship between the foreclosure option and equity is particularly strong for non-occupants, because non-occupants place a particularly high value on the profit opportunities that may occur associated with homeownership. In addition, foreclosure imposes greater noninvestment losses on owner-occupants, such as moving costs, credit impairment effects, and emotional stress. As a result, owner-occupants are less likely to exploit the mortgage foreclosure option. Not facing these same constraints, non-occupants are freer to exercise their foreclosure option when expected profits are low.[9] For this reason, non-occupant homeowners are considered "ruthless" borrowers.[10]

The theory behind the mortgage foreclosure option suggests that, other things being equal, foreclosure rates will be higher for mortgages on non-owner-occupied homes. For this reason, mortgage lenders often compensate for the ruthlessness of non-occupant borrowers by imposing stricter terms on their mortgages. A Federal Reserve staff member experienced in banking supervision and policy analysis states that most mortgage lenders charge an interest rate premium on mortgages to non-occupants ranging from 25 to 100 basis points, other things being equal. Lenders may also seek additional risk controls, such as higher down payments on loans to non-occupants.[11]

The higher default risk associated with non-occupants is also known among investors in mortgage products. These investors often place restrictions on the percentage of loans originated to non-occupants in their mortgage portfolios. According to Doug Duncan, the chief economist for the Mortgage Bankers Association, investors expect that "people who don't live in homes are more

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[7] However, we cannot tell from the HMDA and LPS data if non-occupants support multiple mortgages with the same reported income.

[8] Many states allow creditors to seek additional compensation from the borrower when sale of the property fails to cover the unpaid mortgage balance, but in practice these deficiency judgments are infrequently pursued and even less frequently collected.

[9] See Gerardi, Shapiro, and Willen (2008). Non-occupants also have some disadvantages. As noted above, public assistance to delinquent borrowers usually targets owner-occupants and seeks to exclude non-occupants. In addition, whereas owner-occupants in effect rent to themselves, non-occupants must either forgo rental income or seek tenants. The latter involves both administrative costs and risks, such as the tenant damaging the property or failing to pay the rent. When expected capital gains are small, these disadvantages are relatively large and can significantly limit non-occupant demand for single-family homes.

[10] In Appendix 1, these basic motives are presented more formally in a simple adaptation of the mortgage payment model of Gerardi, Shapiro, and Willen (2008).

[11] For example, a 1998 filing with the Securities and Exchange Commission (SEC) by Green Point Financial Corporation notes that first-lien adjustable rate mortgages to non-occupants require at least 25 percent down, an elevated interest rate, and possibly a prepayment penalty. See sec.edgar-online.com/1998/03/26/09/0001047469-98-011577/Section2.asp.

likely to walk away when mortgage rates reset higher or the property loses value."[12] His assessment is corroborated by filings with the Securities and Exchange Commission that caution investors in mortgage backed securities about the presence of mortgages to non-occupants.[13]

Previous studies find that default and loss rates are higher on mortgages to non-occupant owners than on mortgages to owner-occupants, at least after controlling for credit scores and other standard underwriting criteria. Cowan and Cowan (2004) use 1995-2001 data provided by a large subprime mortgage lender, and they state that "The likelihood of default, whether measured by foreclosure or delinquency, is much greater for properties where the owner is not the occupant."[14] Immergluck and Smith (2004) find that, in the Chicago area, a higher volume of subprime lending to non-occupant owners is associated with higher foreclosure rates, even when several risk factors are accounted for.[15] Avery, Canner, and Brevoort (2007) find that, other factors held constant, non-occupants' share of a county's mortgages in 2004 was significantly associated with the county's increase in mortgage delinquencies between 2004 and 2007.[16] In a detailed analysis of public records in Massachusetts, Gerardi, Shapiro, and Willen (2008) use mortgage data on condominiums and multi-family dwellings to proxy for loans to non-occupants.[17] After controlling for other risk factors, they state that "owners of condominiums and multi-family homes are estimated, respectively, to have 42 percent and 57 percent higher conditional default probabilities than owners of single-family homes." Using data from over 100,000 subprime and Alt-A mortgages that were originated between 1992 and 2007,[18] Bajari, Chu, and Park (2008) find that, other things being equal, non-occupants are more likely to exercise their foreclosure option. Haughwout, Peach, and Tracy (2008) compare owner-occupants, investors, and second-home buyers with regard to rates of early (within the first year) default on mortgages originated from 2001 to 2007. After controlling for observed risk factors, these authors find that "investors are more likely to default in the first year" and that investors' early default behavior is more sensitive to housing depreciation and having negative equity in the property. They also find that owners of second homes behave differently from investors and are not more likely than owner-occupants to default early.[19] Lenders may also face higher rates of loss given foreclosure when the property is non-owner-occupied.[20]

We have seen that non-occupant owners tend to have stronger financial characteristics than owner-occupants but less incentive to make mortgage payments when times are tough. Nationally, these opposing effects have apparently offset each other in recent years, resulting in only small differences in foreclosure rates on mortgages to non-occupant owners and owner-occupants. Our LPS data on home-purchase and refinance mortgages originated in 2004 show that the national foreclosure rate on non-occupant mortgages was 4.5 percent, which is slightly under the 5.0 percent

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[12] Investors own about one-fifth of Bay Area homes in foreclosure. See McCormick and Said (2007).

[13] For example, the S-3/A SEC Filing by J. P. Morgan Acceptance Corp I on February 8, 2006, states "The mortgaged properties in the trust fund may not be owner occupied. Rates of delinquencies, foreclosures and losses on mortgage loans secured by non-owner occupied properties may be higher than mortgage loans secured by a primary residence." See http://sec.edgar-online.com/2006/02/08/0001162318-06-000172/Section14.asp

[14] See Cowan and Cowan (2004). The reported quote is especially unfavorable to investors because it appears to be unconditional; that is, they do not include controls for risk factors such as the borrower's income or credit score. The authors report a smaller difference in performance between mortgages on vacation homes and owner-occupied homes, in part because in their data (as in our LPS data) owners of second homes tend to be above average in credit quality.

[15] See Immergluck and Smith (2004).

[16] See Avery, Brevoort, and Canner (July 2008).

[17] See Gerardi, Shapiro, and Willen (2008).

[18] Personal communication from Sean Chu of the Board of Governors of the Federal Reserve System, based on supplemental calculations related to research reported in Bajari, Chu, and Park (2008).

[19] See Haughwout, Peach, and Tracy (2008).

[20] See Qi and Yang (2007).

rate on owner-occupants' mortgages.[21] As defaults escalated for both groups in subsequent years, the foreclosure rate for non-occupants grew somewhat higher but remained close to the foreclosure rate for owner-occupants. By year of mortgage origination, the foreclosure rates for non-occupants and owner-occupants were the following: 8.5 and 8.1 in 2005, 12.6 and 12.0 percent in 2006, and 7.6 and 6.8 percent in 2007.

An examination of state foreclosure rates confirms the general alignment of non-occupant and owner-occupant foreclosure rates but also identifies places where they diverge. Figure 5 displays the relative foreclosure rates on non-owner-occupied and owner-occupied mortgages by year of origination for 2004-2007 by state. The 45-degree line in the figure represents equality between the foreclosure rate for non-occupants and occupants. The symbol for most states lies near this line, in keeping with the similarity on non-occupant and owner-occupant foreclosure rates nationally. There are exceptions, however. The symbols for some of the Midwestern states (for example, Michigan, Indiana and Ohio) are well above the 45-degree line, which means that in these states non-occupant borrowers are distinctly more likely than owner-occupants to be in foreclosure. The symbols for some of the rural or Sunbelt states that may have a high percentage of vacation homes relative to the national average are well below the 45-degree line, at least in some years. This means that non-occupant owners are less likely to enter into foreclosure than owner-occupants. Despite these exceptions, Figure 5 indicates that foreclosure rates between non-occupants and owner-occupants are highly correlated across the 50 states and the District of Columbia.[22]

We noted above that non-occupant owners may focus more exclusively on the expected profits of home ownership, when compared to owner-occupants. For this reason alone, non-occupants are likely to respond more quickly to changes in economic conditions or demographic trends that would generate profitable opportunities in acquiring single-family housing. In addition, investors and even vacation home buyers can own multiple properties in multiple areas, which is impossible (by definition) for owner-occupants. For these reasons, we expect non-occupants' buying and mortgage borrowing activity to be more procyclical than for owner-occupants.

Using data from the National Association of Realtors (NAR), Figure 6 supports the relative procyclicality of non-occupant home buying activity. As the housing boom rose to its peak in 2005, home buying by non-occupants grew faster than that of owner-occupants. For example, purchases by investors increased almost 50 percent between 2003 and 2005. Over the same time period, investors' share of the overall increase in home sales is about 61 percent. If you add in the 20 percent rise in vacation-home purchases, non-occupants account for 75 percent of the growth in sales in the final two years (2004–2005) of the boom. In the subsequent housing downturn, the NAR data show that non-occupants accounted for 65 percent of the decline in home sales. Over the same period, the cyclical swing in owner-occupant purchases is much milder. For example, sales to owner-occupants rose just 6.4 percent from 2003 to 2005 and then fell 13.5 percent during the housing downturn.

The HMDA data also show that non-occupant owners were relatively active in the recent housing cycle. We focus here on originations of home-purchase mortgages, rather than mortgages used for home improvements or refinancing of an existing mortgage. As reflected in Figures 1 and 7, non-occupants' share of home-purchase mortgages had been rising since the early 1990s but accelerated after 2001. As the housing boom peaked, home-purchase mortgage originations to non-occupant

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[21] Our data include all foreclosures from the date of origination through July 2009.

[22] Cross-sectionally, for the 50 states and District of Columbia, the correlations between owner-occupied and non-occupant foreclosure rates are 0.87 in 2004, 0.90 in 2005, 0.89 in 2006, and 0.92 in 2007.

owners rose 84 percent between 2003 and 2005. Over the same period, home-purchase mortgage originations to owner-occupants rose much less, 36 percent. As a result, non-occupant borrowers accounted for 26 percent of the increase in home-purchase mortgage borrowing between 2003 and 2005, even though their share of this market was only about half that size.[23]

Both the NAR and HMDA data report flows, for either new purchases or new mortgages. Neither directly addresses what happened to the stock of housing units. For example, a large flow of non-occupants buying homes could simply reflect the churning of properties among non-occupant owners, with no net increase in the number of non-owner-occupied properties. A rise in the number of non-occupants who buy properties from developers in order to ultimately resell them to owner-occupants (sometimes referred to as flipping) could also cause a boost in non-occupant buying with little net change in non-occupants' share of ownership.[24]

In fact, data from the American Housing Survey (AHS) show that non-occupants' share of ownership did not parallel their share of home purchasing and borrowing. Although the flow data show a big rise in the share of buying and borrowing by non-occupants in 2003-2005, the AHS data show the stock of owner-occupied single-family homes growing faster than other types of housing units.[25] Some of this divergence could be explained by considerable churning or flipping in the stock of non-owner-occupied housing for the period 2003-2005.[26]

After 2005, the data on single-family housing stock are difficult to interpret, due to a big increase in vacant properties that may reflect foreclosures. Again, the stock data appear to be at odds with the flow data for purchases and mortgages. For example, the AHS data indicate that the stock of non-owner-occupied single-family housing grew faster than the stock of owner-occupied housing in the

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[23] The NAR and HMDA data disagree over the magnitude of non-owner occupants' role in the housing boom and bust, although both sources confirm that home purchasing was more procyclical for non-occupant owners than for owner-occupants during the recent housing cycle. We have not looked into the reasons for the differences between the NAR figures and the HMDA data, but there are some obvious possibilities. NAR's figures come from a survey, which is subject to sampling error and, possibly, response bias. However, HMDA data have limitations as well. HMDA only captures home purchases that involve a new mortgage (thereby omitting cash purchases). In addition, HMDA's coverage under-represents mortgages by small lenders in rural areas, which could lead to an undercount of vacation-home mortgages, for example. The HMDA data can also exaggerate changes in home purchases, when two or more mortgages are associated with a single home purchase. For example, combinations of first and second mortgages to finance a single home purchase increased substantially in 2004–2006, according to Avery, Brevoort, and Canner (2007).

[24] The term "flipping" generally has a negative connotation but can also provide needed financing for housing development in rapidly growing markets.

[25] From the second quarter of 2003 to second quarter of 2005, the total number of owner-occupied single-family housing units grew by 3.8 percent, faster than the 2.9 percent increase in total single-family housing units. Thus, owner-occupied single-family units grew faster than the total of all other kinds of single-family units. (We defined a single-family unit as a unit in a structure with 4 or fewer total units.) A 2.2 percent drop in the number of single-family rental units that were occupied or for rent (as opposed to for sale) restrained the overall growth in single-family units between 2003 and 2005. However, rapid growth in certain sub-categories of the non-owner-occupied single-family housing stock from 2003 to 2005 was more aligned with the data on non-occupant buying and borrowing. For example, the stock of seasonal (vacation) single-family properties grew 14 percent over this period, and the stock of vacant single-family properties for sale rose 16 percent.

[26] See Benjamin, Chinloy, Hardin III, and Wu (2008) for a model that incorporates residential real estate churning and flipping, with an application to the Miami, Florida, real estate market for the time period 2004-2006 . They argue that apartment buildings were converted to condominiums because investors seeking to convert them were able to outbid investors who were planning to maintain apartments as rental units. They find (pp. 631-632) that there is "a higher price when the volume of sales accounted for by converters rises" and that the "entry of condo converters to the Miami-Fort Lauderdale apartment market in 2004 causes a bubble in prices, which eventually dissipates."

years 2005-2007. However, during this same time period, non-occupants accounted for a disproportionate share of the drop in the flow of home purchases and home-purchase borrowing.[27]

Although the NAR and HMDA flow data show different patterns of change than the AHS housing stock data, they mostly agree on a key point—that the behavior of non-occupant buyers and borrowers is in many ways distinct from that of owner-occupants. In this section, we have presented the case that investors and other non-occupant home owners have motives, characteristics, and behavior patterns that, on average, differ from those of owner-occupants. Having established that they are different, we now look across space (regions of the U.S.) and time to examine how home buying and mortgage borrowing by investors and other non-occupant borrowers were related to housing prices and foreclosures in recent years.

IV. Non-Occupant Owners and Housing Prices

We argue above that non-occupant home buyers respond primarily to profit opportunities and can do so more quickly and extensively than owner-occupants. This suggests that non-occupant owners may be attracted to areas where single-family housing is expected to appreciate more rapidly. In other words, causality might run from expectations of rapidly rising prices to above-average buying activity by non-occupants. Causality may flow in the other direction too, such as when a growing population of affluent middle-aged families seeks to buy vacation properties, boosting demand and increasing prices for homes in recreational areas. The direction of causality in these relationships is often difficult to determine, and we do not attempt to do so here. However, we can document growing correlation between housing appreciation and non-occupant mortgage borrowing near the end of the housing boom.

We wish to observe if non-occupant borrowers are relatively active in areas where housing prices appreciate rapidly. To do so, we spatially correlate the level or percentage change in the share of home-purchase mortgage originations to non-occupants with the percent change in housing prices, across the 50 states and the District of Columbia.[28] In Figure 8, we take the percentage change for a ten-year period, for the share of home-purchase mortgage borrowing by non-occupants and housing prices.[29] The figure shows that a number of states lie fairly close to the 45-degree line, which would symbolize a one-to-one relationship between the percentage change in non-occupant share and the percentage change in housing prices. However, several states lie far from the 45-degree line. Among these outliers, the more common case is for non-occupants' share of home purchase mortgages to grow considerably faster than home prices, as in Delaware, Georgia, Idaho, Indiana, Michigan, Minnesota, Montana, New Mexico, Pennsylvania, Tennessee, or Texas. The clearest case of prices rising faster than non-occupants' share is California, but the District of Columbia, Florida, Massachusetts, and Rhode Island also share this pattern. With so many points lying well off the 45-degree line in multiple directions, the overall statistical correlation is low.

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[27] From the second quarter of 2005 to second quarter of 2007, the total number of owner-occupied single-family housing units grew by 2.8 percent, which is slower than the 3.4 percent increase in total single-family housing units. Thus non-occupants' share in the ownership of single-family housing units increased during the housing bust. A 5.9 percent rise in the number of single-family rental units that were occupied or for rent contributed to the overall growth in single-family units between 2003 and 2005 as well as to the rise in non-occupants' share of ownership. The stock of seasonal (vacation) single-family properties and vacant single-family properties for sale also continued to grow rapidly over this period (by 14 and 40 percent, respectively).

[28] The mortgage data come from HMDA. Repeat-sales data for housing from the Federal Housing Finance Authority (FHFA, formerly the Office of Federal Housing Enterprise Oversight) are used to measure housing appreciation.

[29] The correlation was just 0.09, which is not significantly different from zero.

Although home prices and the share of non-occupant home-purchase mortgage borrowing had only a slight tendency to move together over the 1996–2006 time period as a whole, their relationship tended to be stronger near the end of the period. This is illustrated in Figure 9, which uses the state data mentioned above to compute cross-sectional correlations between the one-year percentage change in home-prices and the share of mortgage originations for home-purchase to non-occupant borrowers.[30] The left-most (green) bar for each year displays the contemporaneous (no lags) correlation between the annual percentage change in home prices and non-occupants' share of home-purchase mortgages. The middle bar (yellow) displays correlations in which non-occupants' share of mortgages is lagged one year, and the right-most (maroon) bar displays correlations in which the price change is lagged one year. Values above 0.25 or below -0.25 are statistically significant at a 10 percent level or better. Using 10 percent as the standard, the contemporaneous correlations are insignificant or negative until 2003, but then the correlations become mostly statistically significant and positive for the final three years of the boom.[31] As a result, we find that as the housing boom progressed, the spatial correlation of home price appreciation and non-occupants' share of home purchase mortgage borrowing seemed to increase from weak or negative to moderately positive and statistically significant.[32]

V. The Spatial Pattern of Non-Occupant Mortgage Borrowing and Foreclosures

As noted earlier, foreclosure rates for non-occupant owners and owner-occupants have been similar, both nationally and at the state level, during the housing bust. However, significant variation in the extent of non-occupant borrowing and non-occupant foreclosure rates has made the impact of foreclosures on properties owned by non-occupants far from uniform across the United States. In this section, we document and analyze these regional variations.[33]

One way to measure the extent of non-occupant foreclosures is to compute the percentage of foreclosures that involve properties owned by non-occupants. Figure 10 uses LPS data for mortgages originated in 2006 to show that this percentage varies significantly across states. For example, the share of foreclosures involving non-occupant owners averages 11 percent nationwide but equals or exceeds 14 percent in two Midwestern states, four Southeastern states, and three Western states.

The share of foreclosures involving non-owner-occupied properties may be useful for some purposes, such as determining which types of foreclosure mitigation programs are needed in a given area. Nonetheless, we do not emphasize it in this study because it may distort the relative significance of non-owner-occupant foreclosures across regions. For example, in states with relatively few foreclosures overall, the incidence of foreclosures on non-owner-occupied properties could be low in an absolute sense and yet account for a high share of the state's few foreclosures. Conversely, in states with many foreclosures, non-owner-occupied properties could account for a

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[30] Here we use non-occupants' share, not the change in non-occupants' share, to focus on the relationship between the level of non-occupant activity and housing appreciation.

[31] During the boom years, the highest correlations in Figure 9 result when neither variable is lagged. The lowest correlations result when the variable for housing price appreciation is lagged, but even these are significantly positive in 2005-2006. There is also a slight asymmetry between the two correlations with lagged variables. This asymmetry is somewhat similar to Wheaton and Lee's findings on lead-lag relationships between sales and prices for total home purchases. See Wheaton and Lee (2008).

[32] See Wheaton and Nechayev (2008) for a related finding. They find that the share of non-occupant mortgage borrowing is positively correlated with errors in forecasting housing prices.

[33] A key question is whether the LPS data we use accurately capture the regional variation in non-occupant borrowing and foreclosure. Appendix 2 presents evidence that the LPS data are reliable for this purpose.

relatively low share of overall foreclosures and yet be much more common and significant than in low-foreclosure states. This is not just a hypothetical issue, in our view, for some of the non-occupant foreclosure shares in Figure 10 seem to have been materially influenced by the relatively good or bad performance of owner-occupied mortgages in certain states. For example, the map shows that the non-occupant share of foreclosures was 13 percent in New Mexico and 12 percent or less in Arizona. However, foreclosure rates on owner-occupant mortgages originated in 2006 were about three times as high in Arizona as in New Mexico. As a result, using the share of foreclosures to measure the impact of non-occupant borrowing artificially dilutes the scale of the non-occupant foreclosure problem in Arizona and, relatively speaking, exaggerates it in New Mexico.

Accordingly, we prefer to use a measure that is not affected by the extent of foreclosures among owner-occupants and reflects only the prevalence and performance of non-occupant mortgages. By *prevalence*, we mean, for a given year of origination, the number of non-occupant mortgages divided by the total number of housing units.[34] By *performance*, we mean the foreclosure rate (the number of foreclosures on non-occupant mortgages divided by the total number of non-occupant mortgages), again for a given year of origination. The product of these two factors is what we call the impact of non-occupant foreclosures, or the number of foreclosures on non-occupant mortgages divided by the total number of housing units. In other words,

Impact = Prevalence x Performance.

We make use of this relationship to show that states vary significantly not only in the overall impact of non-occupant foreclosures but also in the two factors, prevalence and performance, that determine the overall impact.

Using LPS data on annual cohorts of home-purchase and refinance mortgages, Figure 11a shows how the prevalence and performance of non-occupant mortgages evolved nationally for mortgages originated each year between 2004 and 2007. In 2004, for example, the data include 404 mortgages originated to non-occupant borrowers for every 100,000 housing units in the U.S. Of the mortgages originated to non-occupants in 2004, 4.5 percent had been foreclosed on or were in foreclosure by July 2009, the last month for which we have data. Together, the prevalence and performance of non-occupant mortgages originated in 2004 imply that there were about 18 foreclosures on non-occupant mortgages originated for every 100,000 housing units. Compared with 2004, the impact of foreclosures on non-occupant mortgages increased for loans originated in 2005 and 2006. This is partly because non-occupant mortgages became more prevalent (533 and 471 per 100,000 housing units, respectively) during this time period and also because their performance deteriorated (to foreclosure rates of 8.5 and 12.7 percent, respectively). As a result, our overall measure of impact (non-occupant foreclosures per 100,000 housing units) rose to 45.1 in 2005 and then to 59.6 in 2006, well above the overall 2004-2007 average of 37.6 foreclosures per 100,000 housing units.[35]

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[34] We analyze first-lien, home-purchases plus refinanced mortgages on single-family homes, but we omit home-improvement loans. The data on state housing units come from the American Community Surveys for the time period 2004–2007. In Appendix 5, we present an alternative measure of mortgage prevalence based on non-occupant mortgage originations as a percentage of total first-lien home-purchases plus refinanced mortgage originations in the same calendar year. Results based on this "per mortgage" measure of the prevalence of non-occupant mortgages are similar to the "per housing unit" results presented in the body of this paper, but the details of state rankings change. We focus on the per housing unit measure because it captures the broadest base for measuring the impact of non-occupant foreclosures and is not affected by state-to-state differences in the intensity of mortgage lending, as noted in a paper written by Mayer and Pence (2008).

[35] The full impact of non-owner occupied mortgages is higher than the numbers reported in this study, because the LPS data do not cover the entire mortgage market and may underestimate the share of mortgages to non-occupants. The

This can be seen in Figure 11a by noting that 2004 lies below the curved line while 2005 and 2006 lie above, for the line shows all the combinations of prevalence and performance that equate to the average national impact for non-occupant foreclosures during the time period, 2004-2007. The U.S. foreclosure impact for non-occupant mortgages originated in 2007 is 27.4 per 100,000 housing units, which is below the 2004-2007 national average. This was partly due to the housing bust, which reduced the prevalence of non-occupant mortgages sharply to 358 per 100,000 housing units.[36] Table 1 summarizes the data in Figure 11a and provides an overview of the impact of non-occupant foreclosures in 2004-07.

Table 1: Prevalence, Performance and Foreclosure Impact
of Non-Occupant Mortgages in our LPS Data, 2004-07

Year of Mortgage Origination	Performance (Percent of Non-Occupant Mortgages Foreclosed)	Prevalence (Number of Non-Occupant Mortgages per 100,000 Housing Units)	Impact (Number of Non-Occupant Mortgage Foreclosures per 100,000 Housing Units)
2004	4.5	404	18.1
2005	8.5	533	45.1
2006	12.7	471	59.6
2007	7.6	358	27.4
2004-2007	8.5	441	37.6

Figures 11b to 11e show how the relative impact of non-occupant foreclosures varied across U.S. states for the years 2004-2007, as well as how the impact outcomes were driven by the underlying prevalence and performance factors. In these figures, prevalence, performance, and impact are measured relative to national norms.[37] This means that the point 1.0 on the horizontal axis stands for a level of prevalence equal to the 2004-07 U.S. average for prevalence. Similarly, the point 1.0 on the vertical axis stands for a performance level equal to the 2004-2007 U.S. average for performance. The highest point in Figure 11b is labeled IN for Indiana, and it has an x-axis value of about 0.64. This means that Indiana's prevalence measure, non-occupant home-purchase and refinance mortgages originated in Indiana in 2004 as a fraction of total housing units in Indiana in 2004, is about 0.64 times the corresponding 2004-07 U.S. average for the prevalence of non-occupant mortgages. On the y-axis, the value for Indiana is almost 2. This means that Indiana has a foreclosure rate for non-occupant mortgages originated in 2004 that is almost 2 times higher than the corresponding 2004-2007 U.S. average. The product of these two factors for Indiana is about 1.26. This degree of relative impact means that the number of foreclosures on non-occupant

degree to which the data underestimate non-occupant foreclosures is discussed in Appendix 2, where we show that the LPS data capture 50 to 60 percent as many mortgage originations as the HMDA data and also imply a share of non-occupant mortgages in 2006 that is about 27 percent lower than in the HMDA data (10.5 percent versus 14.4 percent). In Appendix 2, we adjust our data to take account of the LPS data's limited coverage of originations. This raises our impact measures significantly. For example, the peak impact (in 2006) rises to 103.2 non-occupant foreclosures per 100,000 housing units. However, we show in the appendix that the adjusted data and the unadjusted data imply similar relative impacts across the states, and on that basis we use the unadjusted data in the body of this paper. We do not adjust for the difference in non-occupants' share of mortgage originations between the LPS and HMDA data, because we don't know which is more accurate. However, if we were to assume that the higher share implied by HMDA is correct, our impact figures would rise to 37 percent in 2006. (This increase is derived by dividing 14.4 by 10.5.) Along with our coverage adjustment, this would imply a non-occupant foreclosure impact of 141.5 per 100.000 housing units for mortgages originated in 2006.

[36] Another factor is that loans originated in 2007 have had less time to enter foreclosure than loans in the earlier years.
[37] The data for these figures appear in Table A4-1 of Appendix 4.

mortgages originated in Indiana in 2004, as a percentage of housing units in Indiana in 2004, was 26 percent higher than the corresponding national average for the period 2004-07.

When relative prevalence and relative performance are both 1.0, they multiply to create a relative impact measure of 1.0 as well. A relative impact measure of 1.0 means that non-occupant foreclosures equal the 2004-07 national average of 37.6 per 100,000 housing units. The middle of the three curves sweeping from the upper left toward the lower right in Figures 11b-11e illustrates all points for which the relative impact measure is 1.0. For any state whose dot lies above this curve, the impact of non-occupant foreclosures exceeds the 2004-07 national average impact, and vice versa for points below the curve. The lower-most and upper-most curves in the graph illustrate points where non-occupant foreclosures per housing unit (impact) are, respectively, half of and three times the 2004-07 national average. For mortgages originated in 2004, both Indiana and Nevada have impact measures that clearly exceed the 2004-07 national average. However, in most states, the impact of non-occupant mortgages originated in 2004 was at or below the 2004-07 average.

Figure 11b also tells us something about why foreclosures on non-occupant mortgages originated in 2004 are relatively important (or not) in each state. Note that Indiana suffered an above-average impact from non-occupant mortgage foreclosures because of performance problems, not an unusually high prevalence of non-occupant mortgages. On the other extreme, Nevada experienced a relatively low foreclosure rate on mortgages to non-occupant owners but had an above-average impact because non-occupant mortgages were unusually prevalent.

Figures 11c, 11d, and 11e present the same analysis but for non-occupant mortgages originated in 2005, 2006, and 2007. From 2004 to 2005, the whole distribution of impact measures shift toward the northeast, as non-occupant mortgages surged to a peak level of prevalence while also performing more poorly. In three states—Nevada, Florida, and Arizona—the impact of non-occupant foreclosures from 2005 originations reached or exceeded 3 times the 2004-07 national average. This was driven by high prevalence in Arizona and a combination of high prevalence and poor performance in Nevada and Florida. For a cluster of Midwestern states (Indiana, Michigan, Ohio, Minnesota, and Missouri), the foreclosure impact for 2005 non-occupant originations reached or exceeded the 2004-07 national average, even though this type of mortgage was not especially prevalent. However, these states have above-average impact measures due to below-average performance of non-occupant mortgages.

Very poor performance caused the foreclosure impact from non-occupant mortgages to peak in 2006 even though prevalence declined that year. Visually this shows up as a shift toward the Northwest in the distribution of impact measures. Several Midwestern states continued to experience very poor performance combined with unexceptional prevalence. Deteriorating performance combined with still high prevalence kept the impact numbers very high in Nevada, Florida, and Arizona, while additional states began to experience impact outcomes that were above the 2004-2007 national average. In the case of Hawaii, Utah, and Idaho, high impact outcomes were driven by high prevalence, while poor performance was the problem in states like Indiana, Michigan, and Ohio.

In most states, a combination of lower prevalence and better performance reduced the foreclosure impact of non-occupant mortgages originated in 2007. This is seen in a shift toward the Southwest in the distribution of impacts in Figure 11e, as compared to Figure 11d. However, the level of impact remained quite high in Nevada, Florida, and Arizona.

To provide a clearer view of the geographic patterns in non-occupant foreclosure impact and its underlying factors, Figures 12, 13, and 14 use maps to show the prevalence, performance, and impact for 2006 mortgage originations in the 50 states and the District of Columbia. Figure 12 shows that in 2006, non-occupant mortgages were relatively prevalent in the West (including Hawaii); along the mid- to lower-East Coast from Florida to New Jersey; and in Vermont. Since we have already seen that in several of these states the impact of non-occupant mortgages was not especially high, it's not surprising that Figure 13 shows relatively low non-occupant foreclosure rates in many Western and mid- and lower-East Coast states, the big exceptions being California, Nevada, and Arizona in the West and Florida and Georgia on the lower East Coast. Figure 13 also shows that foreclosure rates for non-occupant mortgages were well above-average in much of the Midwest and parts of the Northeast. Figure 14 presents the effect of prevalence and performance on the relative impact of non-occupant mortgages. States that rank high in both Figures 12 and 13, like Florida and Nevada, are also high (in red) in Figure 14. The figures printed in black indicate that the impact of non-occupant foreclosures was 752 percent of the national average in Nevada and 645 percent of the national average in Florida. The eight states with the highest impacts are all in the West or Southeast. Michigan, Indiana, Rhode Island, Minnesota, Ohio, Illinois, Missouri, and Connecticut are all above average in Figure 14 due to poor performance, or high foreclosure rates for their non-occupant mortgages.[38]

VI. Conclusion

Non-occupant home buyers make up a distinct and significant segment of the U.S. housing and mortgage markets. We show that compared to owner-occupants, non-occupant borrowers tend to have higher incomes, higher credit scores, smaller loans, and generally a lower overall risk profile. Nonetheless, the national rate of foreclosure on mortgages to non-occupants is comparable to the foreclosure rate on mortgages to owner-occupants, presumably due to non-occupants' greater willingness to use their foreclosure option when the value of housing falls. We also show that, the share of non-occupants borrowing to buy homes was positively correlated with increases in housing prices during the final years of the housing boom.

Lastly, we document that the prevalence and performance of non-occupant mortgages varies significantly by state, leading to significant differences in the overall impact of non-occupant foreclosures in local housing markets. In Michigan, Indiana, and some other Midwestern and Northeastern states, the overall incidence of non-occupant foreclosures exceeds the national average mainly due to the poor performance of non-occupant mortgages. By contrast, in Idaho and some other Western states, the relatively high incidence of non-occupant foreclosures is primarily driven by the relatively high prevalence of non-occupant mortgages. The states that experienced the highest impact from foreclosures on properties owned by non-occupants (Florida, Nevada and Arizona) exhibit both relatively poor performance and relatively high prevalence of non-occupant mortgages.

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[38] Maps covering mortgages originated in 2004, 2005, and 2007 are presented in Appendices Four.

Figure 1

Two Facets of the Housing Cycle
(Housing Prices and Mortgages to Non-Occupants)
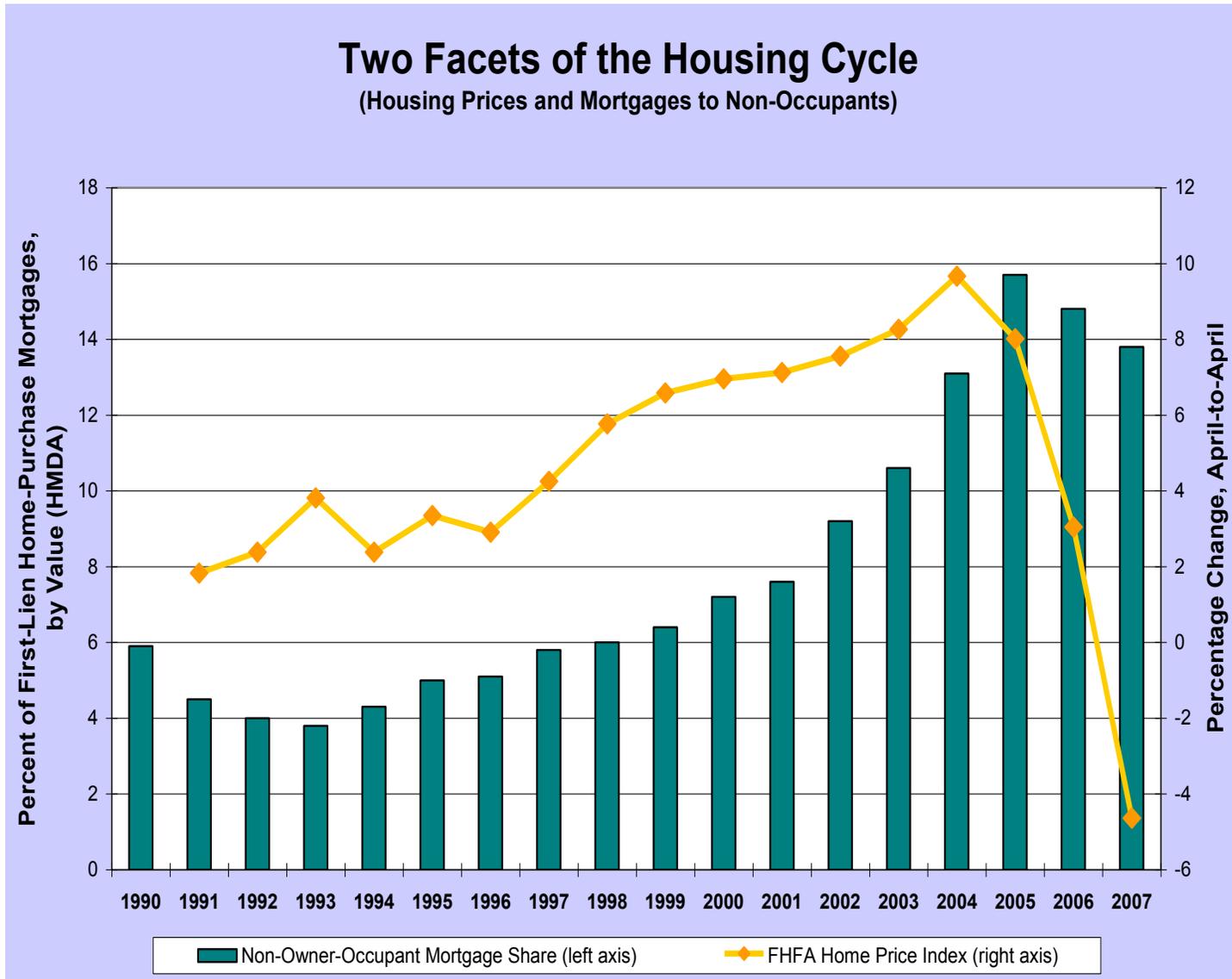
Figure 2: Distributions Across States of the Median Income of Owner-Occupant and Non-Owner-Occupant Mortgage Borrowers, by Loan Purpose and Year of Origination (HMDA)

Median Borrower Income by Occupancy (Home Purchase)
(Box-Whisker Distribution over U.S. States, 2004-07)

(Each box covers the 25th to 75th percentile; the line in the box is the median.)

Median Borrower Income by Occupancy (Refinance)
(Box-Whisker Distribution over U.S. States, 2004-07)

(From HMDA data; each box covers the 25th to 75th percentile; the line in the box is the median.)
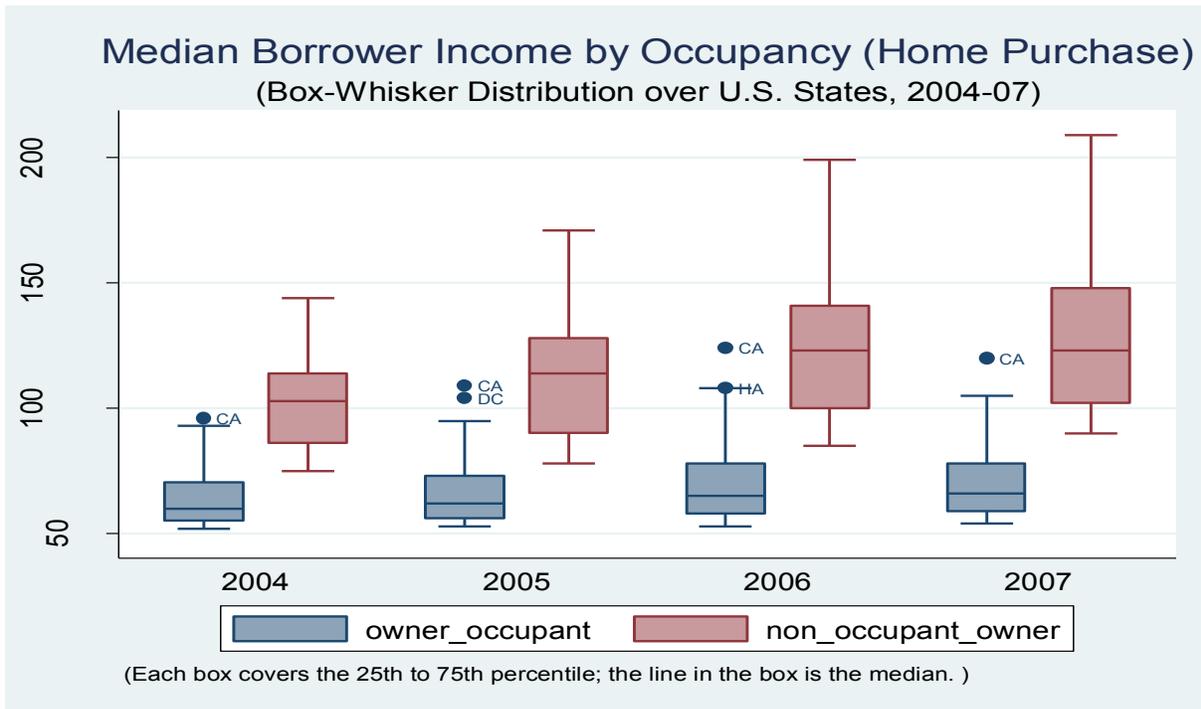
[Note: The data are median applicant income for each state and the District of Columbia, segregated by occupancy. The line in each box is the median of the distribution of median incomes across the 50 states and the District of Columbia. Each box covers the inter-quartile range (25th percentile to the 75th percentile) of the distribution. The "whiskers" extend beyond the box either to the end of the distribution or to a length of 1.5 times the inter-quartile range, whichever comes first. Dots beyond the whiskers identify extreme outlier jurisdictions.]

Figure 3a: Distribution Across States of the Mean FICO Score of Owner-Occupant and Non-Owner-Occupant Mortgage Borrowers, by Year of Origination (LPS)

FICO Score Distributions by Type of Owner
(Box-Whisker Distribution over U.S. States, 2004-07)

(From LPS data. Each box covers the 25th to 75th percentile; the line in the box is the median.)
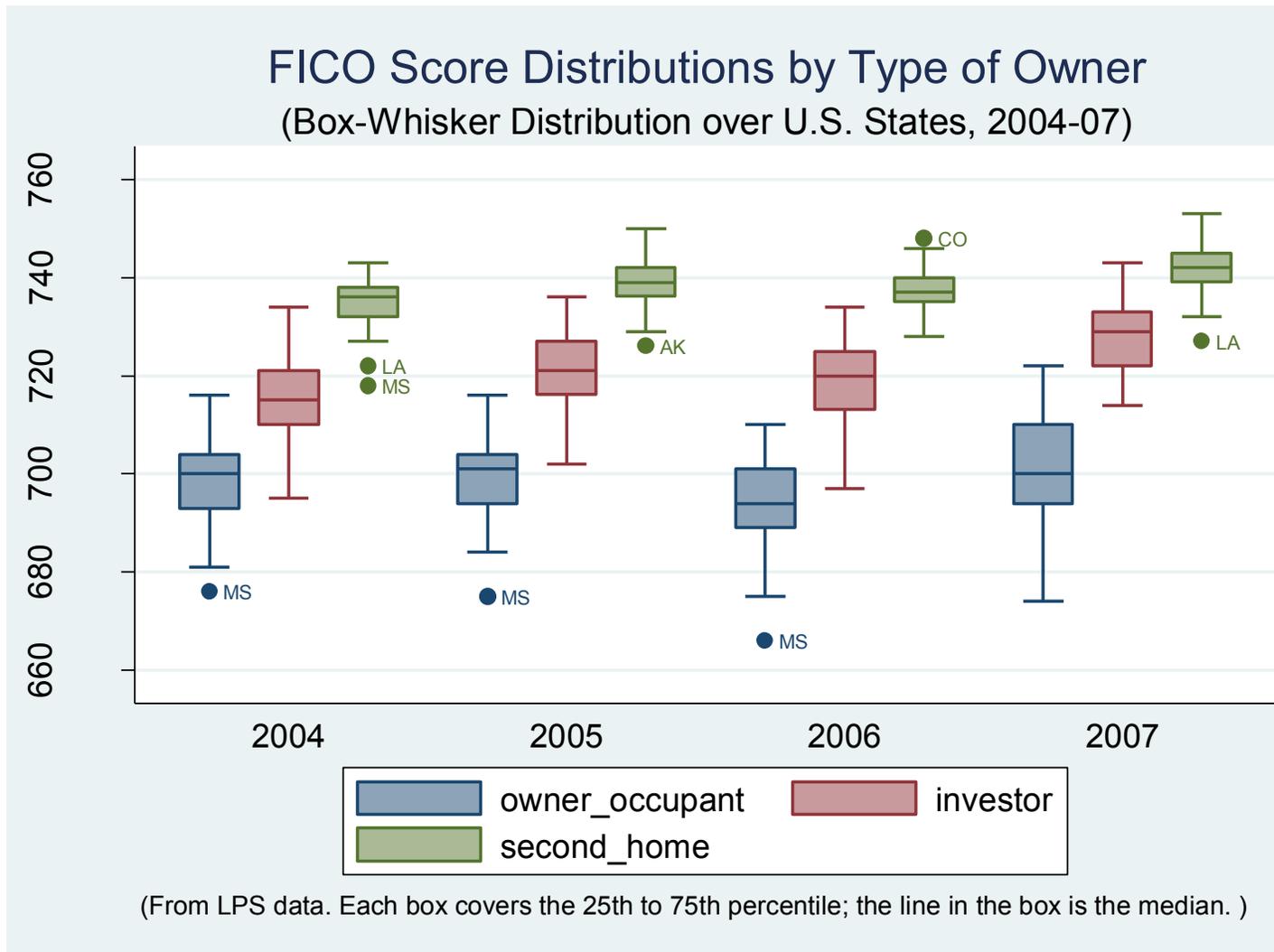
[Note: The data are mean FICO scores for each state and the District of Columbia, segregated by occupancy. Loans whose loan-to-value ratio exceeded 400 were dropped.]

Figure 3b: Distribution Across States of Loan-to-Value Ratios for Owner-Occupant and Non-Owner-Occupant Mortgage Borrowers, by Year of Origination (LPS)
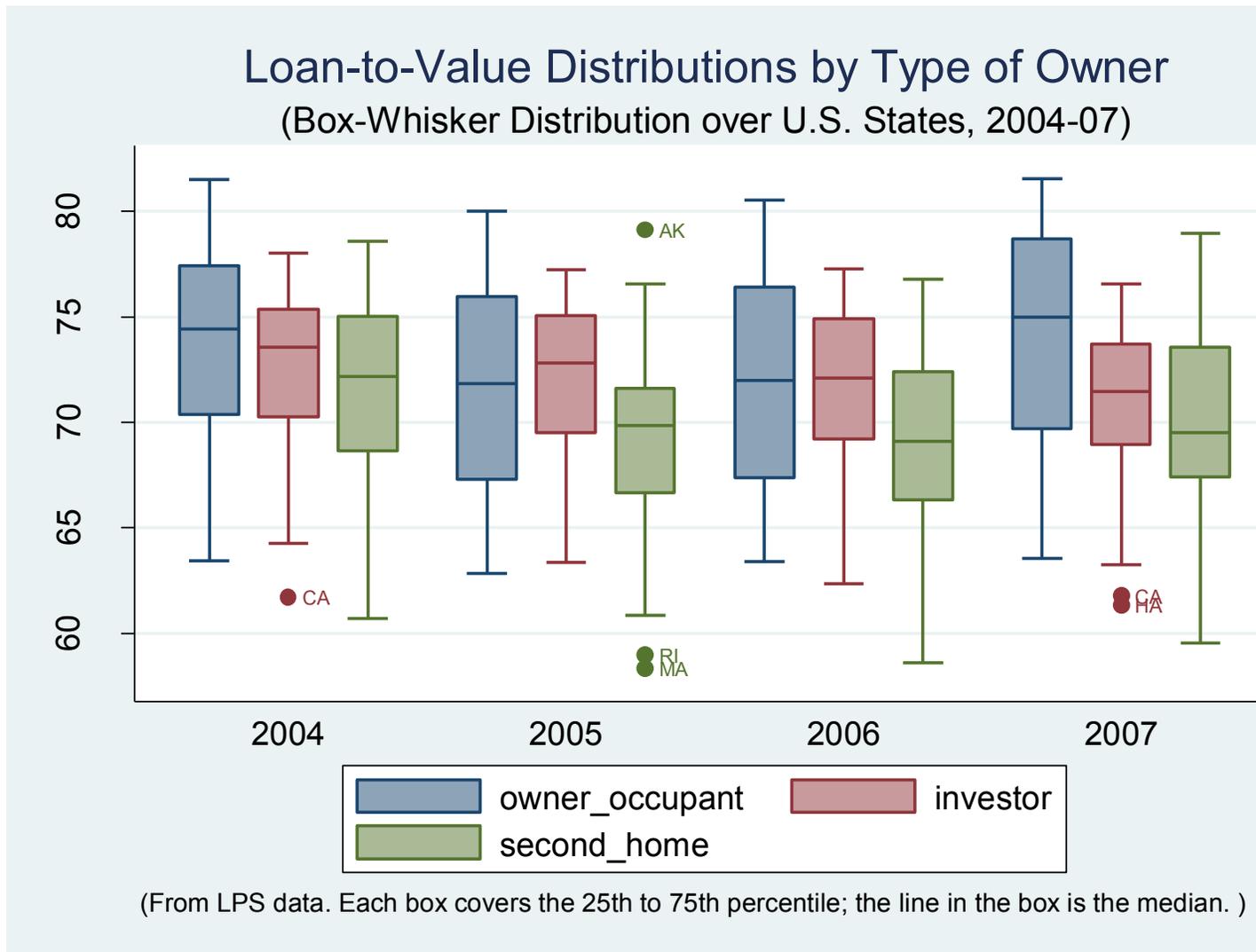
Note: Loan-to-value ratios here are computed as the original principal of the mortgage divided by the most recently available appraised value of the mortgaged property. Loans whose loan-to-value ratio exceeded 400 were dropped.

Figure 3c: Distribution Across States of Debt-to-Income Ratios of Owner-Occupant and Non-Owner-Occupant Mortgage Borrowers, by Year of Origination (LPS)

Debt to Income Distributions by Type of Owner
(Box-Whisker Distribution over U.S. States, 2004-07)

(From LPS data. Each box covers the 25th to 75th percentile; the line in the box is the median.)

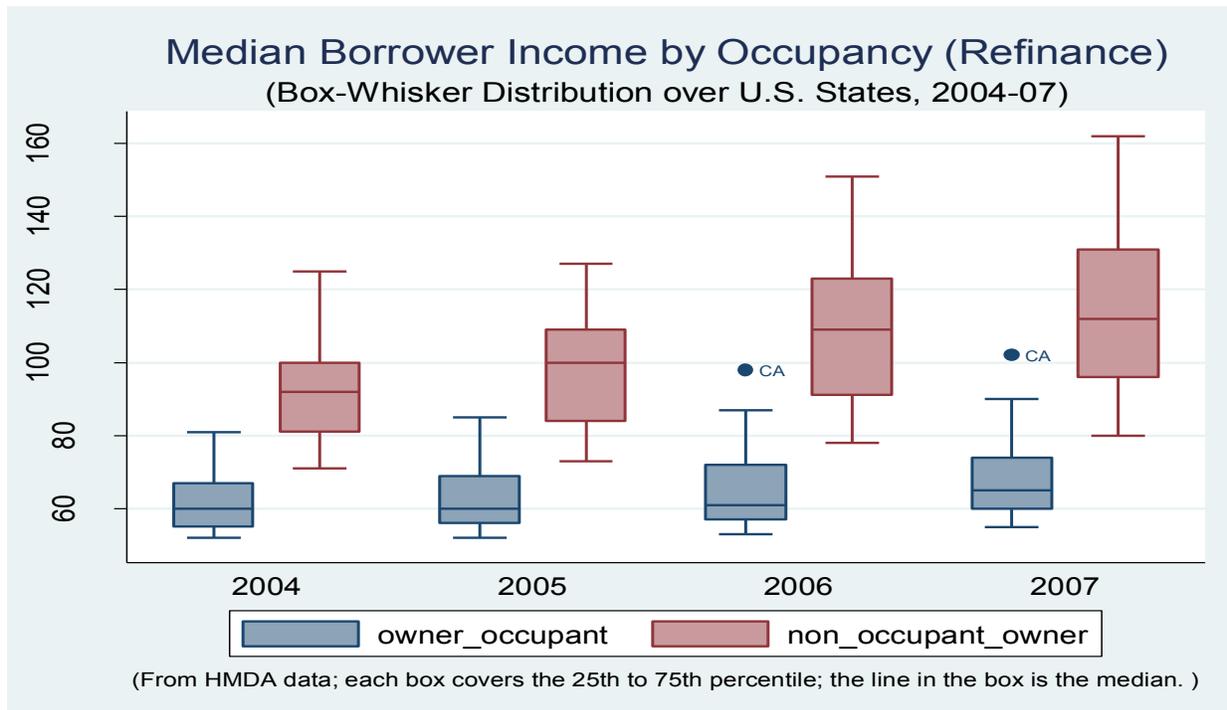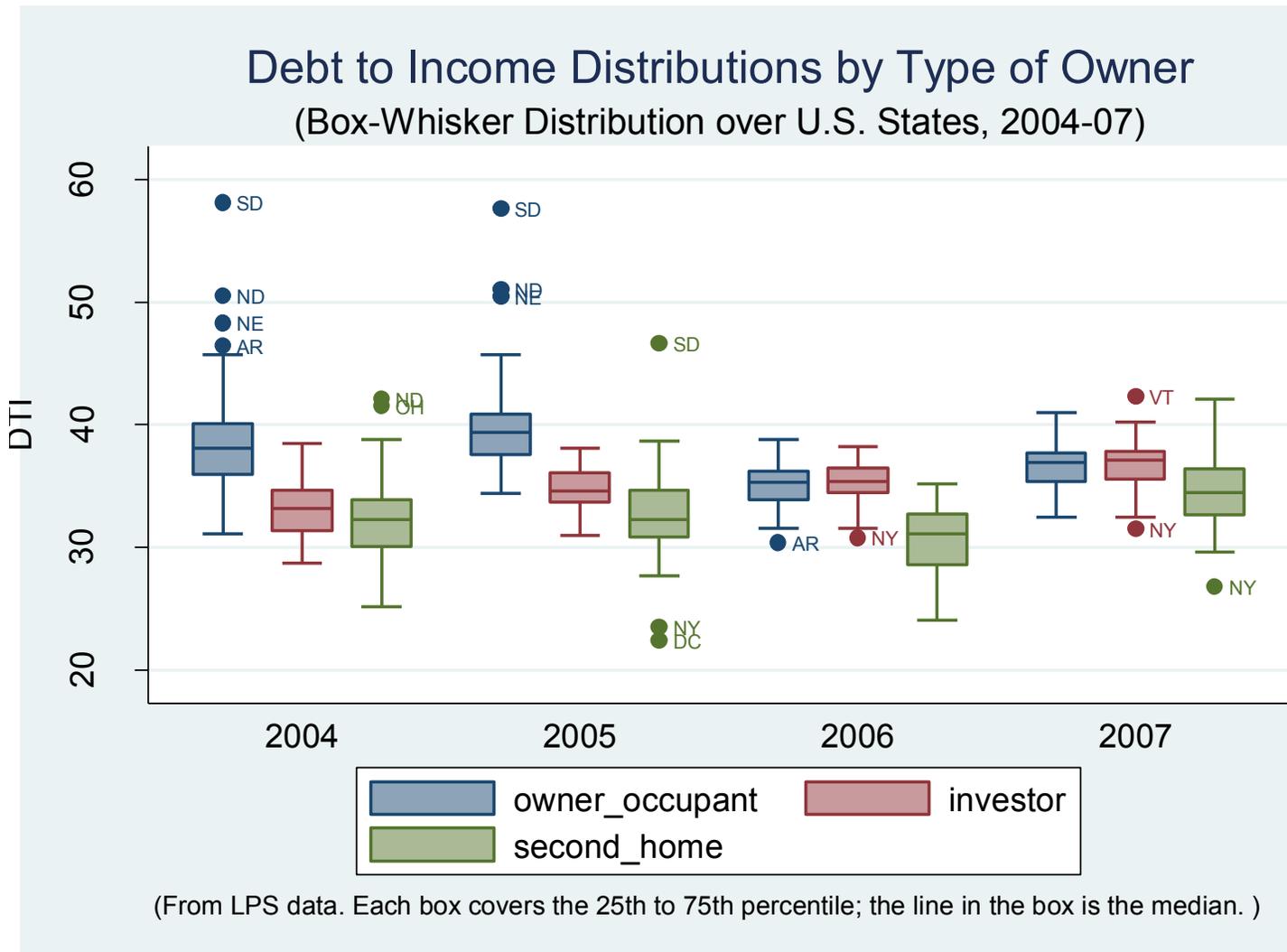Note: Loans whose loan-to-value ratio exceeded 400 were dropped.

Figure 4: Distribution Across States of the Median Amount of Owner-Occupant and Non-Owner-Occupant Mortgages, by Loan Purpose and Year of Origination (HMDA)

Median Mortgage Amount by Occupancy (Home Purchase)
(Box-Whisker Distribution over U.S. States, 2004-07)

(From HMDA data; each box covers the 25th to 75th percentile; the line in the box is the median.)

Median Mortgage Amount by Occupancy (Refinance)
(Box-Whisker Distribution over U.S. States, 2004-07)

(From HMDA data; each box covers the 25th to 75th percentile; the line in the box is the median.)
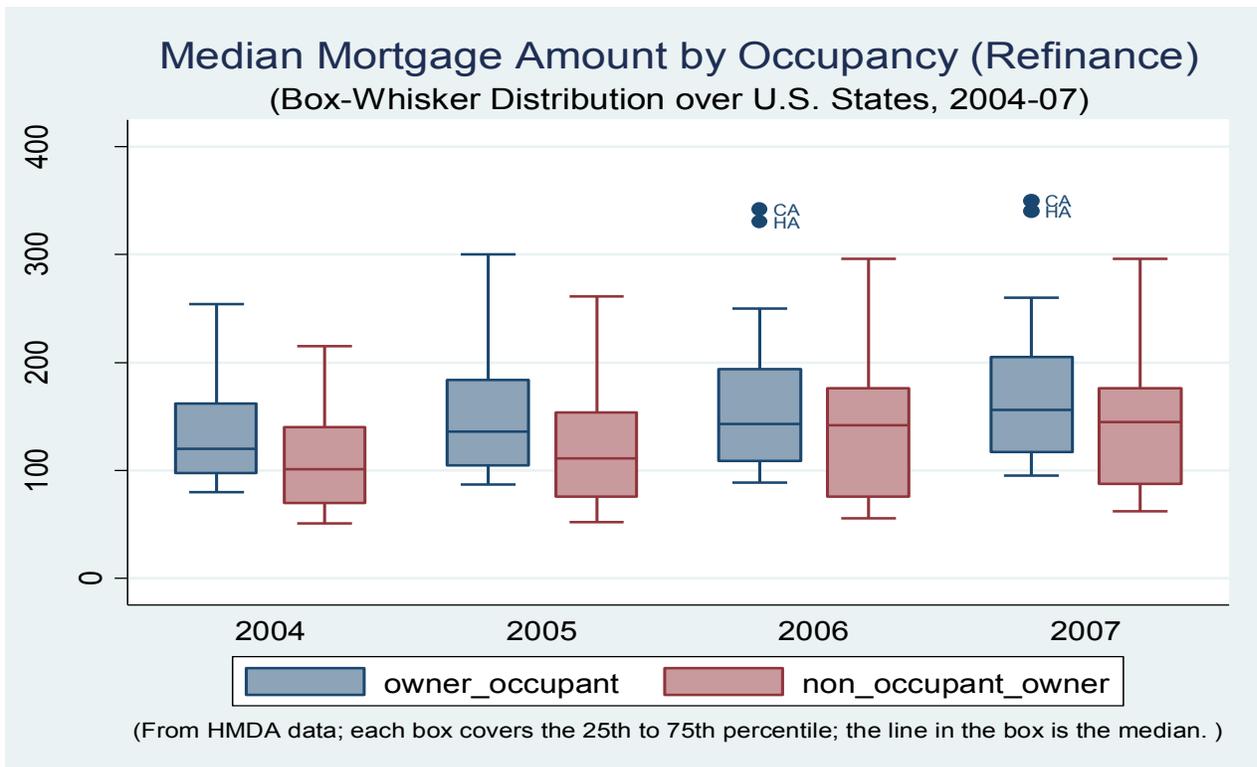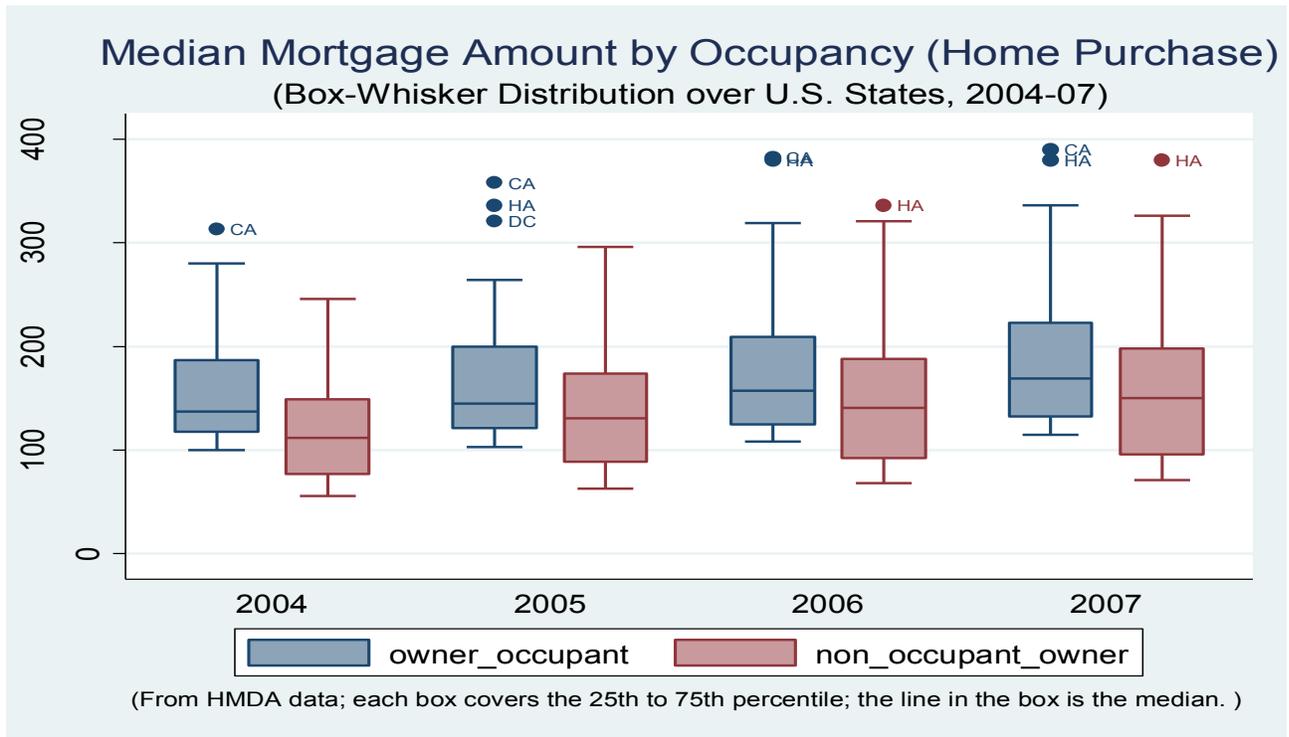
[Note: The data are median mortgage amount for each state and the District of Columbia, segregated by occupancy.]

Figure 5: A Cross-State Comparison of Foreclosure Rates on Non-Owner-Occupied and Owner-Occupied Mortgages, by Year of Origination (2004-2007)

Figure 6

Home Sales by Use, 2003-07
(from the National Assn. of Realtors)

Figure 7

Home-Purchase Mortgage Originations by Occupancy
(HMDA data on number of originations)

Figure 8

Relative Change in House Prices and Non-Occupant Share of Mortgages
HMDA Purchase Mortgages and FHFA Housing Price Index, 1996-2006

% Change in Housing Prices 1996-2006

Figure 9

Cross-State Correlations Between Non-Occupants' Share of Home-Purchase Mortgage Originations and Annual Percentage Changes in Housing Prices, 1997-2006

Legend: No Lags | Mortgage Share Lagged 1 Year | Price Change Lagged 1 Year

Figure 10: Share of Foreclosure That Involve Non-Owner-Occupied Properties (LPS data for mortgages originated in 2006)
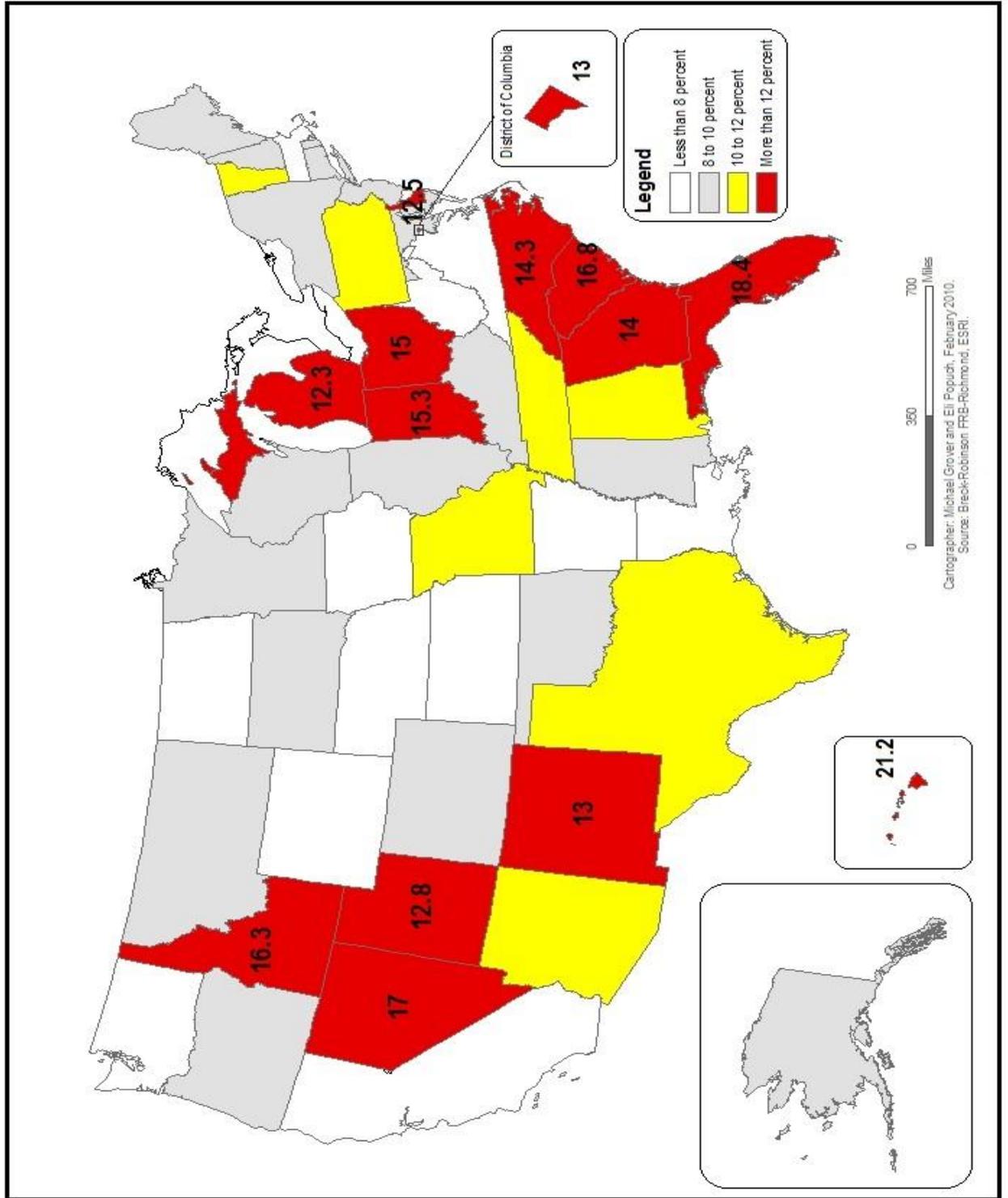
Figure 11a: National Prevalence and Performance of Non-Occupant Mortgages,
by Year of Origination, 2004-2007

U.S. Non-Occupant Mortgage and Foreclosure Impact
2004-07 Home Purchase and Refi Originations (LPS)

Prevalence (Non-Occupant Mortgages per 100,000 Housing Units)

2004-07 Natl. Avg.= 37.6 foreclosures per 100,000 housing units

Figures 11b, c, d, and e: The Relative Impact (per Housing Unit) of Non-Occupant Foreclosures, by States and Underlying Factors, for Mortgages Originated in 2004, 2005, 2006, and 2007

Relative Non-Occupant Foreclosure Impact per Housing Unit
2004 Home Purchase and Refinance Originations (LPS)

Relative Non-Occupant Foreclosure Impact per Housing Unit
2005 Home Purchase and Refinance Originations (LPS)

Relative Non-Occupant Foreclosure Impact per Housing Unit
2006 Home Purchase and Refinance Originations (LPS)

Relative Non-Occupant Mortgage Prevalence (U.S.=1)

Relative Non-Occupant Foreclosure Impact per Housing Unit
2007 Home Purchase and Refinance Originations (LPS)

Relative Non-Occupant Mortgage Prevalence (U.S.=1)

Note: Middle line represents an impact equal to the LPS data 2004-07 national average of 37.6 non-occupant foreclosures per 100,000 housing units. The lower and upper lines represent impacts of, respectively, half and three times that national average impact.

Figure 12: Non-Owner-Occupied Mortgage Prevalence per Housing Unit, Relative to 2004-2007
U.S. Average (LPS data for mortgages originated in 2006)

Figure 13: Non-Owner-Occupied Mortgage Foreclosure Rates, Relative to 2004-2007 U.S. Average
(LPS data for mortgages originated in 2006)

Index of Performance of Non-Owner Occupied Mortgages, 2006

Figure 14: Non-Owner-Occupied Mortgage Foreclosure Impact per Housing Unit, Relative to U.S. 2004-2007 Average (LPS data for mortgages originated in 2006)
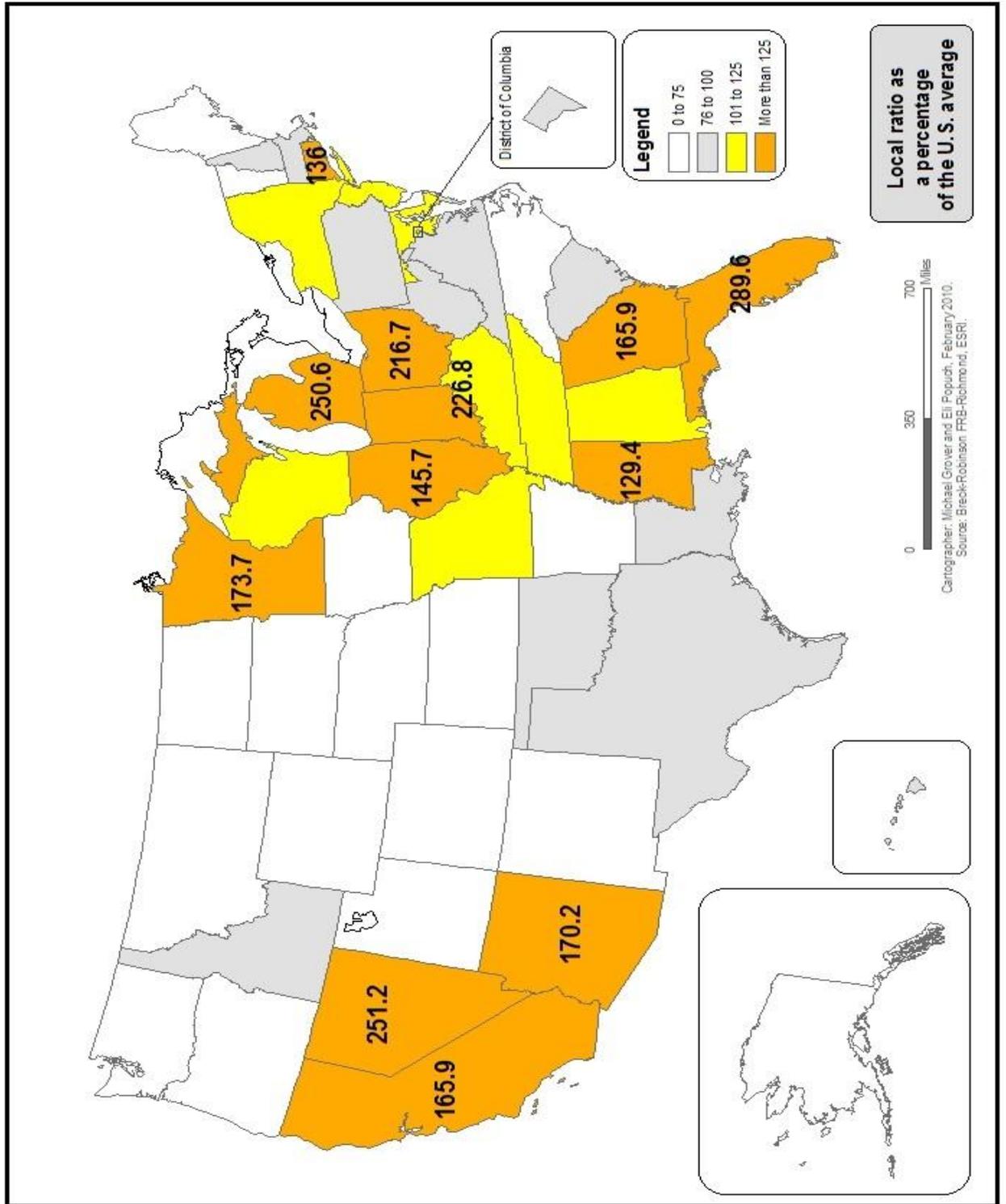
References

Apgar, William C., and Shekar Narasimhan (2008). "Capital for Small Rental Properties: Preserving a Vital Housing Resource." Chapter 8 in: *Revisiting Rental Housing: Policies, Programs, and Priorities*, ed. Nicolas P. Retsinas and Eric S. Belsky. Brookings Institution Press, Washington, DC.

Avery, Robert B., Kenneth P. Brevoort, and Glenn B. Canner (2007). "The 2006 HMDA Data." *The Federal Reserve Bulletin* 93(Dec.): A73–A109.

—— (2009). "Geographic Patterns in Mortgage Loan Performance." Unpublished working paper, Board of Governors of the Federal Reserve System.

Bajari, Patrick, Chenghuan Sean Chu, and Minjung Park (2008). "An Empirical Model of Subprime Mortgage Default from 2000 to 2007." NBER Working Paper 14625. National Bureau of Economic Research.

Benjamin, John D., Peter Chinloy, William G. Hardin III, and Zhonghua Wu (2008). "Clientele Effects and Condo Conversions." *Real Estate Economics* 36(3): 611–634.

Coulton, Claudia, Tsui Chan, Michael Schramm, and Kristen Mikelbank (2008). *Pathways to Foreclosure: A Longitudinal Study of Mortgage Loans, Cleveland and Cuyahoga County, 2005–2008.* Report of the Center on Urban Poverty and Community Development, Mandel School of Applied Social Sciences (June). Case Western Reserve University, Cleveland, OH.

Cowan, Adrian M., and Charles D. Cowan (2004). "Default Correlation: An Empirical Investigation of a Subprime Lender." *Journal of Banking and Finance* 28: 753–771.

Gerardi, Kristopher, Adam Shapiro, and Paul Willen (2008). "Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures." Working Paper 07-15 (May 4, 2008, version). Federal Reserve Bank of Boston.

Haughwout, Andrew, Richard Peach, and Joseph Tracy (2008). "Juvenile Delinquent Mortgages: Bad Credit or Bad Economy?" Staff Report 341 (August). Federal Reserve Bank of New York.

Immergluck, Dan, and Geoff Smith (2004). *Risky Business—An Econometric Analysis of the Relationship Between Subprime Lending and Neighborhood Foreclosures.* Woodstock Institute, Chicago.

Mayer, Chris, and Karen Pence (2008). "Subprime Mortgages: What, Where, and to Whom?" Finance and Economics Discussion Series paper 2008-29. Board of Governors of the Federal Reserve System.

McCormick, Erin, and Carolyn Said (2007). "Investors Own About One-Fifth of Bay Area Homes in Foreclosure." *San Francisco Chronicle* (Dec. 16).

Qi, Min, and Xialong Yang (2007). "Loss Given Default of High Loan-to-Value Residential Mortgages." Economics and Policy Analysis Working Paper 2007-4 (August). Office of the Comptroller of the Currency, U.S. Treasury.

Todd, R.M. (2010). "Foreclosures on Non-Owner-Occupied Properties in Ohio's Cuyahoga County: Evidence from Mortgages Originated in 2005-2006." Community Affairs Research Report 2010-2. Federal Reserve Bank of Minneapolis.

Wheaton, William C., and Nai Jia Lee (2008). "Do Housing Sales Drive Prices or the Converse?" Working Paper 08-01 (Jan. 28). Department of Economics, Massachusetts Institute of Technology, Cambridge.

Appendix 1: A simple theory of investor mortgage default

The mortgage payment decision for both non-occupants and owner-occupants is affected by the option to default on the mortgage. We modify the model presented in Gerardi, Shapiro, and Willen (2008) by assuming that non-occupants ("investors") are purely profit-maximizers. Our model is a simple, two-period analysis. In period zero, the non-occupant owner owns the property and has financed it with an interest-only mortgage.[39] In period one, the mortgage is due. Refinancing the mortgage is not an available option in the model. As a result, the owner in period zero has the option of making the mortgage payment and keeping the property, selling the property to pay off the mortgage, or defaulting on the mortgage. The payoff structure under each scenario can be written as follows:

Option 1: Pay the mortgage in period 0; sell the property in period 1.

$$\pi_0 = \rho - r_M U$$

$$\pi_1 = (H_1 - U)^+,$$

where π_0 is profit in period zero, π_1 is profit in period one, ρ is net rental income, r_M is the mortgage interest rate, U is the unpaid balance on the investor's interest-only mortgage, H_1 is the price of the house in period one, and $(H_1 - U)^+$ means either $(H_1 - U)$ or zero, whichever is greater.[40] This last term reflects the fact that, in period one, the investor will sell the house and pay off the mortgage if $H_1 \geq U$ but will simply default if not.

Option 2: Sell the property in period 0.

$$\pi_0 = H_0 - U$$

$$\pi_1 = 0,$$

where H_0 is the price of the house in period zero.

Option 3: Default on the mortgage in period 0.

$$\pi 0 = \pi 1 = 0.$$

Options 2 and 3 can be combined into a single "Don't keep the property" option in which $\pi_0 = (H_0 - U)^+$ and $\pi_1 = 0$. Then the entire investor decision in this simple framework boils down to keeping the property (making the period one mortgage payment) if

$$\rho + \{[1/(1+r)](H_1 - U)^+ - (H_0 - U)^+\} \geq r_M U,$$

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[39] Before purchasing the property, and in particular before making the down payment, the investor would analyze capital gains by comparing future property values to the purchase price (albeit while also recognizing that potential losses are limited to the down payment). Thereafter, as in the analysis presented here, the mortgage default option leads the investor to analyze capital gains by comparing the future value of the property to the unpaid balance on the mortgage instead of the current value of the property.

[40] We parallel Gerardi, Shapiro, and Willen (2008) also in assuming that housing prices in both periods are known in period zero. As they note, allowing the period one housing price to be unknown as of period zero would mean that both the expected value and the variance of the period one housing price would affect the investor's decision.

where r is the interest rate at which the investor discounts period one profits. The first term on the left is period-zero net rental income. The bracketed term on the left is the present value of expected capital gains from future sale, taking into account the value of the option to default today or tomorrow. The term on the right is the period-zero interest payment on the mortgage.

Appendix 2: Comparing the LPS Mortgage Data to Some Alternatives

We rely heavily on LPS's data that are reported by a group of large mortgages servicers. Here we assess and adjust for how the LPS data differ from other national and local data on mortgages, focusing on first-lien mortgages originated in 2004–2007 for the purposes of either home purchase or mortgage refinance.[41]

Compared to the HMDA data, the LPS data cover about 50 percent of the mortgages originated in 2004 and about 60 percent of those originated in 2005-07.[42] This coverage difference implies that our prevalence and foreclosure impact measures for non-occupant mortgages underestimate the actual levels of prevalence and impact. We provide adjustments that scale up our LPS measures to more realistic levels, and we show that these adjustments do not greatly alter the relative regional distributions of prevalence, performance, and impact discussed in the body of the paper. Similarly, we find that the share of mortgages made to non-occupant owners is lower in the LPS data than in the HMDA data. We show that this difference is fairly uniform across states and should have a minor effect on the relative regional patterns discussed in the body of the paper. Finally, we benchmark the LPS data for selected ZIP-code areas against local records on non-owner-occupied mortgages and foreclosures and again find a high spatial correlation. We conclude that the LPS data are likely to undercount the extent of non-owner-occupant home buying, mortgage borrowing, and mortgage foreclosures, but this undercounting appears to be relatively uniform across the country. As a result, we assert that the LPS data correctly identifies significant regional patterns in non-occupant mortgage prevalence, performance, and impact.

Figure A2-1 documents that the LPS data cover fewer mortgages than the HMDA data. The figure compares the total number of mortgage originations[43] in the LPS data with the total number of mortgage originations reported under HMDA for each state by year of origination for the period 2004-2007. LPS's coverage is highest for the most recent year, probably in part because the market share of the servicers reporting to LPS has increased. For 2004, Figure A2-1 shows that mortgage originations in the LPS database are nearly half of the total number of HMDA originations in a typical state, where the fraction of mortgage originations falls within the range of 0.30 to 0.62.[44] For home-purchase mortgages originated in 2005-07, LPS's coverage rises to about 60 percent of the HMDA originations in a typical state, but the fraction falls into the high 30s in some states, while rising to about 80 percent in others.

LPS's incomplete coverage of the mortgage market depresses our estimates of the prevalence and foreclosure impact of non-occupant mortgages. In this appendix, we created adjusted estimates by inflating each state's annual LPS data by the state's ratio of HMDA to LPS originations for that year. For example, in Alabama in 2006, the number of mortgage originations reported by LPS was

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[41] We also limit our comparisons to mortgages for which LPS reports that the borrower is an owner-occupant, a second-home owner, or an investor. We omit LPS mortgages for which the occupancy status of the borrower is not known to be one of these three types.

[42] Some of the LPS-HMDA gap arises because LPS obtains its data from mortgage servicers whose collective market share is less than 100 percent of the total market for mortgage originations. It also reflects our omission of LPS mortgages with unknown owner occupancy type.

[43] In the comparison of the LPS and HMDA data in this appendix, we use "mortgage" to refer to loans made to purchase a house or refinance an existing mortgage but exclude home improvement loans.

[44] Differences among the states can arise because of regional variations in the speed with which mortgages are paid off or are foreclosed as well as regional variations in the coverage of both the LPS and HMDA data. The collective market share of the mortgage servicers that provide data to LPS may vary regionally, and HMDA's coverage can be spotty to varying degrees in rural areas, for example.

about 56.1 percent of the corresponding figure from HMDA. Thus, for our adjusted estimates, we scale the LPS mortgage data for Alabama for 2006 by 1.78 (the inverse of 0.561) and make corresponding adjustments for the other states and years. These adjustments significantly raise the level of all of our prevalence-per-housing-unit and impact-per-housing-unit measures.[45] For example, the peak national non-occupant foreclosure impact based on just the LPS data was 59.6 non-occupant foreclosures per 100,000 housing units, for mortgages originated in 2006 (as discussed in conjunction with Figure 11 above.). After scaling up the LPS data, we compute that the impact measure is 73 percent higher, or 103.2 non-occupant foreclosures per 100,000 housing units for mortgages originated in 2006.

It is obvious that scaling up the LPS mortgage data to match HMDA's state-by-state total of mortgage originations significantly raises the level of our per-housing-unit prevalence and foreclosure impact measures. However, we find that it does not greatly change the cross-state spatial distribution of prevalence and impact that was discussed above in conjunction with Figures 11, 12, and 14. For example, across the 50 states and the District of Columbia in the year of peak impact (2006), the correlation coefficient for the unadjusted and adjusted impact measures is 0.99. The general similarity in regional patterns can be seen by comparing the adjusted data shown in Figures A2-2a through A2-2d with the unadjusted data shown in Figures 11b through 11e. Finally, Table A2-1 provides a complete listing of our adjusted measures for 2004-2007 originations, for comparison with the unadjusted data presented in Table A4-1 below. Although the two tables differ in detail, states that rank high (low) in the unadjusted data also rank high (low) in the adjusted data.

The LPS data also show a lower share of mortgages to non-occupants, compared to the HMDA data. In the LPS data, the percentage of mortgages to non-occupants was about 10 percent in 2004-2006, or about three to four percentage points less than the corresponding shares computed from HMDA originations.[46] It is not clear whether the LPS or HMDA fraction is more accurate, as both are subject to misreporting and less than complete coverage. For that reason, we make no detailed adjustments for this difference. However, if we were to assume that the HMDA figures are correct, then the low share of non-occupants in the LPS data would imply about a 25 percent underestimate of the prevalence and foreclosure impact of mortgages to non-occupant owners.

Although the share of mortgages to non-occupants could be biased downward in the LPS data, it seems to vary among the states much like the corresponding HMDA shares. Figures A2-3a to A2-3d compare LPS and HMDA data for 2004-07 across states with regard to the share of mortgages (home-purchase and refinance) to non-occupant owners. The percentages are generally lower in the LPS data, as discussed above and as indicated by the fact that most of the points in these figures are on or near the 45-degree line, which depicts equal shares between the two data sets. Nonetheless, the LPS and HMDA shares generally move together, so that states that are relatively high by one measure are also relatively high according to the other. This is confirmed by high statistical correlations—0.87 for 2004, 0.91 for 2005, 0.88 for 2006, and 0.83 for 2007—between the two measures of the share of mortgages to non-owner occupants. Overall, we find that the relative regional patterns for non-occupant mortgages and foreclosures are similar in the LPS and HMDA data.

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[45] All of our performance measures and the per-mortgage measures of prevalence and impact that are found in Appendix 5 are only slightly affected, because the adjustment affects the numerators and denominators by similar amounts.

[46] More precisely, the LPS data put the non-occupant share of home-purchase plus refinance originations at 8.7 percent in 2004, 10.2 percent in 2005, 10.5 percent in 2006, and 10.3 percent in 2007. The corresponding shares based on HMDA originations are 11.9, 13.5, 14.4, and 14.1 percent, respectively.

We have also compared the LPS data at the ZIP-code level with data from local property records in Ohio and Minnesota. Our most extensive ZIP-level comparison involves 49 ZIP Code areas in Cuyahoga County, Ohio, where we obtained local data on mortgages originated in 2005 and 2006 from Michael Schramm of Case Western Reserve University.[47] The Case Western data are estimated to cover about 68 percent of all local originations. LPS's coverage is again lower; the number of mortgages in the LPS data equals about 55 percent of the number of mortgages in the Case Western data for 2005 and about 61 percent for 2006. Despite this difference in coverage, the share of mortgages to non-occupants in the LPS data for these ZIP Codes matches fairly well with the share computed from the Case Western data. Among mortgages originated in 2005 in the 49 ZIP Code areas, the LPS data show an 11.5 percent non-occupant share, compared to a 13.2 percent share in the Case Western data. For 2006, the share computed from the LPS data is 14.5 percent, slightly lower than the 14.8 percent share computed from the Case Western data.

As shown in Table A2-2, the Case Western data imply somewhat lower foreclosure rates than what we find in the LPS data. These differences partly reflect the time periods involved. The Case Western data tabulate whether a mortgage has had any foreclosure notice between its origination date and April 2008. The LPS data tabulate whether a mortgage has been in the foreclosure process ("pre-sale" status) between origination and July 2009, or 15 months longer than the period tracked by Case Western. Note that both data sources imply that the rate of foreclosure on non-owner-occupied mortgages was about 1.7 to over 3 times higher than on owner-occupied mortgages.

Despite their different levels of foreclosure, the two sources agree on how lending and foreclosure rates varied among the 49 ZIP Codes, as shown in Table A2-3.[48] This reinforces the conclusion that the LPS data provides reliable information about the spatial pattern of non-occupant borrowing and foreclosure.

We also compared the LPS data to local records for two ZIP Codes in Ramsey County, Minnesota, which includes the city of St. Paul. Minnesota provides special property tax relief to owner-occupants. To receive the credit, owner-occupants must file for the state's homestead credit. County records show which properties are on file as owner-occupied homesteads. Through a labor-intensive process, staff at the Federal Reserve Bank of Minneapolis pulled mortgage records for samples of both homesteaded and non-homesteaded single-family residences in ZIP Code areas 55106 and 55109.[49] As a result, we can estimate the number of single-family homes in these ZIP Codes that had active mortgages in early 2008. Furthermore, we can estimate the percentage of these mortgaged single-family homes that were non-homesteaded, which serves as an estimate of the percentage of mortgaged single-family homes owned by non-occupants.

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[47] As before, these mortgage data are for loans made to purchase a house or refinance an existing mortgage and exclude home improvement loans. Collection of the Cuyahoga County data is described in Coulton, Chan, Schramm, and Mikelbank (2008). Using the same data for the years 2005-2006, Todd (2010) shows a pattern of relatively high prevalence, poor performance, and high foreclosure impact associated with mortgages by non-local banks to non-owner occupants in low-income, minority neighborhoods with low housing values.

[48] In both 2005 and 2006, one ZIP Code had no non-owner-occupied mortgages and was thus omitted when the correlation for foreclosure rates was computed. For 2005, the LPS data had no non-owner-occupied mortgages in ZIP Code area 44114, and in 2006 the Case Western data had none in ZIP Code area 44115.

[49] ZIP Code area 55106 covers much of St. Paul's "East Side", an inner-city low- to moderate-income area that has recently experienced a high level of foreclosure. ZIP Code area 55109 covers some moderate- to medium-income inner-ring suburbs on the northern and eastern edges of St. Paul.

Using these estimates, we find that the share of mortgages to non-occupant owners computed from Ramsey county property records is close to the share computed from the LPS data for our two ZIP Code areas. We estimate that 80 percent of the single-family homes in the ZIP Code area 55106 had active mortgages in early 2008 and that 10.2 percent of them were not homesteaded. Given that we sampled 10 percent of the single-family property records for this ZIP Code, a 95 percent confidence interval would state that the percentage of active mortgages to non-occupants falls in the range of 6.2 to 14.2 percent. The LPS data on 2004-2006 originations imply that 13.1 percent of active mortgages in ZIP Code area 55106 were to non-occupant owners as of March 2008. This percentage is higher than what the property records imply but within the 95 percent confidence interval. In ZIP Code area 55109, about 76 percent of the single-family properties we sampled had an active mortgage in early 2008, and just 3.6 percent of these mortgages were on non-homesteaded properties. In the LPS data, 4.2 percent of the active mortgages in ZIP Code area 55109 are to non-occupants, a figure which is again higher than what we estimate from property records but within the 95 percent confidence interval. These two Minnesota ZIP Code areas provide a bit more evidence that our LPS data reflect actual regional differences in lending to non-owner-occupants as well as, perhaps, the actual share of this form of lending.

Table A2-1: Adjusted Indices of Non-Occupant Mortgage Performance, Prevalence, and Impact

Adjusted Indices of the Relative Performance, Prevalence, and Impact of Non-Owner-Occupied (NOO) Mortgages and Foreclosures, by State and Year Mortgage Was Originated (based on LPS data scaled up to each state's number of HMDA originations)

State	Performance Index* (Foreclosures per mortgage, for NOO mortgages, by year of origination, as a percentage of the 2004-07 national average)				Prevalence Index (Mortgages per housing unit, for NOO mortgages, by year of origination, as a percentage of the 2004-07 national average)				Impact Index (NOO foreclosures per housing unit, by year of origination, as a percentage of the 2004-07 national average)			
	2004	2005	2006	2007	2004	2005	2006	2007	2004	2005	2006	2007
AL	68	88	103	61	61	68	74	63	42	60	77	39
AK	30	48	74	32	66	67	56	48	20	32	41	15
AZ	24	99	170	136	243	334	221	149	57	331	376	203
AR	33	44	70	44	48	55	54	50	16	24	38	22
CA	28	100	166	94	153	155	108	83	43	156	179	77
CO	42	62	74	42	148	147	132	124	63	91	98	52
CT	42	81	136	65	73	77	61	46	30	62	83	30
DE	18	40	74	34	192	209	155	123	34	83	114	42
DC	27	54	98	59	140	156	134	92	37	84	131	54
FL	52	160	289	210	230	309	234	136	120	494	677	285
GA	108	136	166	103	95	119	118	86	102	161	195	88
HA	15	54	94	52	298	308	210	143	46	165	197	73
ID	22	41	88	73	182	271	209	146	41	112	184	107
IL	75	107	145	88	62	75	73	59	46	80	106	51
IN	197	207	226	100	74	76	74	54	145	157	168	54
IA	69	68	70	34	37	37	34	31	25	25	23	10
KS	56	57	68	39	58	60	53	46	32	35	36	18
KY	88	111	103	54	50	53	50	42	44	59	52	22
LA	55	69	87	57	54	56	51	48	29	38	44	27
ME	30	55	60	42	115	112	92	72	35	61	55	30
MD	27	56	109	83	129	148	120	83	34	83	131	69
MA	38	65	89	47	91	93	69	57	35	61	62	27
MI	153	210	250	168	72	74	68	54	110	154	169	91
MN	86	128	173	116	73	76	63	48	63	98	110	55
MS	118	120	129	89	47	50	53	55	55	60	68	49
MO	96	115	118	78	80	87	85	72	76	100	101	56
MT	19	13	38	27	89	96	89	82	17	13	33	22
NE	62	56	69	27	36	35	41	37	22	20	28	10
NV	55	170	251	164	379	417	281	162	210	708	703	266
NH	45	60	82	59	105	96	79	62	47	58	65	37
NJ	42	76	125	86	99	114	88	63	42	86	110	55
NM	21	33	57	51	103	138	129	91	22	46	73	46
NY	58	84	115	61	45	50	44	35	26	42	50	21
NC	41	46	61	37	113	136	133	107	46	63	81	39
ND	31	49	27	6	34	34	30	27	11	16	8	2
OH	170	188	216	105	68	76	70	53	117	143	151	55
OK	58	78	96	40	50	55	54	45	29	43	52	18
OR	14	30	66	54	131	161	127	102	19	49	84	55
PA	49	60	89	45	70	80	71	53	35	48	63	24
RI	53	89	159	74	141	128	86	62	74	114	137	46
SC	33	62	85	60	160	209	176	130	53	130	149	78
SD	47	46	55	20	44	47	47	50	21	21	26	10
TN	83	88	108	64	63	78	84	74	53	69	91	47
TX	55	66	84	39	62	70	78	63	34	46	66	24
UT	32	35	67	78	139	187	193	152	44	66	128	119
VT	20	23	44	32	161	146	115	95	32	33	51	30
VA	20	52	91	53	115	131	101	75	23	68	92	40
WA	18	28	61	48	102	120	111	98	18	33	68	48
WV	51	100	91	61	50	54	45	38	26	54	41	24
WI	51	73	100	73	88	89	78	65	45	66	78	48
WY	22	12	29	11	84	78	75	65	19	9	22	7
National Average	4.57%	8.68%	12.91%	7.84%	825 per 100,000	955 per 100,000	799 per 100,000	598 per 100,000	37.7 per 100,000	82.9 per 100,000	103.2 per 100,000	46.9 per 100,000

* Not affected by the adjustment

Table A2-2: Case Western and LPS Foreclosure Rates in Cuyahoga County (percent)	Owner-Occupied	Non-Owner-Occupied	Combined
2005 Case Western	11	31	13
2005 LPS	15	25	16
2006 Case Western	8	25	10
2006 LPS	17	33	19

Table A2-3: Correlations between Selected Case Western and LPS Variables	2005	2006
Number of Owner-Occupied Mortgages	0.93	0.91
Number of Non-Owner-Occupied Mortgages	0.93	0.98
Number of Foreclosures on Owner-Occupied Mortgages	0.96	0.96
Number of Foreclosures on Non-Owner-Occupied Mortgages	0.95	0.97
Percent of Mortgages Not Owner-Occupied	0.82	0.92
Foreclosure Rate on Non-Owner-Occupied Mortgages	0.89	0.94

Figure A2-1

LPS vs. HMDA Originations, Home Purchase plus Refi
(Box-Whisker Distribution over U.S. States, 2004-07)

LPS data as of Nov. 2009. Boxes cover 25th to 75th percentile; the line in the box is the median.
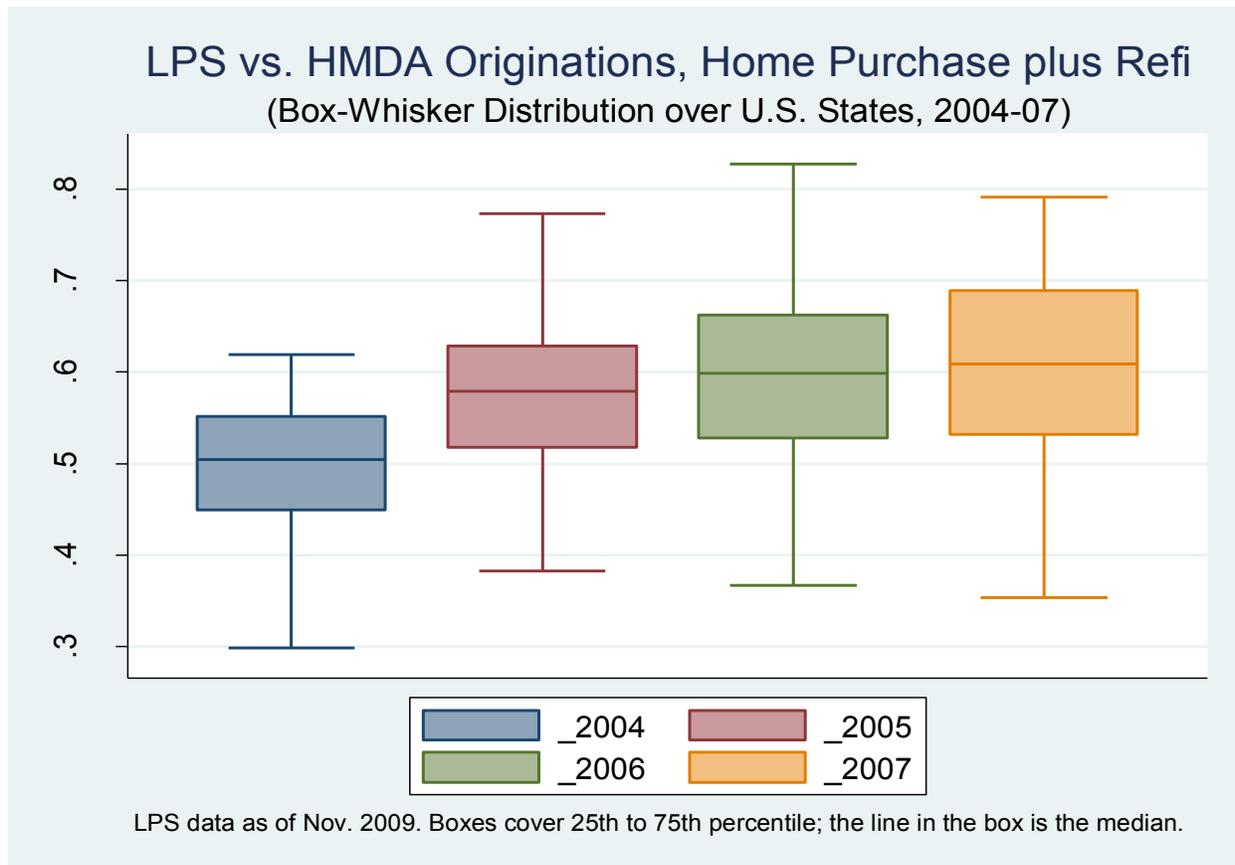
Figure A2-2a (2004, adjusted LPS data)

Relative Non-Occupant Foreclosure Impact per Housing Unit
2004 Home Purchase and Refinance Originations (Adjusted LPS)
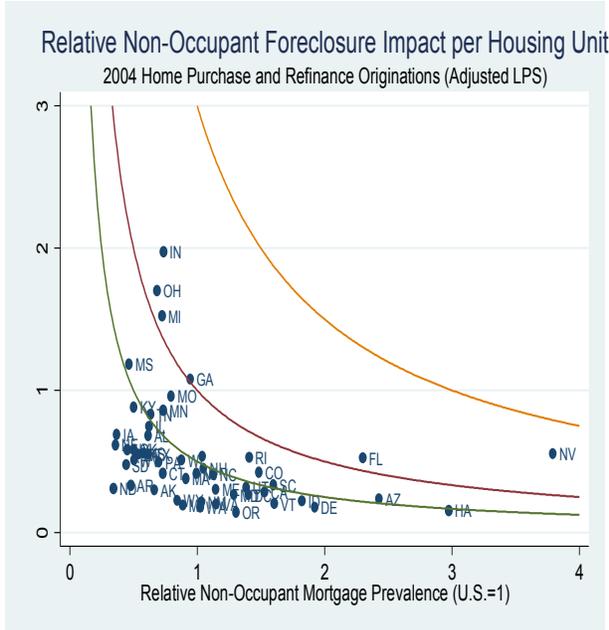
Figure A2-2b (2005, adjusted LPS data)

Relative Non-Occupant Foreclosure Impact per Housing Unit
2005 Home Purchase and Refinance Originations (Adjusted LPS)
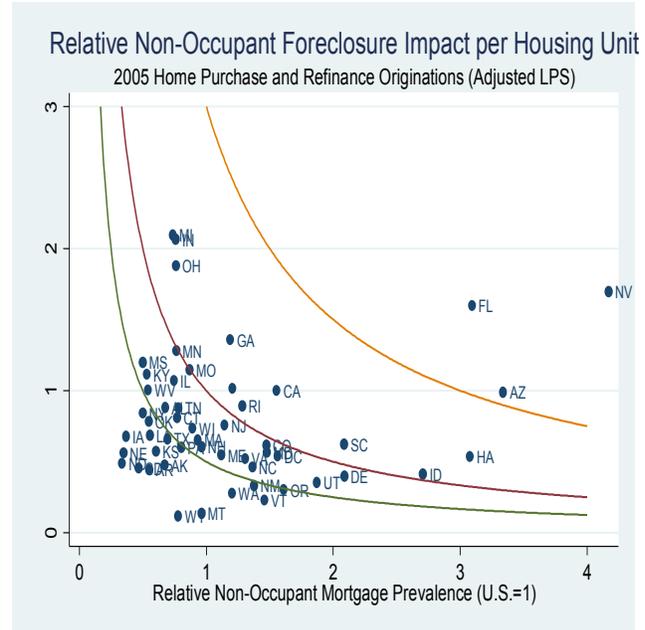
Figure A2-2c (2006, adjusted LPS data)

Relative Non-Occupant Foreclosure Impact per Housing Unit
2006 Home Purchase and Refinance Originations (Adjusted LPS)
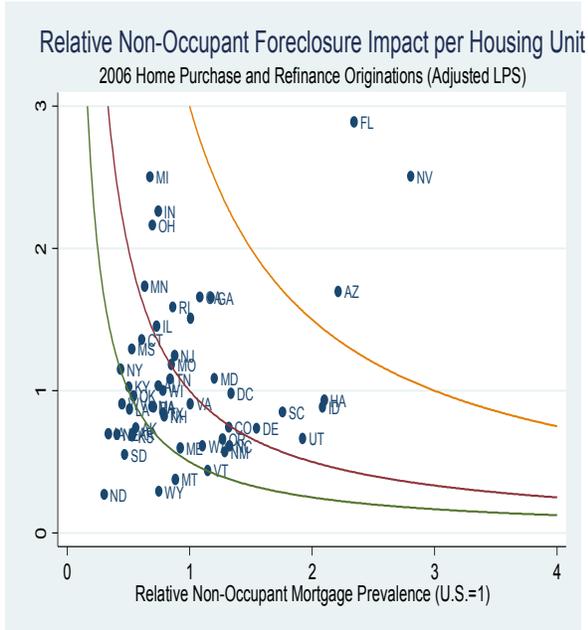
Figure A2-2d (2007, adjusted LPS data)

Relative Non-Occupant Foreclosure Impact per Housing Unit
2007 Home Purchase and Refinance Originations (Adjusted LPS)

Figure A2-3a

Non-Occupants' Share of Mortgage Originations
HMDA versus LPS, Home Purchase plus Refinance, 2004

Figure A2-3b

Non-Occupants' Share of Mortgage Originations
HMDA versus LPS, Home Purchase plus Refinance, 2005

Figure A2-3c

Non-Occupants' Share of Mortgage Originations
HMDA versus LPS, Home Purchase plus Refinance, 2006

Figure A2-3d

Non-Occupants' Share of Mortgage Originations
HMDA versus LPS, Home Purchase plus Refinance, 2007

Appendix 3: Investor and Second-Home Foreclosures Considered Separately

In most of our analysis we have dealt with non-occupant owners as a whole, without distinguishing between second-home owners (owners of non-primary residences intended mainly for the owners' occasional occupancy) and investors (owners of non-primary residences primarily meant to be rented and/or sold for gain). As discussed in the body of the paper, we have not stressed this distinction in part because key data sources such as HMDA do not make this distinction. However, the LPS data include a data field that distinguishes between the two sub-groups that make up the non-occupant category. In this appendix we examine separately the prevalence of these two types of non-occupant mortgages as well as their performance (foreclosure rate) and foreclosure impact (per housing unit). We find that mortgages to investors account for over three-fourths of the foreclosures among non-occupant mortgages, partly because they are more prevalent (accounting for about two-thirds of non-occupant mortgages), but also because they perform more poorly. However, the relative importance of second-home mortgages is above the national norm in only a few states, and Hawaii is the only state that has a foreclosure rate that is consistently higher for second homes than for investor-owned properties.

Tables A3-1 to A3-4 provide information on how investors and second-home owners contributed to the overall performance, prevalence, and foreclosure impact associated with non-occupant mortgages originated in the years 2004-2007. For example, in Alabama in 2004, there were 236.35 new mortgages made to non-occupants for every 100,000 housing units, and 58.9 percent of them were originated by investors. The rate of foreclosure on Alabama's 2004 non-occupant mortgages was 5.84 percent overall, but the performance of investor-owned mortgages was much worse, with 8.13 percent entering foreclosure by July 2009. The resulting foreclosure impact from mortgages originated in 2004 in Alabama was 13.80 foreclosures for every 100,000 housing units, with investors accounting for 82 percent of the foreclosure impact. The last two rows in each of the tables give the U.S. annual average for the year and for the entire 2004-2007 period, respectively.

As shown above in Figure 11, the prevalence of mortgages to non-occupant owners rose to a peak in 2005 before subsiding in 2006 and again in 2007. However, investors' share of non-occupant mortgages stayed near two-thirds nationally over the whole period, as shown in the second column of Tables A3-1 to A3-4. Investors' share of non-occupant mortgage originations varies from state to state and year to year but only falls below 50 percent in a small number of states, most notably Vermont.

Columns 5 to 7 of the tables show the foreclosure rates on all non-occupant mortgages as well as on mortgages to investors and second-home owners. Nationally, the foreclosure rate on mortgages to investors is significantly higher than the foreclosure rate on mortgages for second homes. The same is true in most states for all four years. This genera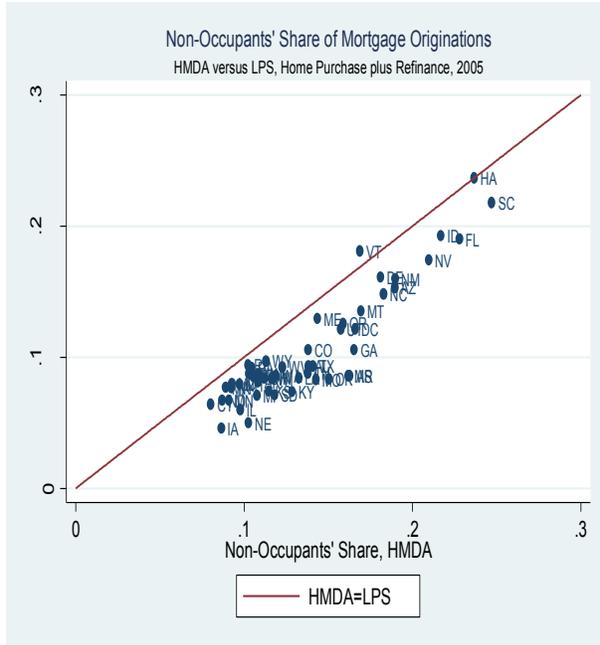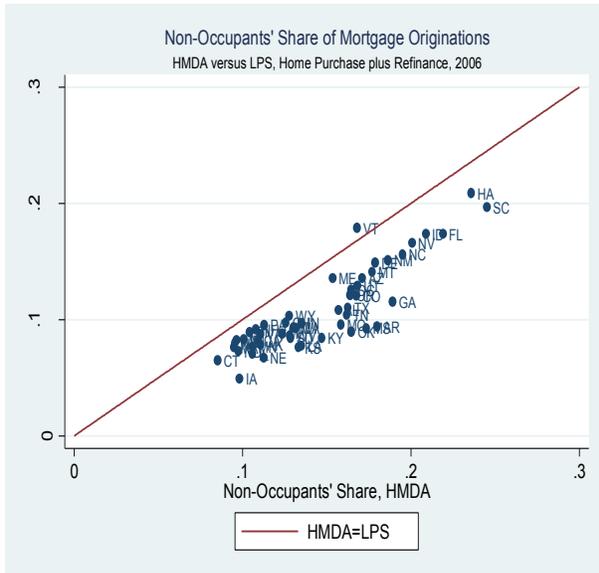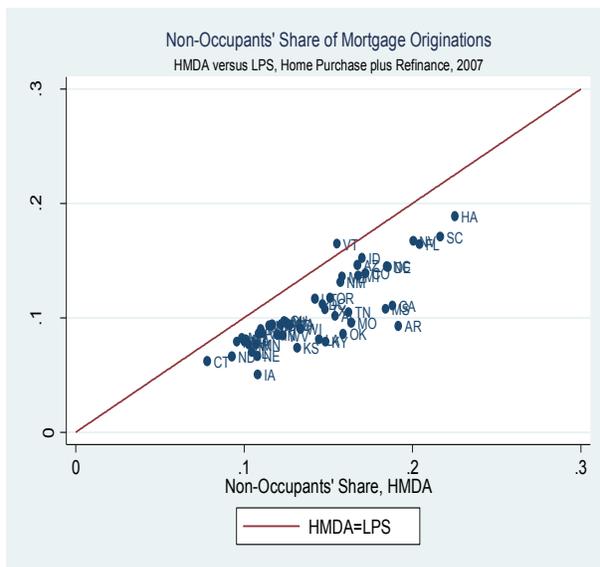l pattern is consistent with the evidence on credit qualifications in Figure 3 (above) and the theoretical perspective on ruthlessness discussed in Appendix 1. Since investor mortgages are more prevalent, their relatively high rate of foreclosure tends to heavily influence the overall rate of foreclosure on non-occupant mortgages. Thus, the typical pattern is for the foreclosure rate on all non-occupant mortgages to be 10 to 20 percent lower than the foreclosure rate on mortgages to investors and for the foreclosure rate on second homes to be at least 25 percent lower than the overall non-occupant rate. The gap between investor and second-home foreclosure rates was widest in 2004 and narrowed somewhat thereafter. However, the performance gap between investor and second-home mortgages was narrower in a minority of states, and in a few cases (Hawaii in all four years and Arkansas, North Dakota, Wyoming, and

Utah one year each) second-home mortgages were foreclosed at a higher rate than investor mortgages.

Columns 8 to 10 show the impact measure—the number of foreclosures per 100,000 housing units—for all non-occupant mortgages as well as the share of the overall impact attributed to investor versus second-home mortgages. Because mortgages to investors were more common and performed more poorly than second-home mortgages, at least 75 percent of the foreclosure impact from non-occupant mortgages nationwide can be attributed to investor mortgages. Investors' share in the overall impact from non-occupant mortgages was especially high in a number of Midwestern and Northeastern states.

Second homes played a prominent role in non-occupant foreclosures in some states, however. The leading example is Hawaii, where second-home mortgages consistently accounted for at least 55 percent of all non-occupant foreclosures. Second-home foreclosures accounted for about half of the foreclosures on non-owner-occupied properties in some years in Montana, Vermont, and Wyoming, too, and their share was above the national average in other rural states with attractive recreational amenities. Second homes also accounted for a moderately high proportion of non-occupant foreclosures in some large states that have experienced unusually high impacts from non-occupant foreclosures. For example, 30 to 40 percent of the non-occupant foreclosures in the hardest hit states, Nevada and Florida, have been on second homes, and the share in hard-hit Arizona is almost as high.

Figures A3-1 to A3-8, in the format of Figure 11 above, show how the prevalence and performance of investor and second-home mortgages contributed to their respective foreclosure impacts by state. In these figures, the two types of non-occupant mortgages are benchmarked against their own 2004-2007 national averages. For example, in Figure A3-1, the point for Hawaii (HA) has a prevalence index (or x-axis value) of almost 2. This means that for mortgage originations in 2004, the prevalence of investor mortgages in Hawaii (per housing unit) was almost twice the 2004-2007 national average prevalence measure for investor mortgages. On the y-axis, which indexes foreclosure rates (performance), Indiana's value of nearly 2 means that Indiana's rate of foreclosure on investor mortgages originated in 2004 was about twice as high as the 2004-2007 national average for investor mortgages (as also shown in Table A3-1). Figures A3-5 to A3-8 are similar except that the national averages are for the prevalence and performance of second-home mortgages originated in 2004-2007. As in Figure 11, the middle of the three curves in each graph shows all points where the impact of investor (Figures A3-1 to A3-4) or second home (Figures A3-5 to A3-8) foreclosures equals the respective national average impact for 2004-2007. As before, the upper curve shows all points where the impact was three times the national average, and the lower curve shows all points where the impact was half the national average.

The first four figures show that in 2005-2007, Nevada, Florida, and Arizona had the highest foreclosure impact for investor-owned mortgages. The high impact from 2005-2007 originations in these three states is a result of their above-average prevalence and high foreclosure rate on investor mortgages. States such as Georgia, Indiana, Michigan, Minnesota, Missouri, and Ohio have near to moderately above-average impacts from investor mortgages in most years that are almost entirely due to a high rate of foreclosure on these mortgages. By contrast, areas such as California, the District of Columbia, Colorado, Hawaii, Idaho, and Utah experience a similar degree of impact primarily due to an above-average prevalence of mortgages to investors.

Nevada, Florida, and Arizona are joined by Hawaii as the states with the highest relative impact from foreclosures on second homes (Figures A3-5 toA3-8). The above-average prevalence of second-home mortgages in these states was the primary cause initially, among the loans originated in 2004. Starting in 2005, the relatively poor performance of second-home mortgages in Nevada, Florida, and Arizona (and to a lesser extent Hawaii) added to their overall foreclosure impact. Several other states also have an above-average impact from second-home foreclosures in some years, but these states tend to have a high prevalence of second homes. Among these other states, Georgia is notable for an above-average rate of foreclosure on second homes, and Idaho, South Carolina, and Utah exemplify states where the prevalence of mortgages on second homes was relatively high.

Table A3-1

	Prevalence			Performance (NOO foreclosure rate)			Impact		
Foreclosure Impact Decomposition by Type of Non-Occupant Owner (NOO), 2004 (LPS data)									
	All NOO (NOO mortgages per 100000 housing units)	Investor Share	2nd Home Share	All NOO	Investors	2nd-Home	All NOO (NOO foreclosures per 100000 housing units)	Investor Share	2nd Home Share
AL	236.35	58.9%	41.1%	5.84%	8.13%	2.55%	13.80	82.0%	18.0%
AK	299.88	74.4%	25.6%	2.56%	3.11%	0.95%	7.67	90.5%	9.5%
AZ	861.93	55.9%	44.1%	2.01%	2.31%	1.64%	17.36	64.1%	35.9%
AR	183.26	62.5%	37.5%	2.83%	4.11%	0.71%	5.19	90.6%	9.4%
CA	637.13	75.9%	24.1%	2.41%	2.71%	1.49%	15.38	85.1%	14.9%
CO	635.54	61.3%	38.7%	3.62%	5.17%	1.15%	22.98	87.7%	12.3%
CT	314.05	80.0%	20.0%	3.56%	4.11%	1.35%	11.17	92.4%	7.6%
DE	791.95	41.8%	58.2%	1.51%	3.04%	0.41%	11.97	84.1%	15.9%
DC	649.36	83.8%	16.2%	2.27%	2.38%	1.71%	14.73	87.8%	12.2%
FL	810.36	47.9%	52.1%	4.47%	5.66%	3.38%	36.24	60.6%	39.4%
GA	381.49	71.5%	28.5%	9.22%	11.43%	3.66%	35.17	88.7%	11.3%
HA	1216.89	46.8%	53.2%	1.31%	0.98%	1.60%	15.95	35.1%	64.9%
ID	727.24	63.3%	36.7%	1.90%	2.03%	1.68%	13.82	67.5%	32.5%
IL	249.07	80.9%	19.1%	6.38%	7.38%	2.18%	15.90	93.5%	6.5%
IN	281.73	83.1%	16.9%	16.87%	19.49%	3.98%	47.54	96.0%	4.0%
IA	134.62	75.7%	24.3%	5.90%	7.03%	2.38%	7.94	90.2%	9.8%
KS	223.95	86.8%	13.2%	4.75%	5.08%	2.57%	10.63	92.9%	7.1%
KY	171.46	78.2%	21.8%	7.53%	8.66%	3.48%	12.91	89.9%	10.1%
LA	184.32	78.3%	21.7%	4.69%	5.48%	1.83%	8.65	91.6%	8.4%
ME	400.20	44.8%	55.2%	2.58%	3.54%	1.81%	10.34	61.4%	38.6%
MD	498.58	71.0%	29.0%	2.27%	2.74%	1.14%	11.33	85.5%	14.5%
MA	385.60	69.9%	30.1%	3.24%	4.22%	0.97%	12.51	91.0%	9.0%
MI	293.82	64.0%	36.0%	13.04%	18.50%	3.31%	38.30	90.9%	9.1%
MN	318.99	65.2%	34.8%	7.34%	10.09%	2.19%	23.41	89.6%	10.4%
MS	137.59	63.9%	36.1%	10.12%	13.69%	3.80%	13.92	86.5%	13.5%
MO	305.60	72.6%	27.4%	8.19%	10.57%	1.86%	25.02	93.8%	6.2%
MT	435.70	51.0%	49.0%	1.63%	2.13%	1.11%	7.09	66.7%	33.3%
NE	155.32	79.9%	20.1%	5.27%	6.06%	2.11%	8.18	91.9%	8.1%
NV	1300.49	60.0%	40.0%	4.74%	5.10%	4.19%	61.64	64.6%	35.4%
NH	462.45	54.0%	46.0%	3.83%	5.42%	1.96%	17.72	76.5%	23.5%
NJ	463.55	61.6%	38.4%	3.57%	4.89%	1.45%	16.54	84.4%	15.6%
NM	461.75	61.8%	38.2%	1.81%	1.83%	1.79%	8.37	62.3%	37.7%
NY	196.80	65.7%	34.3%	4.97%	6.61%	1.82%	9.78	87.5%	12.5%
NC	401.66	51.3%	48.7%	3.50%	5.44%	1.46%	14.06	79.7%	20.3%
ND	150.60	74.4%	25.6%	2.65%	2.67%	2.59%	3.99	75.0%	25.0%
OH	210.90	85.1%	14.9%	14.55%	16.44%	3.77%	30.68	96.1%	3.9%
OK	221.15	78.6%	21.4%	4.97%	5.71%	2.28%	11.00	90.2%	9.8%
OR	567.92	68.4%	31.6%	1.22%	1.36%	0.91%	6.90	76.4%	23.6%
PA	256.51	75.6%	24.4%	4.22%	4.85%	2.28%	10.82	86.8%	13.2%
RI	501.67	74.1%	25.9%	4.51%	5.67%	1.20%	22.63	93.1%	6.9%
SC	565.01	39.8%	60.2%	2.85%	4.44%	1.80%	16.12	62.0%	38.0%
SD	194.45	64.0%	36.0%	4.05%	5.63%	1.25%	7.88	88.9%	11.1%
TN	232.07	67.5%	32.5%	7.11%	9.27%	2.61%	16.49	88.1%	11.9%
TX	260.58	72.3%	27.7%	4.71%	5.76%	1.96%	12.27	88.5%	11.5%
UT	619.41	62.5%	37.5%	2.72%	3.68%	1.12%	16.83	84.6%	15.4%
VT	534.37	27.0%	73.0%	1.72%	3.64%	1.01%	9.20	57.1%	42.9%
VA	438.89	72.6%	27.4%	1.70%	1.91%	1.15%	7.47	81.5%	18.5%
WA	453.30	75.1%	24.9%	1.52%	1.67%	1.09%	6.90	82.2%	17.8%
WV	119.51	51.8%	48.2%	4.34%	6.89%	1.60%	5.19	82.2%	17.8%
WI	252.79	57.6%	42.4%	4.35%	6.33%	1.67%	11.00	83.8%	16.2%
WY	405.50	63.9%	36.1%	1.91%	1.99%	1.76%	7.74	66.7%	33.3%
U.S. 2004	404.26	65.4%	34.6%	4.48%	5.71%	2.16%	18.10	83.3%	16.7%
U.S. 2004-2007	441.35	66.8%	33.2%	8.50%	9.95%	5.67%	37.6	77.9%	22.1%

Table A3-2

	Foreclosure Impact Decomposition by Type of Non-Occupant Owner (NOO), 2005 (LPS data)								
	Prevalence			Performance (NOO foreclosure rate)			Impact		
	All NOO (NOO mortgages per 100000 housing units)	Investor Share	2nd Home Share	All NOO	Investors	2nd-Home	All NOO (NOO foreclosures per 100000 housing units)	Investor Share	2nd Home Share
AL	295.09	61.3%	38.7%	7.54%	9.59%	4.29%	22.24	78.0%	22.0%
AK	354.77	67.7%	32.3%	4.07%	4.36%	3.46%	14.44	72.5%	27.5%
AZ	1331.47	62.2%	37.8%	8.47%	9.27%	7.15%	112.73	68.1%	31.9%
AR	243.16	63.6%	36.4%	3.79%	4.61%	2.36%	9.21	77.4%	22.6%
CA	796.37	76.7%	23.3%	8.55%	9.34%	5.96%	68.12	83.8%	16.2%
CO	735.63	61.5%	38.5%	5.26%	7.10%	2.34%	38.73	82.9%	17.1%
CT	380.02	80.1%	19.9%	6.90%	7.90%	2.88%	26.21	91.7%	8.3%
DE	962.47	50.1%	49.9%	3.41%	5.25%	1.56%	32.81	77.2%	22.8%
DC	808.80	82.9%	17.1%	4.59%	5.11%	2.07%	37.14	92.3%	7.7%
FL	1223.76	55.1%	44.9%	13.66%	16.10%	10.67%	167.13	64.9%	35.1%
GA	495.74	68.6%	31.4%	11.60%	13.73%	6.95%	57.53	81.2%	18.8%
HA	1544.99	47.0%	53.0%	4.57%	3.73%	5.32%	70.66	38.3%	61.7%
ID	1247.90	67.9%	32.1%	3.53%	3.75%	3.06%	43.99	72.1%	27.9%
IL	345.92	79.6%	20.4%	9.16%	10.37%	4.41%	31.68	90.2%	9.8%
IN	311.74	83.1%	16.9%	17.67%	20.48%	3.84%	55.09	96.3%	3.7%
IA	159.08	75.3%	24.7%	5.81%	7.07%	1.96%	9.24	91.7%	8.3%
KS	270.32	84.8%	15.2%	4.89%	5.39%	2.04%	13.21	93.7%	6.3%
KY	199.81	77.8%	22.2%	9.52%	11.44%	2.78%	19.02	93.5%	6.5%
LA	207.69	76.4%	23.6%	5.86%	6.76%	2.94%	12.16	88.1%	11.9%
ME	461.11	44.9%	55.1%	4.66%	5.86%	3.68%	21.50	56.5%	43.5%
MD	656.18	75.7%	24.3%	4.83%	5.41%	3.01%	31.67	84.9%	15.1%
MA	441.76	68.7%	31.3%	5.59%	7.33%	1.77%	24.70	90.1%	9.9%
MI	330.46	66.5%	33.5%	17.91%	24.29%	5.28%	59.19	90.1%	9.9%
MN	379.73	65.9%	34.1%	10.95%	15.17%	2.80%	41.57	91.3%	8.7%
MS	173.89	66.5%	33.5%	10.24%	13.44%	3.89%	17.81	87.3%	12.7%
MO	398.76	73.6%	26.4%	9.80%	12.10%	3.37%	39.07	90.9%	9.1%
MT	589.12	47.4%	52.6%	1.15%	1.17%	1.13%	6.77	48.3%	51.7%
NE	165.58	78.7%	21.3%	4.80%	5.30%	2.96%	7.95	86.9%	13.1%
NV	1751.33	60.6%	39.4%	14.52%	15.57%	12.90%	254.21	65.0%	35.0%
NH	488.29	54.5%	45.5%	5.16%	6.96%	3.01%	25.20	73.5%	26.5%
NJ	583.62	67.3%	32.7%	6.45%	8.09%	3.08%	37.67	84.4%	15.6%
NM	688.03	61.6%	38.4%	2.83%	2.96%	2.62%	19.47	64.4%	35.6%
NY	241.94	68.1%	31.9%	7.20%	9.28%	2.77%	17.43	87.8%	12.2%
NC	522.63	51.3%	48.7%	3.94%	5.31%	2.50%	20.58	69.1%	30.9%
ND	165.55	73.4%	26.6%	4.17%	4.86%	2.24%	6.90	85.7%	14.3%
OH	248.96	85.9%	14.1%	16.07%	17.57%	6.89%	40.00	94.0%	6.0%
OK	266.92	78.1%	21.9%	6.67%	7.45%	3.88%	17.81	87.3%	12.7%
OR	809.00	70.8%	29.2%	2.58%	2.73%	2.20%	20.85	75.1%	24.9%
PA	343.37	79.6%	20.4%	5.13%	5.86%	2.31%	17.63	90.8%	9.2%
RI	568.32	73.3%	26.7%	7.62%	8.90%	4.12%	43.32	85.6%	14.4%
SC	821.15	45.7%	54.3%	5.33%	6.77%	4.11%	43.74	58.1%	41.9%
SD	221.60	62.5%	37.5%	3.89%	5.19%	1.73%	8.62	83.3%	16.7%
TN	321.28	67.2%	32.8%	7.49%	9.42%	3.53%	24.07	84.6%	15.4%
TX	321.90	71.9%	28.1%	5.66%	6.39%	3.79%	18.22	81.2%	18.8%
UT	933.12	62.0%	38.0%	3.03%	3.23%	2.71%	28.26	66.0%	34.0%
VT	581.44	29.7%	70.3%	1.96%	3.01%	1.51%	11.39	45.7%	54.3%
VA	565.89	75.6%	24.4%	4.44%	5.15%	2.23%	25.11	87.7%	12.3%
WA	640.07	75.6%	24.4%	2.35%	2.53%	1.80%	15.05	81.3%	18.8%
WV	164.43	56.3%	43.7%	8.58%	13.38%	2.39%	14.10	87.8%	12.2%
WI	317.01	59.5%	40.5%	6.27%	8.76%	2.62%	19.89	83.1%	16.9%
WY	420.26	61.9%	38.1%	1.01%	1.47%	0.27%	4.25	90.0%	10.0%
U.S. 2004	533.16	67.1%	32.9%	8.46%	9.83%	5.66%	45.10	78.0%	22.0%
U.S. 2004-2007	441.35	66.8%	33.2%	8.50%	9.95%	5.67%	37.6	77.9%	22.1%

Table A3-3

	Prevalence			Performance (NOO foreclosure rate)			Impact		
	All NOO (NOO mortgages per 100000 housing units)	Investor Share	2nd Home Share	All NOO	Investors	2nd-Home	All NOO (NOO foreclosures per 100000 housing units)	Investor Share	2nd Home Share
AL	331.42	65.0%	35.0%	8.82%	10.84%	5.07%	29.25	79.9%	20.1%
AK	293.86	69.9%	30.1%	6.32%	7.13%	4.44%	18.57	78.8%	21.2%
AZ	954.57	63.0%	37.0%	14.51%	16.53%	11.07%	138.53	71.8%	28.2%
AR	260.66	66.0%	34.0%	6.00%	7.49%	3.10%	15.63	82.4%	17.6%
CA	607.33	76.7%	23.3%	14.15%	15.17%	10.79%	85.93	82.2%	17.8%
CO	697.42	63.7%	36.3%	6.34%	8.24%	3.00%	44.22	82.8%	17.2%
CT	328.02	79.1%	20.9%	11.60%	13.65%	3.87%	38.05	93.0%	7.0%
DE	756.48	51.9%	48.1%	6.28%	9.32%	3.01%	47.54	76.9%	23.1%
DC	729.25	83.4%	16.6%	8.39%	9.24%	4.09%	61.15	91.9%	8.1%
FL	983.32	55.4%	44.6%	24.70%	28.50%	19.99%	242.86	63.9%	36.1%
GA	476.27	66.4%	33.6%	14.15%	16.69%	9.13%	67.37	78.3%	21.7%
HA	1188.12	48.4%	51.6%	8.00%	7.33%	8.62%	94.99	44.4%	55.6%
ID	1087.29	70.9%	29.1%	7.56%	8.01%	6.46%	82.20	75.1%	24.9%
IL	357.77	80.5%	19.5%	12.43%	14.10%	5.54%	44.47	91.3%	8.7%
IN	307.60	83.0%	17.0%	19.34%	22.34%	4.72%	59.50	95.9%	4.1%
IA	158.33	70.8%	29.2%	5.97%	7.07%	3.30%	9.45	83.9%	16.1%
KS	249.73	82.8%	17.2%	5.84%	6.45%	2.89%	14.58	91.5%	8.5%
KY	199.20	78.5%	21.5%	8.77%	10.16%	3.71%	17.47	90.9%	9.1%
LA	196.21	76.6%	23.4%	7.44%	8.69%	3.36%	14.61	89.4%	10.6%
ME	427.28	42.5%	57.5%	5.11%	8.69%	2.47%	21.85	72.2%	27.8%
MD	571.60	79.1%	20.9%	9.29%	10.44%	4.95%	53.09	88.9%	11.1%
MA	354.80	67.4%	32.6%	7.60%	9.69%	3.28%	26.95	85.9%	14.1%
MI	311.72	71.0%	29.0%	21.37%	27.61%	6.09%	66.63	91.7%	8.3%
MN	341.80	65.7%	34.3%	14.81%	19.80%	5.27%	50.63	87.8%	12.2%
MS	199.72	69.1%	30.9%	11.03%	12.84%	6.99%	22.04	80.4%	19.6%
MO	424.20	73.7%	26.3%	10.12%	12.33%	3.94%	42.95	89.8%	10.2%
MT	580.81	50.4%	49.6%	3.23%	3.48%	2.97%	18.75	54.3%	45.7%
NE	170.24	79.0%	21.0%	5.91%	7.01%	1.81%	10.07	93.6%	6.4%
NV	1321.68	62.2%	37.8%	21.42%	22.04%	20.40%	283.09	64.0%	36.0%
NH	419.51	50.4%	49.6%	6.99%	10.18%	3.75%	29.34	73.4%	26.6%
NJ	461.49	68.6%	31.4%	10.66%	13.14%	5.22%	49.18	84.6%	15.4%
NM	646.46	59.4%	40.6%	4.84%	5.13%	4.43%	31.32	62.9%	37.1%
NY	229.29	67.2%	32.8%	9.85%	12.87%	3.68%	22.59	87.7%	12.3%
NC	534.50	54.1%	45.9%	5.23%	6.62%	3.59%	27.94	68.4%	31.6%
ND	154.34	71.8%	28.2%	2.32%	2.93%	0.75%	3.57	90.9%	9.1%
OH	250.14	87.6%	12.4%	18.48%	20.28%	5.76%	46.23	96.1%	3.9%
OK	271.47	79.9%	20.1%	8.23%	9.29%	3.99%	22.33	90.3%	9.7%
OR	702.29	72.6%	27.4%	5.64%	5.89%	4.98%	39.62	75.8%	24.2%
PA	322.52	79.8%	20.2%	7.57%	8.55%	3.69%	24.41	90.2%	9.8%
RI	420.17	70.9%	29.1%	13.55%	17.55%	3.82%	56.94	91.8%	8.2%
SC	698.37	46.6%	53.4%	7.25%	9.64%	5.16%	50.61	61.9%	38.1%
SD	216.79	61.3%	38.7%	4.71%	6.82%	1.35%	10.20	88.9%	11.1%
TN	351.83	66.5%	33.5%	9.23%	11.51%	4.71%	32.47	82.9%	17.1%
TX	357.83	70.4%	29.6%	7.20%	7.99%	5.31%	25.76	78.2%	21.8%
UT	1011.44	65.1%	34.9%	5.69%	5.31%	6.39%	57.50	60.8%	39.2%
VT	480.70	33.0%	67.0%	3.76%	6.72%	2.31%	18.09	58.9%	41.1%
VA	455.58	75.5%	24.5%	7.76%	9.03%	3.85%	35.35	87.8%	12.2%
WA	618.44	75.4%	24.6%	5.22%	5.49%	4.42%	32.30	79.2%	20.8%
WV	130.79	55.7%	44.3%	7.75%	10.31%	4.53%	10.14	74.2%	25.8%
WI	307.48	59.2%	40.8%	8.55%	11.64%	4.06%	26.29	80.6%	19.4%
WY	402.78	63.4%	36.6%	2.49%	2.95%	1.70%	10.04	75.0%	25.0%
U.S. 2004	470.81	67.8%	32.2%	12.66%	14.4%	9.1%	59.59	76.9%	23.1%
U.S. 2004-2007	441.35	66.8%	33.2%	8.50%	9.95%	5.67%	37.6	77.9%	22.1%

Table A3-4

	Prevalence			Performance (NOO foreclosure rate)			Impact		
	Foreclosure Impact Decomposition by Type of Non-Occupant Owner (NOO), 2007 (LPS data)								
	All NOO (NOO mortgages per 100000 housing units)	Investor Share	2nd Home Share	All NOO	Investors	2nd-Home	All NOO (NOO foreclosures per 100000 housing units)	Investor Share	2nd Home Share
AL	277.40	63.2%	36.8%	5.25%	6.54%	3.03%	14.55	78.8%	21.2%
AK	258.30	65.4%	34.6%	2.74%	2.31%	3.57%	7.09	55.0%	45.0%
AZ	650.07	61.9%	38.1%	11.60%	14.42%	7.02%	75.38	76.9%	23.1%
AR	217.81	65.3%	34.7%	3.78%	5.14%	1.23%	8.23	88.7%	11.3%
CA	471.98	75.1%	24.9%	7.99%	9.00%	4.96%	37.72	84.5%	15.5%
CO	625.62	64.6%	35.4%	3.59%	4.43%	2.06%	22.47	79.7%	20.3%
CT	260.07	76.5%	23.5%	5.56%	6.43%	2.73%	14.46	88.5%	11.5%
DE	638.17	48.0%	52.0%	2.94%	4.29%	1.71%	18.78	69.9%	30.1%
DC	574.90	81.0%	19.0%	5.02%	5.89%	1.29%	28.85	95.1%	4.9%
FL	567.10	50.5%	49.5%	17.93%	22.42%	13.35%	101.67	63.1%	36.9%
GA	369.77	67.1%	32.9%	8.78%	9.74%	6.82%	32.46	74.4%	25.6%
HA	891.39	47.6%	52.4%	4.41%	4.00%	4.77%	39.27	43.2%	56.8%
ID	765.72	67.8%	32.2%	6.27%	7.08%	4.57%	48.02	76.6%	23.4%
IL	285.06	79.8%	20.2%	7.49%	8.47%	3.60%	21.35	90.3%	9.7%
IN	218.22	80.5%	19.5%	8.58%	9.92%	3.04%	18.72	93.1%	6.9%
IA	150.36	73.1%	26.9%	2.87%	3.37%	1.50%	4.31	86.0%	14.0%
KS	216.26	84.6%	15.4%	3.30%	3.50%	2.21%	7.14	89.7%	10.3%
KY	164.79	76.2%	23.8%	4.58%	5.18%	2.68%	7.55	86.1%	13.9%
LA	169.14	77.3%	22.7%	4.86%	5.51%	2.66%	8.23	87.6%	12.4%
ME	387.44	34.9%	65.1%	3.56%	7.01%	1.71%	13.78	68.8%	31.3%
MD	437.71	76.1%	23.9%	7.06%	8.08%	3.83%	30.92	87.0%	13.0%
MA	314.95	64.7%	35.3%	4.05%	5.34%	1.68%	12.77	85.3%	14.7%
MI	238.60	67.2%	32.8%	14.36%	19.36%	4.12%	34.27	90.6%	9.4%
MN	262.81	63.1%	36.9%	9.88%	13.71%	3.34%	25.97	87.5%	12.5%
MS	186.87	72.7%	27.3%	7.63%	8.44%	5.49%	14.26	80.3%	19.7%
MO	359.18	72.6%	27.4%	6.66%	8.23%	2.49%	23.91	89.7%	10.3%
MT	517.27	49.6%	50.4%	2.26%	2.42%	2.12%	11.71	52.9%	47.1%
NE	142.67	72.0%	28.0%	2.33%	2.74%	1.28%	3.33	84.6%	15.4%
NV	757.73	60.3%	39.7%	14.01%	15.67%	11.49%	106.13	67.4%	32.6%
NH	358.72	45.8%	54.2%	5.07%	7.38%	3.11%	18.18	66.7%	33.3%
NJ	356.79	61.5%	38.5%	7.35%	9.63%	3.72%	26.23	80.5%	19.5%
NM	493.10	60.6%	39.4%	4.32%	4.69%	3.75%	21.29	65.8%	34.2%
NY	189.32	63.5%	36.5%	5.23%	6.99%	2.15%	9.89	85.0%	15.0%
NC	440.89	55.4%	44.6%	3.14%	3.59%	2.58%	13.84	63.4%	36.6%
ND	125.26	64.3%	35.7%	0.51%	0.40%	0.72%	0.64	50.0%	50.0%
OH	190.97	86.6%	13.4%	8.95%	9.80%	3.47%	17.10	94.8%	5.2%
OK	226.87	76.4%	23.6%	3.45%	3.63%	2.88%	7.83	80.3%	19.7%
OR	559.25	70.9%	29.1%	4.58%	5.17%	3.17%	25.63	79.9%	20.1%
PA	248.69	77.5%	22.5%	3.86%	4.34%	2.22%	9.60	87.1%	12.9%
RI	328.02	63.9%	36.1%	6.36%	9.10%	1.50%	20.85	91.5%	8.5%
SC	500.71	43.3%	56.7%	5.12%	6.93%	3.73%	25.62	58.7%	41.3%
SD	209.65	62.3%	37.7%	1.74%	2.14%	1.06%	3.64	76.9%	23.1%
TN	295.85	66.9%	33.1%	5.50%	5.69%	5.10%	16.26	69.3%	30.7%
TX	293.76	72.3%	27.7%	3.32%	3.53%	2.77%	9.76	76.8%	23.2%
UT	820.55	69.3%	30.7%	6.69%	7.03%	5.93%	54.91	72.8%	27.2%
VT	412.93	37.6%	62.4%	2.72%	3.11%	2.49%	11.24	42.9%	57.1%
VA	359.28	73.3%	26.7%	4.50%	5.21%	2.55%	16.16	84.9%	15.1%
WA	538.58	76.0%	24.0%	4.14%	4.48%	3.09%	22.32	82.1%	17.9%
WV	107.86	51.2%	48.8%	5.25%	8.42%	1.94%	5.66	82.0%	18.0%
WI	256.51	57.2%	42.8%	6.25%	8.28%	3.54%	16.04	75.8%	24.2%
WY	363.03	60.6%	39.4%	0.91%	0.56%	1.44%	3.30	37.5%	62.5%
U.S. 2004	358.45	66.6%	33.4%	7.65%	8.79%	5.36%	27.41	76.5%	23.5%
U.S. 2004-2007	441.35	66.8%	33.2%	8.50%	9.95%	5.67%	37.6	77.9%	22.1%

Figure A3-1

Relative Investor Foreclosure Impact per Housing Unit
2004 Investor Purchase and Refinance Originations (LPS)

Figure A3-2

Relative Investor Foreclosure Impact per Housing Unit
2005 Investor Purchase and Refinance Originations (LPS)

Figure A3-3

Relative Investor Foreclosure Impact per Housing Unit
2006 Investor Purchase and Refinance Originations (LPS)

Relative Investor Mortgage Prevalence (2004-07 Nat'l Avg.=1)

Figure A3-4

Relative Investor Foreclosure Impact per Housing Unit
2007 Investor Purchase and Refinance Originations (LPS)

Relative Investor Mortgage Prevalence (2004-07 Nat'l Avg.=1)

Figure A3-5

Relative 2nd-Home Foreclosure Impact per Housing Unit
2004 2nd-Home Purchase and Refinance Originations (LPS)

Relative 2nd-Home Mortgage Prevalence (2004-07 Nat'l Avg.=1)

Figure A3-6

Relative 2nd-Home Foreclosure Impact per Housing Unit
2005 2nd-Home Purchase and Refinance Originations (LPS)

Relative 2nd-Home Mortgage Prevalence (2004-07 Nat'l Avg.=1)

Figure A3-7

Relative 2nd-Home Foreclosure Impact per Housing Unit
2006 2nd-Home Purchase and Refinance Originations (LPS)

Figure A3-8

Relative 2nd-Home Foreclosure Impact per Housing Unit
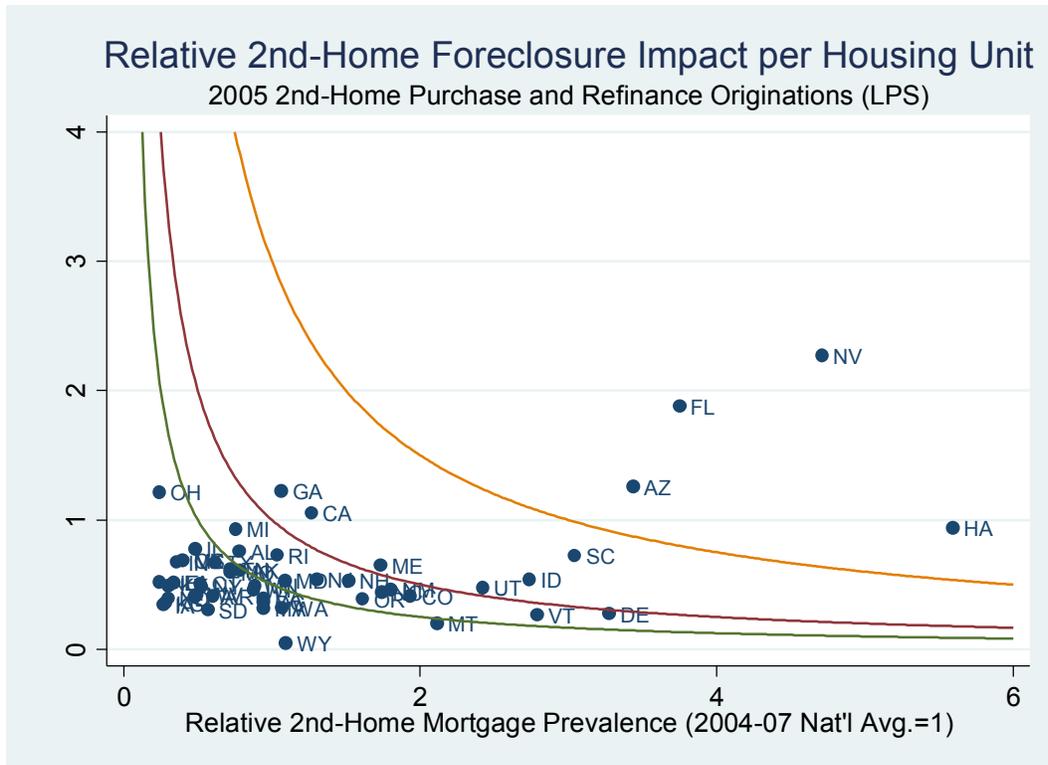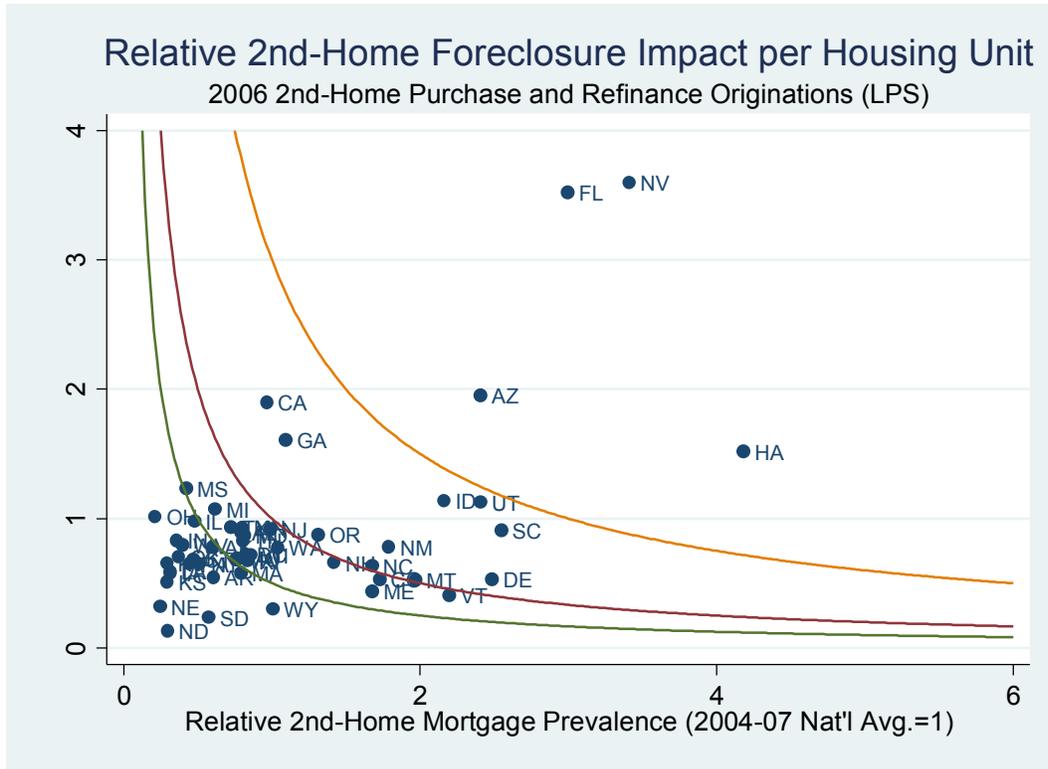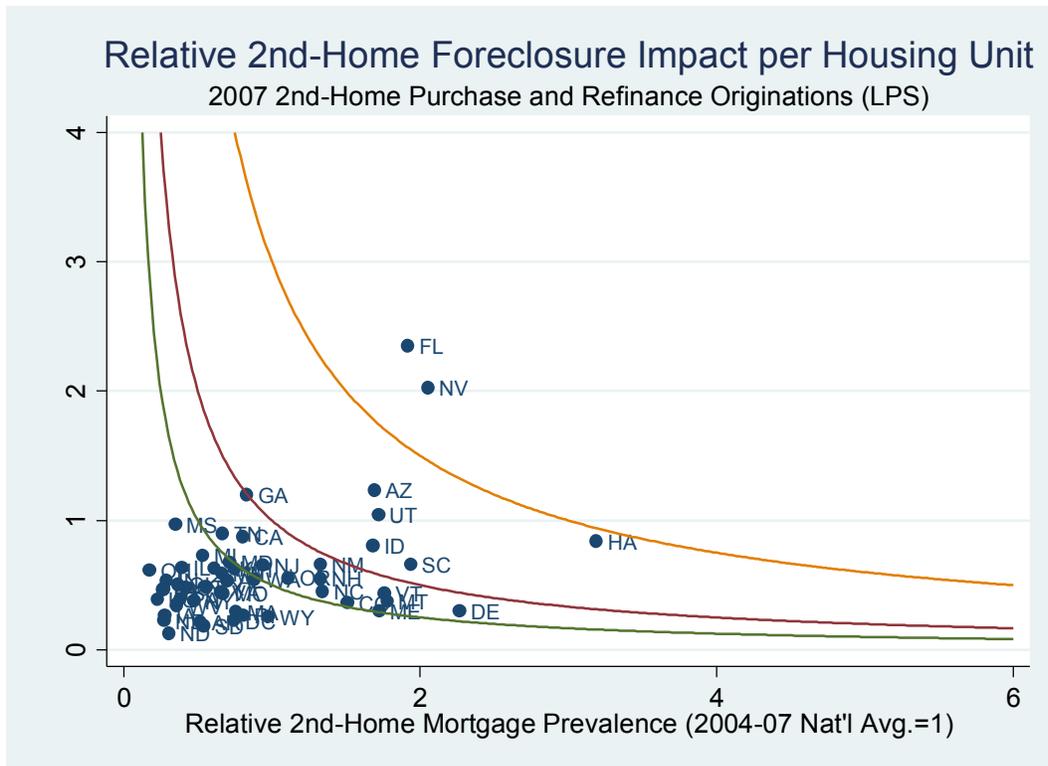2007 2nd-Home Purchase and Refinance Originations (LPS)

Appendix 4: The Prevalence, Performance and Impact (per Housing Unit) of Non-Occupant Mortgages Originated in 2004, 2005, and 2007

The results here are for mortgages originated in 2004, 2005, and 2007. The maps have the same format as Figures 12-14, which was explained in the body of the paper. Table A4-1 summarizes the data for the maps in this appendix as well as for Figures 11-14.

Table A4-1

	Indices of the Relative Performance, Prevalence, and Impact of Non-Owner-Occupied (NOO) Mortgages and Foreclosures, by State and Year Mortgage Was Originated											
	Performance Index (Foreclosures per mortgage, for NOO mortgages, by year of origination, as a percentage of the 2004-07 national average)				Prevalence Index (Mortgages per housing unit, for NOO mortgages, by year of origination, as a percentage of the 2004-07 national average)				Impact Index (NOO foreclosures per housing unit, by year of origination, as a percentage of the 2004-07 national average)			
State	2004	2005	2006	2007	2004	2005	2006	2007	2004	2005	2006	2007
AL	68	88	103	62	54	67	75	63	37	59	78	39
AK	30	48	74	32	68	80	67	59	20	38	49	19
AZ	24	99	170	136	195	302	216	147	46	300	368	200
AR	33	44	70	44	42	55	59	49	14	24	42	22
CA	28	100	166	94	144	180	138	107	41	181	228	100
CO	42	62	74	42	144	167	158	142	61	103	118	60
CT	42	81	136	65	71	86	74	59	30	70	101	38
DE	18	40	74	35	179	218	171	145	32	87	126	50
DC	27	54	98	59	147	183	165	130	39	99	162	77
FL	52	160	290	210	184	277	223	128	96	444	645	270
GA	108	136	166	103	86	112	108	84	93	153	179	86
HA	15	54	94	52	276	350	269	202	42	188	252	104
ID	22	41	89	74	165	283	246	173	37	117	218	128
IL	75	107	146	88	56	78	81	65	42	84	118	57
IN	198	207	227	101	64	71	70	49	126	146	158	50
IA	69	68	70	34	31	36	36	34	21	25	25	11
KS	56	57	68	39	51	61	57	49	28	35	39	19
KY	88	112	103	54	39	45	45	37	34	51	46	20
LA	55	69	87	57	42	47	44	38	23	32	39	22
ME	30	55	60	42	91	104	97	88	27	57	58	37
MD	27	57	109	83	113	149	130	99	30	84	141	82
MA	38	66	89	48	87	100	80	71	33	66	72	34
MI	153	210	251	168	67	75	71	54	102	157	177	91
MN	86	128	174	116	72	86	77	60	62	110	135	69
MS	119	120	129	90	31	39	45	42	37	47	59	38
MO	96	115	119	78	69	90	96	81	66	104	114	64
MT	19	13	38	27	99	133	132	117	19	18	50	31
NE	62	56	69	27	35	38	39	32	22	21	27	9
NV	56	170	251	164	295	397	299	172	164	675	752	282
NH	45	61	82	59	105	111	95	81	47	67	78	48
NJ	42	76	125	86	105	132	105	81	44	100	131	70
NM	21	33	57	51	105	156	146	112	22	52	83	57
NY	58	84	116	61	45	55	52	43	26	46	60	26
NC	41	46	61	37	91	118	121	100	37	55	74	37
ND	31	49	27	6	34	38	35	28	11	18	9	2
OH	171	188	217	105	48	56	57	43	82	106	123	45
OK	58	78	96	40	50	60	62	51	29	47	59	21
OR	14	30	66	54	129	183	159	127	18	55	105	68
PA	49	60	89	45	58	78	73	56	29	47	65	26
RI	53	89	159	75	114	129	95	74	60	115	151	55
SC	33	62	85	60	128	186	158	113	43	116	134	68
SD	48	46	55	20	44	50	49	48	21	23	27	10
TN	83	88	108	64	53	73	80	67	44	64	86	43
TX	55	66	84	39	59	73	81	67	33	48	68	26
UT	32	36	67	78	140	211	229	186	45	75	153	146
VT	20	23	44	32	121	132	109	94	24	30	48	30
VA	20	52	91	53	99	128	103	81	20	67	94	43
WA	18	28	61	49	103	145	140	122	18	40	86	59
WV	51	101	91	62	27	37	30	24	14	37	27	15
WI	51	74	100	73	57	72	70	58	29	53	70	43
WY	22	12	29	11	92	95	91	82	21	11	27	9

Figure A4-1: Non-Owner-Occupied Mortgage Prevalence per Housing Unit, Relative to 2004-2007 U.S. Average (LPS data for mortgages originated in 2004)
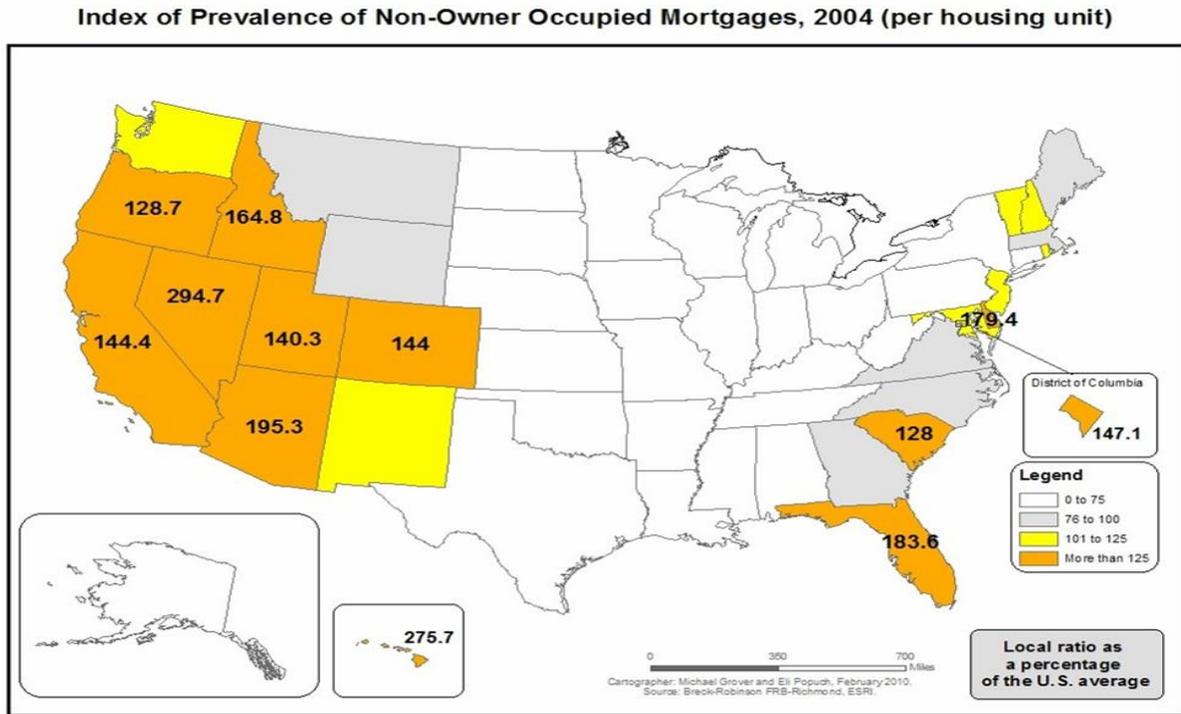

Index of Prevalence of Non-Owner Occupied Mortgages, 2004 (per housing unit)

Figure A4-2: Non-Owner-Occupied Mortgage Foreclosure Rates, Relative to 2004-2007 U.S. Average (LPS data for mortgages originated in 2004)
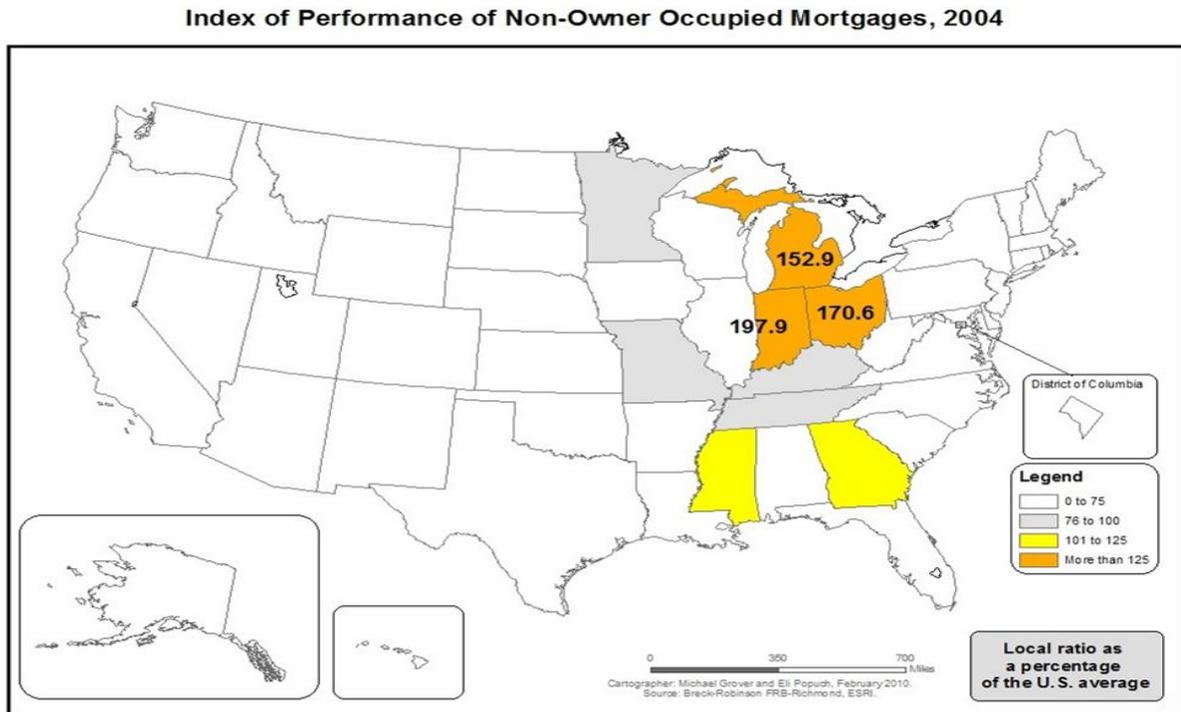

Index of Performance of Non-Owner Occupied Mortgages, 2004

Figure A4-3: Non-Owner-Occupied Mortgage Foreclosure Impact per Housing Unit, Relative to U.S. 2004-2007 Average (LPS data for mortgages originated in 2004)
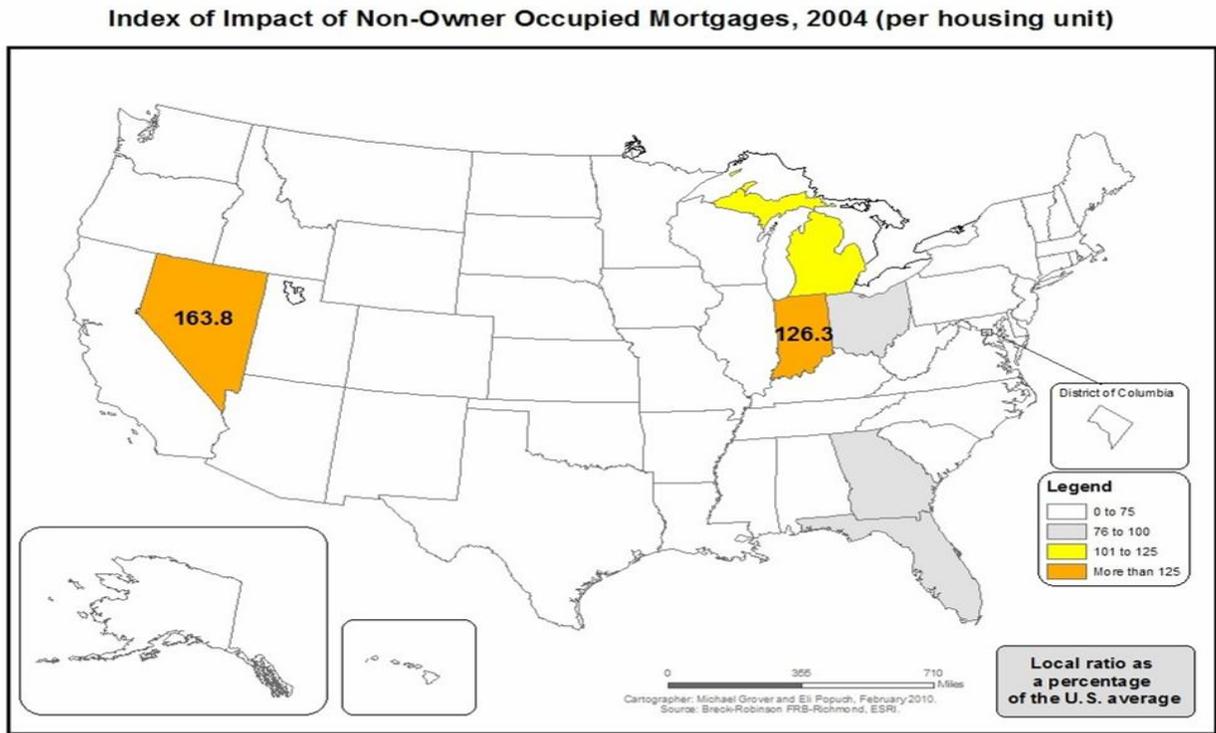

Index of Impact of Non-Owner Occupied Mortgages, 2004 (per housing unit)

Figure A4-4: Non-Owner-Occupied Mortgage Prevalence per Housing Unit, Relative to 2004-2007 U.S. Average (LPS data for mortgages originated in 2005)
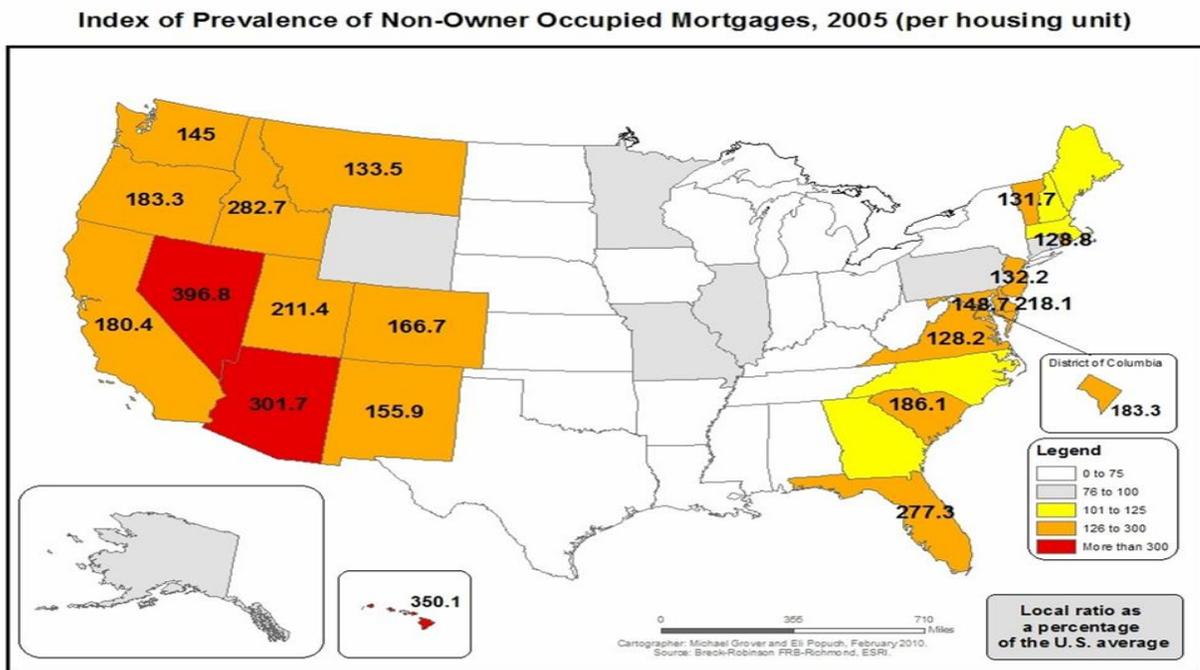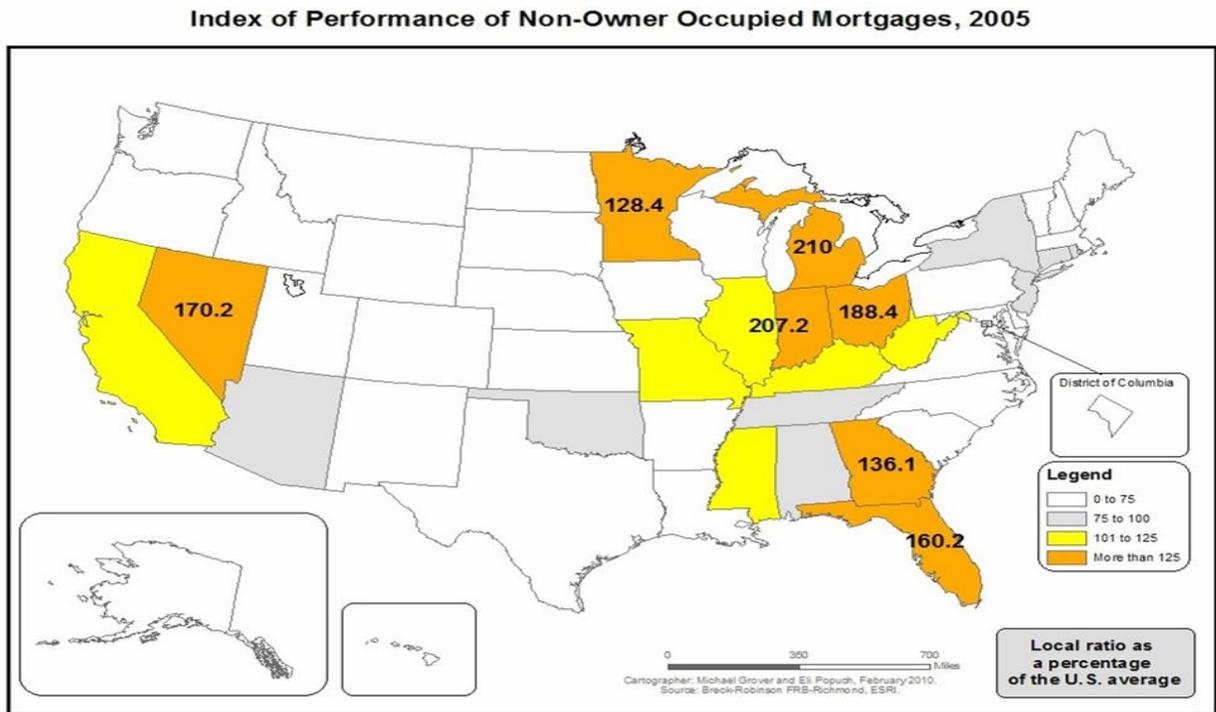

Index of Prevalence of Non-Owner Occupied Mortgages, 2005 (per housing unit)

Figure A4-5: Non-Owner-Occupied Mortgage Foreclosure Rates, Relative to 2004-2007 U.S. Average (LPS data for mortgages originated in 2005)

Figure A4-6: Non-Owner-Occupied Mortgage Foreclosure Impact per Housing Unit, Relative to U.S. 2004-2007 Average (LPS data for mortgages originated in 2005)
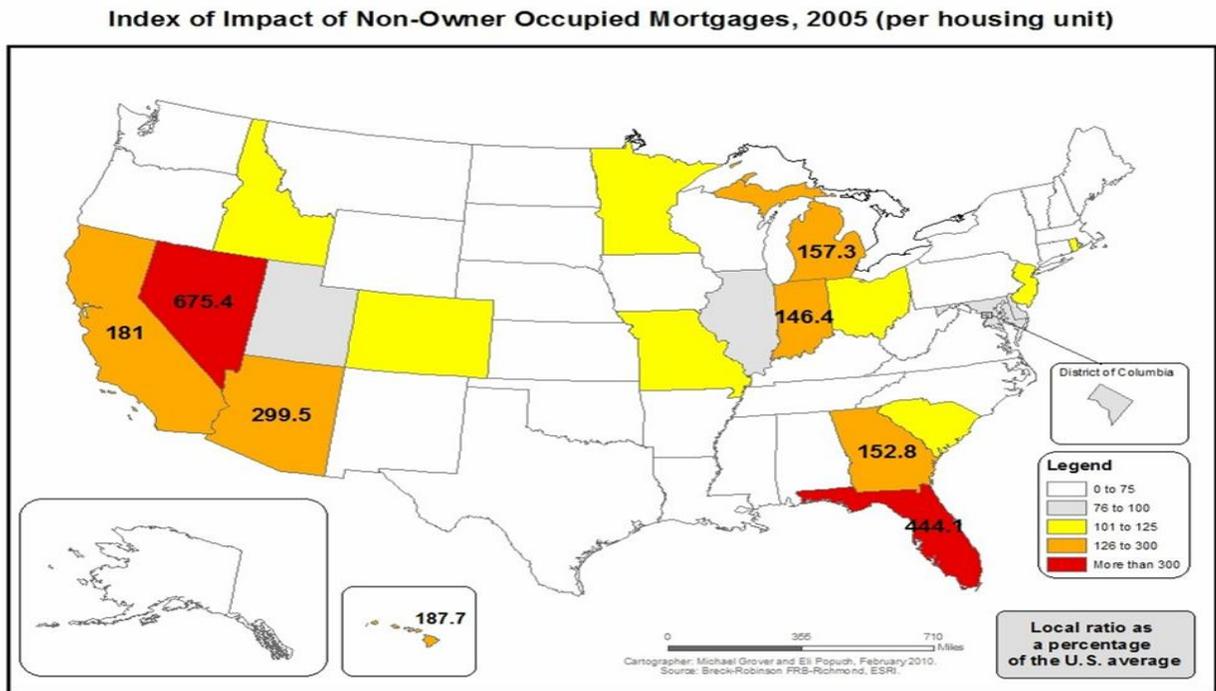
Figure A4-7: Non-Owner-Occupied Mortgage Prevalence per Housing Unit, Relative to 2004-2007 U.S. Average (LPS data for mortgages originated in 2007)
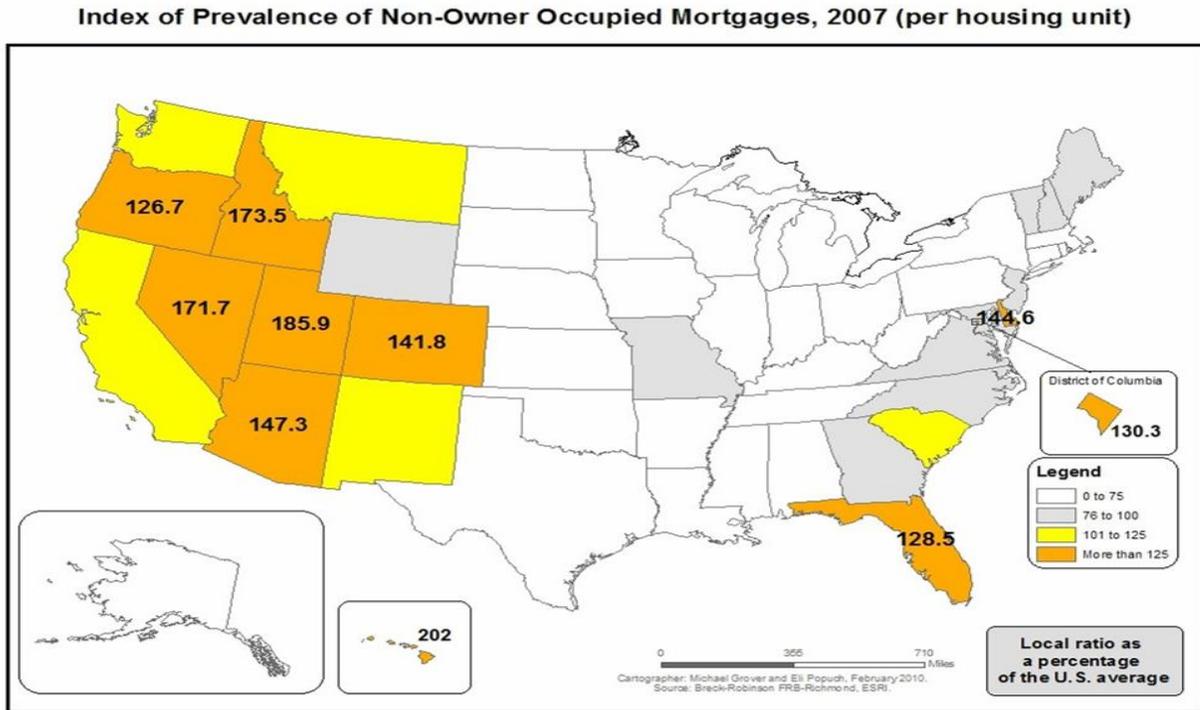
Index of Prevalence of Non-Owner Occupied Mortgages, 2007 (per housing unit)

Figure A4-8: Non-Owner-Occupied Mortgage Foreclosure Rates, Relative to 2004-2007 U.S. Average (LPS data for mortgages originated in 2007)

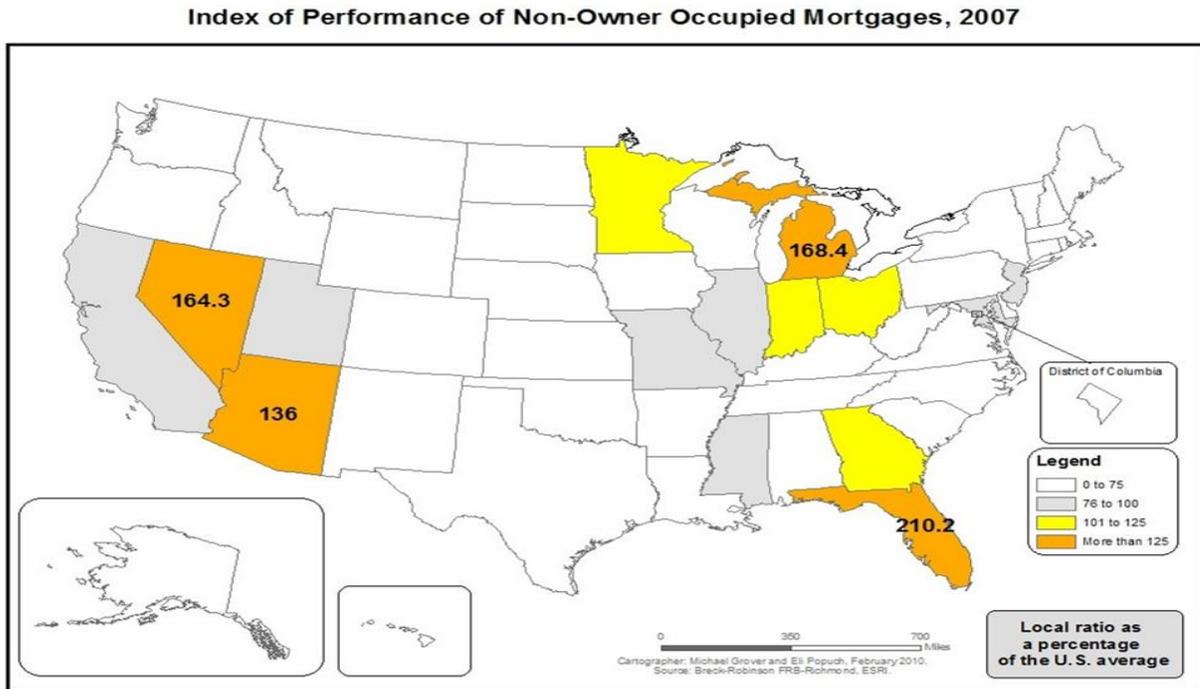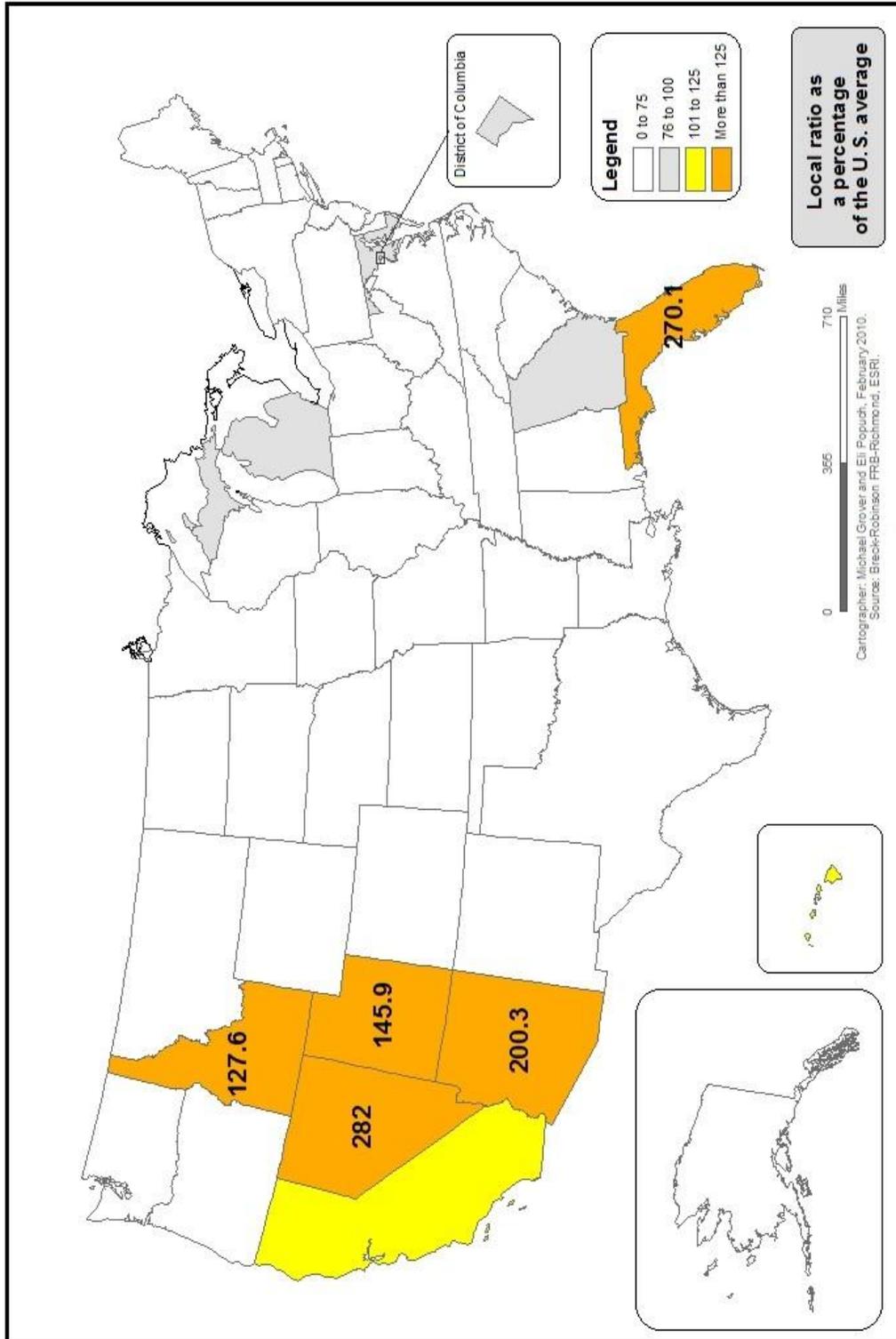Index of Performance of Non-Owner Occupied Mortgages, 2007

Figure A4-9: Non-Owner-Occupied Mortgage Foreclosure Impact per Housing Unit, Relative to U.S. 2004-2007 Average (LPS data for mortgages originated in 2007)

Appendix 5: Non-Occupant Mortgage Prevalence and Foreclosure Impact Measured per Mortgage Originated Instead of Per Housing Unit, 2004-2006

This paper presents measures of non-occupant mortgage prevalence and non-occupant foreclosure impact based on a state's volume of non-occupant mortgage originations and non-occupant foreclosures relative to the total number of housing units in the state. An alternative measure is to express these volumes relative to the total volume of mortgage originations.[50] These alternative measurements are presented here for mortgages originated in 2004-2007, using formats similar to those of Figures 11, 12, and 14 but with total mortgage originations in the denominator instead of total housing units.[51]

Compared to the per housing unit measures in Figures 11, 12, and 14, the per mortgage measures presented here tend to show a higher impact in Midwestern states like Ohio and Indiana, where mortgage originations per housing unit in 2004-2007 were lower than in Western states like Arizona and Idaho. The fact that 2004-2007 mortgage originations per housing unit were higher in Arizona, than in Indiana and Ohio may be related to the faster rate of growth in population and new housing construction in recent years in Arizona.

2004
Figure A5-1
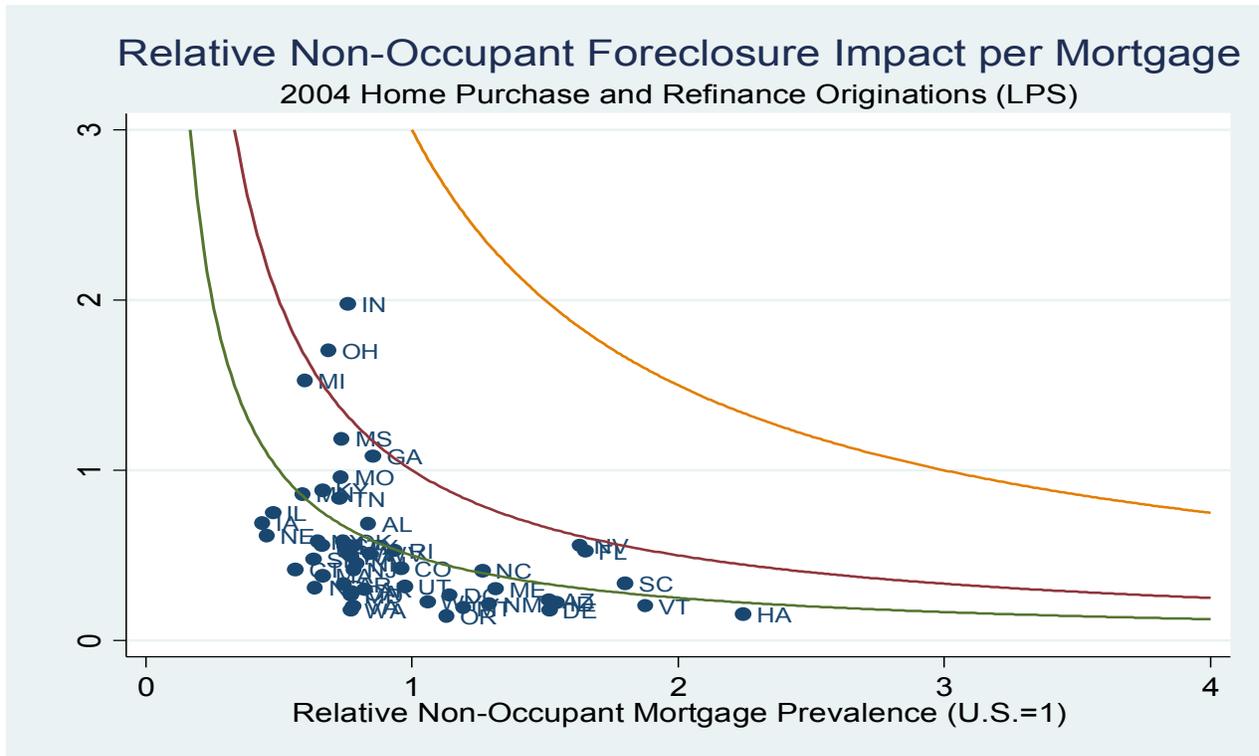
Relative Non-Occupant Foreclosure Impact per Mortgage
2004 Home Purchase and Refinance Originations (LPS)

Note: Middle line represents an impact equal to the LPS data 2004-07 national average of 8.5 non-occupant foreclosures per 1000 home mortgages (owner-occupied and non-owner occupied) . The lower and upper lines represent impacts of, respectively, half and three times that national average impact.

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[50] In all cases, the mortgages considered are first-lien housing purchase and refinance mortgages on single-family housing units.

[51] Figure 13 is not affected by the choice of total mortgages as the denominator for defining prevalence and impact.

Figure A5-2

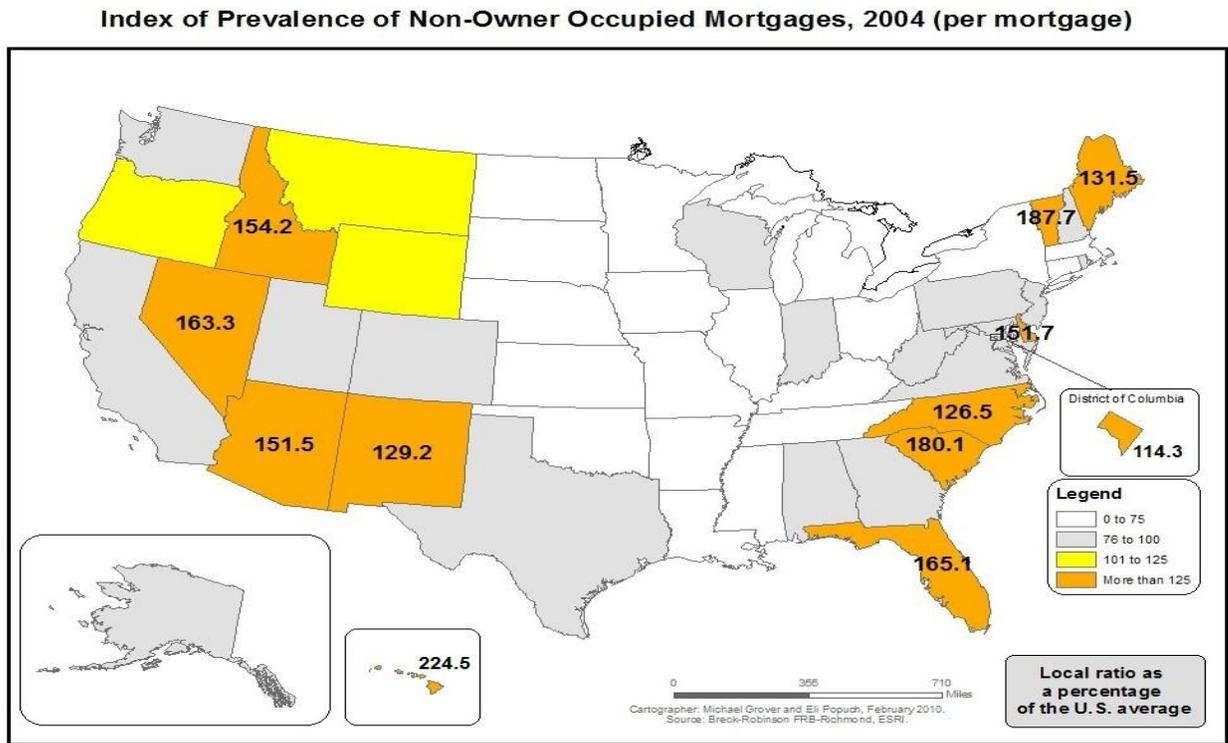## Index of Prevalence of Non-Owner Occupied Mortgages, 2004 (per mortgage)

Local ratio as a percentage of the U.S. average

Figure A5-3

Index of Impact of Non-Owner Occupied Mortgages, 2004 (per mortgage)

Local ratio as a percentage of the U.S. average

Relative Non-Occupant Foreclosure Impact per Mortgage

2005 Home Purchase and Refinance Originations (LPS)

Note: Middle line represents an impact equal to the LPS data 2004-07 national average of 8.5 non-occupant foreclosures per 1000 home mortgages (owner-occupied and non-owner occupied) . The lower and upper lines represent impacts of, respectively, half and three times that national average impact.

Figure A5-5

Index of Prevalence of Non-Owner Occupied Mortgages, 2005 (per mortgage)

District of Columbia
122.5

Legend
0 to 75
76 to 100
101 to 125
More than 125

Local ratio as
a percentage
of the U.S. average

Cartographer: Michael Grover and Eli Popuch, February 2010.
Source: Breck-Robinson FRB-Richmond, ESRI.

Figure A5-6

Index of Impact of Non-Owner Occupied Mortgages, 2005 (per mortgage)

District of Columbia

Legend
0 to 75
76 to 100
101 to 125
126 to 300
More than 300

Local ratio as
a percentage
of the U.S. average

Cartographer: Michael Grover and Eli Popuch, February 2010.
Source: Breck-Robinson FRB-Richmond, ESRI.

Relative Non-Occupant Foreclosure Impact per Mortgage
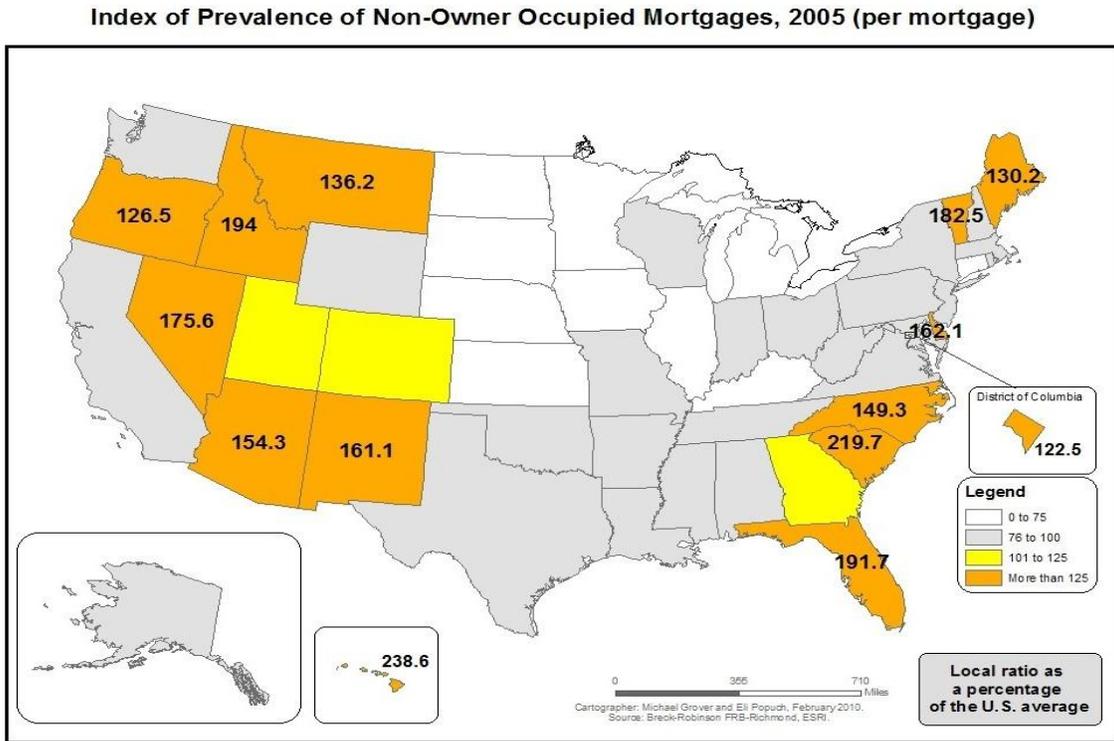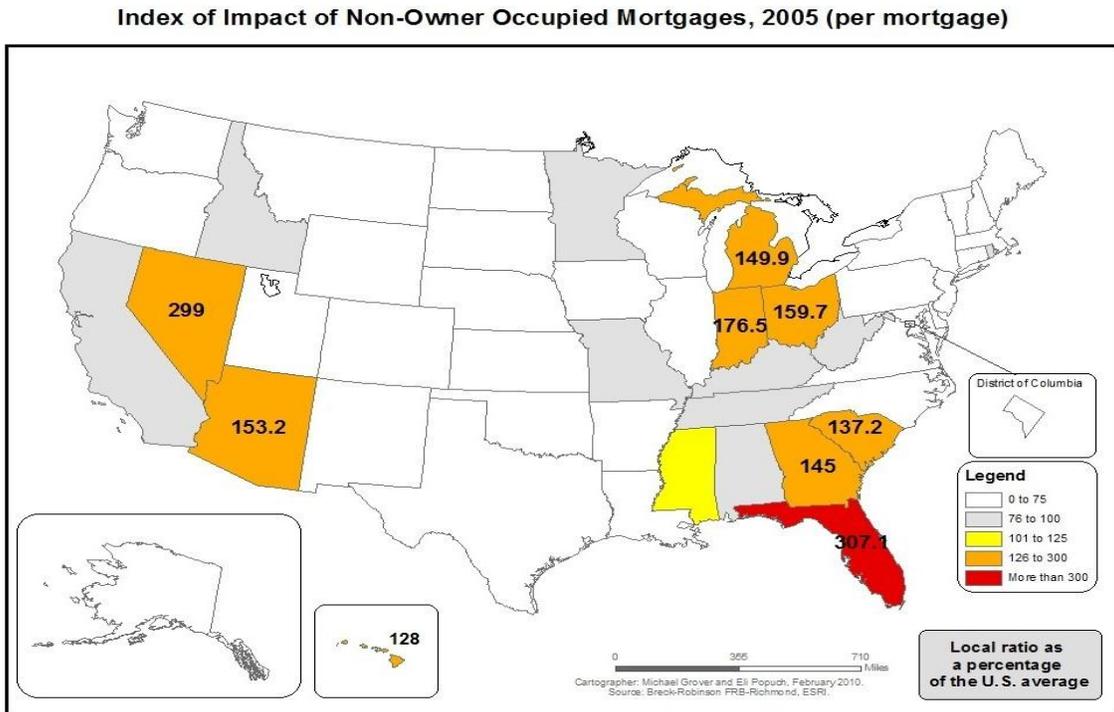2006 Home Purchase and Refinance Originations (LPS)

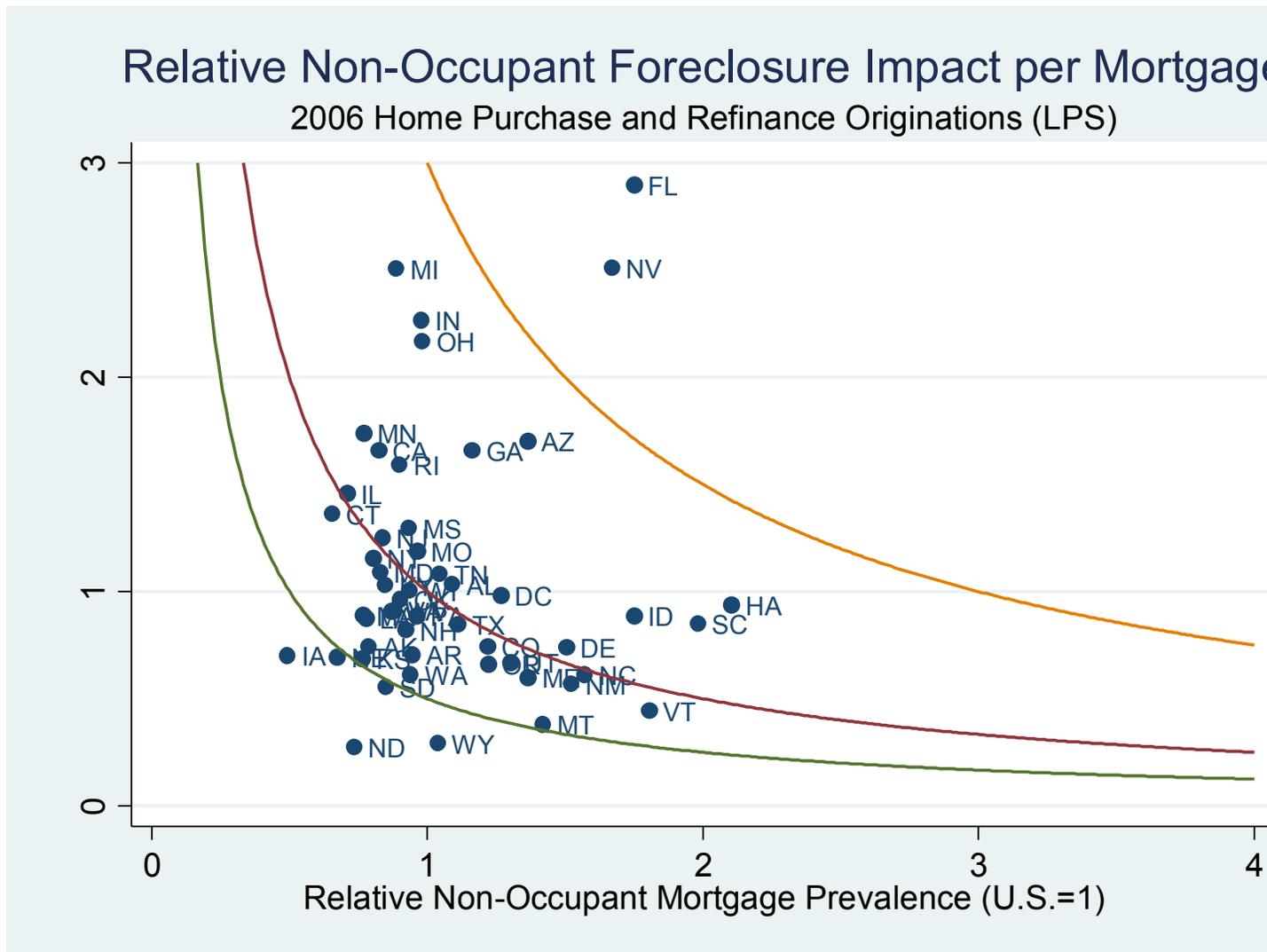**Note: Middle line represents an impact equal to the LPS data 2004-07 national average of 8.5 non-occupant foreclosures per 1000 home mortgages (owner-occupied and non-owner occupied) . The lower and upper lines represent impacts of, respectively, half and three times that national average impact.**

Figure A5-8

Index of Prevalence of Non-Owner Occupied Mortgages, 2006 (per mortgage)

Figure A5-9

Index of Impact of Non-Owner Occupied Mortgages, 2006 (per mortgage)

Relative Non-Occupant Foreclosure Impact per Mortgage
2007 Home Purchase and Refinance Originations (LPS)

Note: Middle line represents an impact equal to the LPS data 2004-07 national average of 8.5 non-occupant foreclosures per 1000 home mortgages (owner-occupied and non-owner occupied) . The lower and upper lines represent impacts of, respectively, half and three times that national average impact.
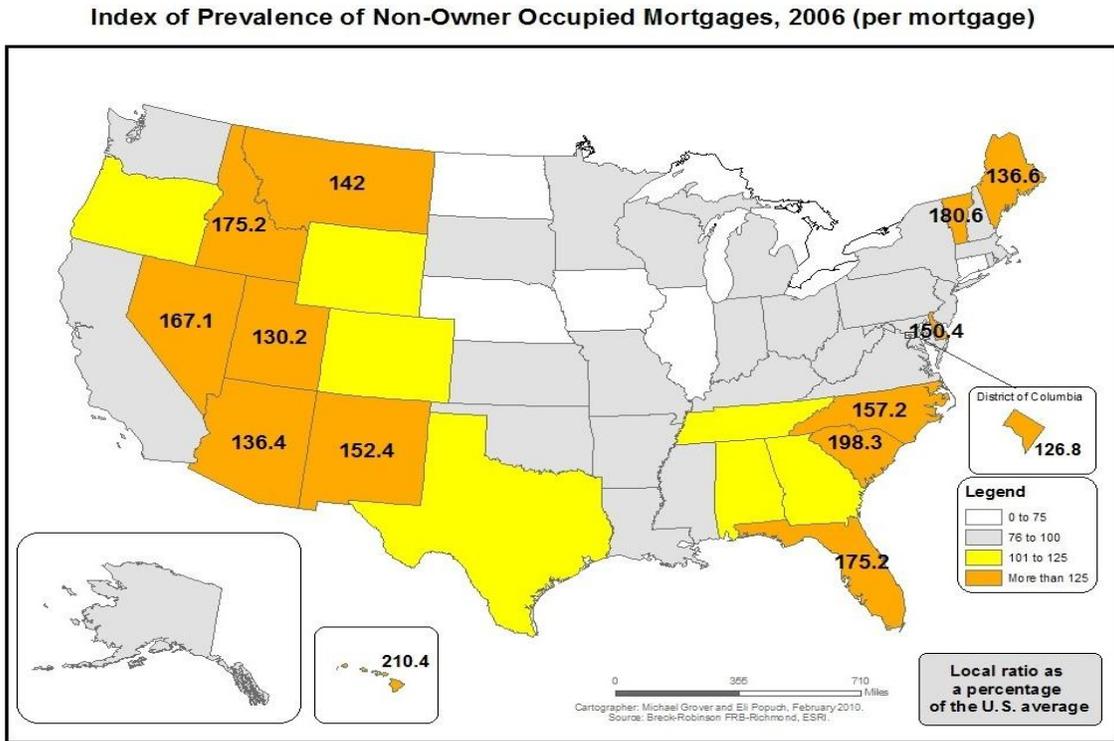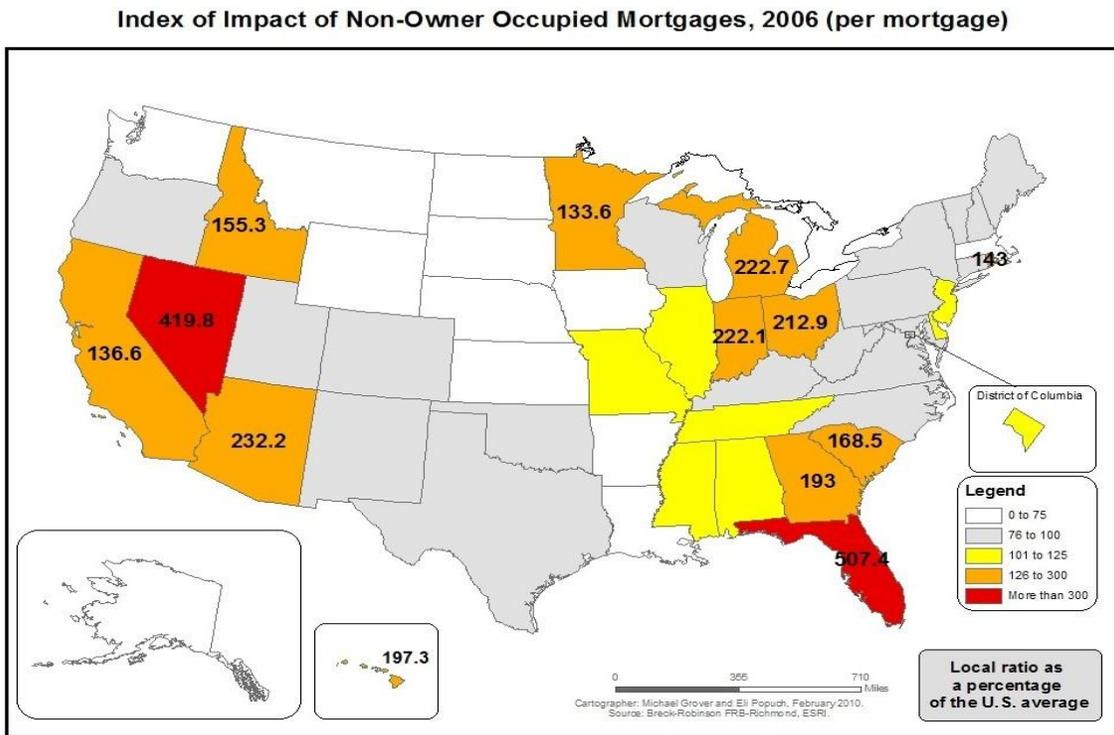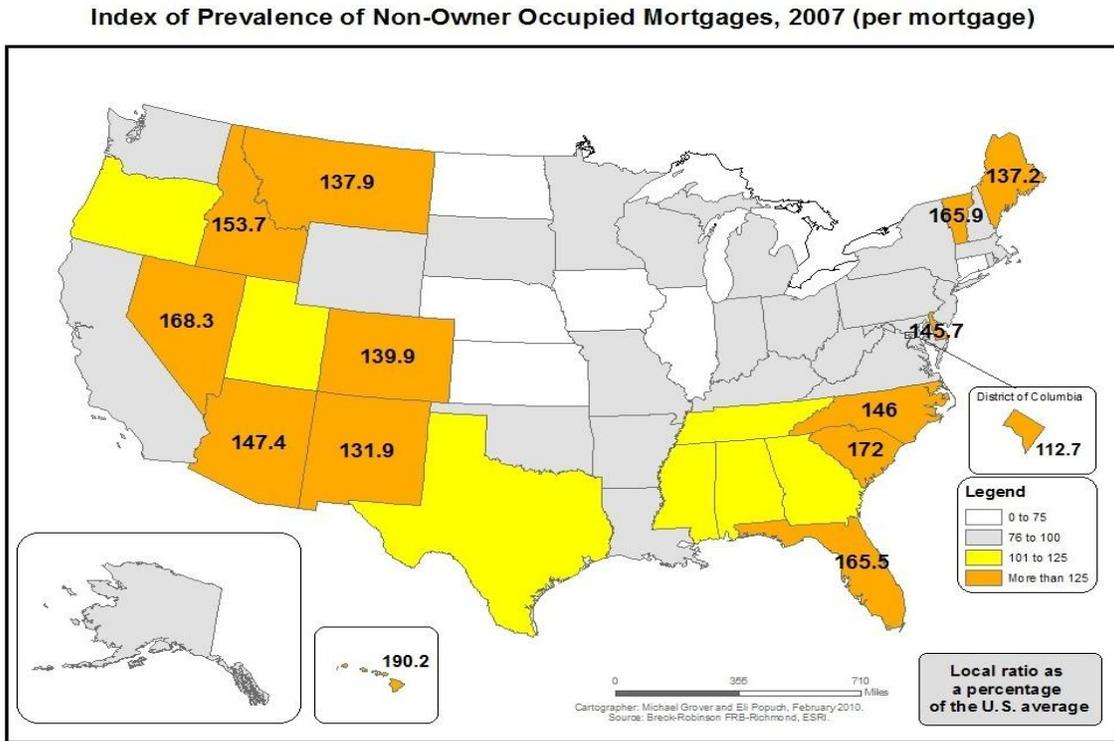
Figure A5-11

Index of Prevalence of Non-Owner Occupied Mortgages, 2007 (per mortgage)

Figure A5-12

Index of Impact of Non-Owner Occupied Mortgages, 2007 (per mortgage)