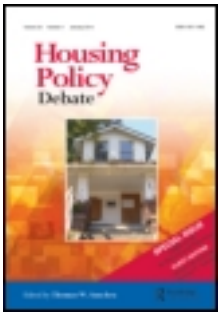


Housing Policy Debate
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rhpd20

Bankruptcy During Foreclosure: Home Preservation Through Chapters 7 and 13

Mark R. Lindblad[a], Roberto G. Quercia[a], Melissa B. Jacoby[b], Ling Wang[a] & Huifang Zhao[a]
[a] UNC Center for Community Capital, Chapel Hill, NC, USA
[b] UNC School of Law, Chapel Hill, NC, USA
Published online: 07 May 2014.

To cite this article: Mark R. Lindblad, Roberto G. Quercia, Melissa B. Jacoby, Ling Wang & Huifang Zhao (2014): Bankruptcy During Foreclosure: Home Preservation Through Chapters 7 and 13, Housing Policy Debate, DOI: 10.1080/10511482.2013.854267

To link to this article: http://dx.doi.org/10.1080/10511482.2013.854267

Housing Policy Debate, 2013
http://dx.doi.org/10.1080/10511482.2013.854267

Taylor & Francis
Taylor & Francis Group

Bankruptcy During Foreclosure: Home Preservation Through Chapters 7 and 13

Mark R. Lindblad,[a]* Roberto G. Quercia,[a] Melissa B. Jacoby,[b] Ling Wang,[a] and Huifang Zhao[a]

[a]*UNC Center for Community Capital, Chapel Hill, NC, USA;*
[b]*UNC School of Law, Chapel Hill, NC, USA*

(*Received July 2, 2013; accepted October 8, 2013*)

Filing for bankruptcy is the primary legal mechanism by which homeowners in foreclosure can exert control over ownership of their home, yet little is known about the interplay among bankruptcy types, mortgage servicers, state foreclosure laws, and home foreclosure auctions. We analyze 4,280 lower-income homeowners in the United States who were more than 90 days late paying their 30-year fixed-rate mortgages. Two dozen organizations serviced these mortgages and initiated foreclosure between 2003 and 2012. We identify wide variation between mortgage servicers in their likelihood of bringing a property to auction. We also show that when homeowners in foreclosure filed for bankruptcy, foreclosure auctions were 70% less likely. Chapters 7 and 13 filings both reduce the hazard of auction, but the effect is 5 times greater for Chapter 13, which contains enhanced tools to preserve homeownership. Bankruptcy's effects are strongest in states that permit power-of-sale foreclosure or withdraw homeowners' right-of-redemption at the time of auction.

Keywords: mortgage servicing; displacement; relocation; real estate owned; homeownership; default

The problem of home foreclosures in the United States continues to unfold in ways that negatively impact families and neighborhoods. In recent years, severe house price declines and a struggling economy have increased the number of homeowners who owe more on their mortgages than their homes are worth, which has challenged the ability of policymakers to effectively address the foreclosure crisis. As homeowners have lost jobs and income, many have fallen behind on bill payments and become seriously delinquent (more than 90 days late) on their home mortgages.

While mortgage loan workouts and modifications have helped a small fraction of homeowners, more often the delinquent mortgages continue uncured. Consequently, mortgage servicers must decide what to do with the mortgaged property and its occupants. These decisions include whether to displace homeowners, how to maintain vacant properties following displacement, and when to sell properties through a foreclosure auction.

Homeowners experiencing serious mortgage delinquency encounter parallel challenges of whether and how to retain ownership of their homes. When homeowners are no longer able to ameliorate delinquent mortgages and must face foreclosure proceedings,

*Corresponding author. Email: mark_lindblad@unc.edu

they risk the loss of their home. Thus, homeowners in foreclosure must decide what to do about their delinquent mortgages.

Most studies of home foreclosure focus on the time when foreclosure proceedings begin, rather than the time when the property is sold through the foreclosure auction. This focus makes sense given policymakers' predominant interest in identifying optimum mortgage-underwriting criteria. Yet, the emphasis on foreclosure starts has detracted from a fuller understanding of what happens after foreclosure proceedings begin.

The emphasis has also led to the conflation of foreclosure starts with foreclosure sales. Both events are often treated as if they were one and the same. Cutts and Merrill (2008) noted the confusion that surrounds the foreclosure process:

> A common misconception is that the borrower loses their home when foreclosure starts (the date at which the loan is referred to foreclosure attorneys to begin legal action), when in fact the legal process averages almost one year since the borrower's last payment and many borrowers are able to reinstate their loans out of foreclosure and keep their homes. (p. 28)

Relatedly, there is a tendency for scholars to imply that mortgage-delinquent homeowners determine foreclosure sales or that foreclosure sales and bankruptcy are synonymous in signaling financial distress. In fact, it is the mortgage servicer who brings the home to foreclosure auction. The mortgage servicer also decides whether the auctioned home is sold to a third party or remains "real estate owned." In contrast, it is the homeowner's decision whether or not to file for bankruptcy.

Researchers have given too little attention to these actors. In our nationwide sample of low- to moderate-income homeowners in foreclosure, we find that the decision to auction a foreclosed home is not a simple one. Foreclosure auctions are influenced by the organization that services the mortgage, as well as the bankruptcy decision of the homeowner.

State property laws determine the process by which mortgage servicers can repossess mortgaged property. Some states require judicial review, a process that involves court supervision over foreclosure proceedings. A smaller number of states maintain a homeowner's right of redemption even after a foreclosure auction, thus giving a borrower the opportunity to reclaim the property. Most states allow deficiency judgments, by which borrowers remain liable for unsatisfied mortgage debt after foreclosure proceedings conclude. In addition, reinstatement laws in some states permit homeowners to monetarily cure their delinquent mortgages over objections of the mortgage servicer (Jacoby, 2008).

Both redemption rights and reinstatement laws provide ways by which homeowners in foreclosure can actively maintain possession of their home. However, both also require a lump-sum payment that includes any costs that the servicer is allowed to charge (Jacoby, 2008). So, although homeowners in states that offer these provisions have the opportunity to monetarily cure their mortgage deficiency, it is unlikely that they will be able to do so. Consequently, even where available, neither reinstatement laws nor rights of redemption may help the vast majority of homeowners in foreclosure retain their homes.

Mortgage modifications also provide a way for homeowners in foreclosure to avoid losing their homes. However, given the legal contracts between borrowers and servicers, all modifications require the cooperation of the servicers, who typically answer to their investors. Consequently, homeowners do not control mortgage modifications.

There is another legal channel by which homeowners in foreclosure can actively protect their home from being auctioned: bankruptcy. By federal law, filing for personal or consumer bankruptcy stops the home foreclosure process. Thus, among homeowners in foreclosure, those who file for bankruptcy may be more likely than nonfilers to preserve their ownership of the home.

In a critique of the federal response to the foreclosure crisis, Immergluck (2013) identified the inadequacy of bankruptcy protection as a key factor that contributed to the foreclosure crisis. Bankruptcy law currently does not permit restructuring of the mortgage principal of the primary residence except in rare circumstances, yet it does contain provisions that may assist mortgage-delinquent homeowners. A number of scholars have detailed the legal mechanisms by which filing for bankruptcy can protect these homeowners from losing their homes in the foreclosure process (Capone, 1996; Culhane, 2012; Eggum, Porter, & Twomey, 2008; Jacoby, 2007; Jacoby, McCue, & Belsky, 2011; M. J. White & Zhu, 2010). Scholars have also discussed the additional requirements and filing fees that resulted from the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act (Jacoby, 2007; Lawless et al., 2008; M. J. White, 2009). While these sources describe many legal complexities that are beyond the scope of this article, we identify the most prominent legal features that apply to the majority of homeowners in foreclosure.

Federal bankruptcy law provides what is called "automatic stay," whereby filing for Chapter 7 or Chapter 13 bankruptcy immediately halts all debt collection, including foreclosure proceedings. Under a Chapter 7 bankruptcy filing, a borrower discharges unsecured debts such as those from credit cards or medical bills. The relief of unsecured debt can release additional household income that people may be able to use to pay their outstanding mortgage debt, thereby forestalling or preventing the sale of their home. Under a Chapter 13 bankruptcy filing, the mortgage-delinquent homeowner proposes a debt-repayment plan for the mortgage and resumes making regular payments under the mortgage agreement. A bankruptcy court must confirm the plan. The potential outcomes of Chapter 13 are successful completion of the plan; conversion from a Chapter 13 to a Chapter 7 bankruptcy; and dismissal of the plan, either with or without a reinstatement of the mortgage debt. While Chapter 7 does not offer the special home-protection provisions of Chapter 13, both provide the automatic stoppage of foreclosure.

Legal scholars who link bankruptcy and foreclosure tend to focus on the formal home-protection provisions in Chapter 13, yet Chapter 7 may also assist homeowners. Sullivan, Warren, and Westbrook (1989) suggested that for homeowners, Chapter 7 may be preferable to Chapter 13 because it releases income that could be used to pay the mortgage. Thus, both Chapters 7 and 13 have provisions to help homeowners retain their home.

Research Linking Bankruptcy to Foreclosure

For decades, bankruptcy laws have contained the automatic stay and other explicit provisions to help mortgage-delinquent borrowers stay in their homes, yet surprisingly little research examines the interactive roles played by mortgage servicers and these homeowners. The major reason is data constraints: Few mortgage origination and performance data sets can be linked to household bankruptcy decisions. Another complication is that bankruptcy and home foreclosure auction are both rare events. Less than 2% of households file for bankruptcy annually, even amid the economic challenges of the past decade. Similarly, actual foreclosure auctions, as opposed to foreclosure starts, are estimated at single-digit percentages of all active mortgages, despite the housing downturn of 2007 and the ensuing foreclosure crisis.

This observation that bankruptcy and foreclosure auction are both uncommon does not imply that these events are inconsequential. Due to the high leveraging of the debt involved, decisions related to foreclosure auctions and bankruptcy filings carry very large financial consequences for households, neighborhoods, servicers, lenders, and society. But from a research perspective, the fact that both bankruptcy filings and foreclosure auctions

are rare events complicates their study because it increases the number of households needed to obtain sample sizes large enough to provide the statistical power to detect differences.

A few empirical studies have examined the overlap between bankruptcy and home foreclosure. Some evidence can be found in descriptive findings from the 2007 Consumer Bankruptcy Project. These data show that 71% of bankrupt homeowners identify saving the home as an important motive for their bankruptcy (Anthony, 2012). Even so, many homeowners who file for bankruptcy nonetheless experience relocation. Culhane (2012) reported that less than a year after filing, 26% of Chapter 7 filers and 10% of Chapter 13 filers had moved from their home. These differences in relocation suggest that the type of filing itself may influence the likelihood of home preservation.

Carroll and Li (2011) examined the links between bankruptcy and foreclosure using a sample of homeowners who filed for Chapter 13 bankruptcy. They found that 28% of filers nonetheless lost their home to foreclosure and that filing for bankruptcy increased the time to foreclosure sale by 28 months. They analyzed Chapter 13 filings only, so the potential impact of a Chapter 7 filing was not assessed. While Carroll and Li provided a helpful picture of relations between bankruptcy and foreclosure, they examined bankruptcy filers from only one state, Delaware, which precluded their assessing the impact of state laws. They also noted that Delaware's laws differ from those in most other states in ways that could affect their findings.

Whereas Anthony (2012), Carroll and Li (2011), and Culhane (2012) examined homeowners who filed for bankruptcy and may have experienced foreclosure, our study reverses this approach. We examine homeowners who experienced a foreclosure start, decided whether to file for bankruptcy, and may have experienced a foreclosure auction. Our research design and data permit a more direct assessment of whether bankruptcy was successfully used by mortgage-delinquent borrowers as a tool to preserve homeownership.

Other studies have examined links among bankruptcy, house payments, and foreclosure starts. Jacoby et al. (2011) analyzed missed mortgage payments and foreclosure starts using a sample of homeowners who filed for Chapter 7 or Chapter 13 bankruptcy. They found that Chapter 13 filers are twice as likely to miss a mortgage payment. In addition, filers who live in states with longer foreclosure time lines are less likely to have their mortgage servicer initiate foreclosure proceedings. Both models—missed mortgage payments and foreclosure starts—show a positive relationship with self-reported mortgage problems as a cause of bankruptcy. However, the authors could not address the question of whether filing for bankruptcy reduces actual foreclosure auctions, because of insufficient data.

Li and White (2012) investigated the potential links between bankruptcy and foreclosure. They found a negative association between filing for bankruptcy and foreclosure starts and sales, although they encountered statistical challenges because of the rare nature of these events and the small number of bankruptcies that overlapped with foreclosure. A. M. White and Reid (2013) found that bankruptcy delays foreclosure but does not cure payment defaults. In earlier research, Li and White (2009) investigated relations among mortgage default, foreclosure, and bankruptcy. Using a national mortgage-performance database, the authors sought to determine whether these events complement or substitute for one another. They found that mortgage default and bankruptcy complement each other in signaling insolvency.

Human Agency in Bankruptcy and Foreclosure

The idea that mortgage default and bankruptcy complement each other is plausible because both events signal an insolvent individual. However, we have a different

interpretation for the notion that bankruptcy can complement foreclosure auctions. These events can only complement each other to the extent that bankruptcies filed for purposes of home preservation are inadequate as a way to delay foreclosure auctions. Individuals with different motives are involved in the decision to file for bankruptcy and the decision to auction a property in foreclosure. Homeowners decide whether and when to file for bankruptcy, while mortgage servicers decide whether and when to auction a property in foreclosure.

In this study, we frame these issues according to the individual in power, and thus we explore the human agency of both the homeowner's decision to file for bankruptcy and the mortgage servicer's decision to hold a property auction. By human agency, we mean that people are not passive observers; they intentionally influence their circumstances (Bandura, 2006). In applying the concept of human agency to bankruptcy and foreclosure, we stress that individuals make leveraged financial decisions. While shareholders in mortgage-servicing organizations can influence servicing through their investor contracts, mortgage servicers themselves decide whether to bring foreclosed homes to auction. This human element is important because foreclosure auctions displace people, occur in different ways, and result in disparate societal impacts.

Human agency also drives bankruptcy filing decisions. Remaining in foreclosed homes may not serve the homeowners' financial interests in the long run (Gerardi, Lambie-Hanson, & Willen, 2013), yet attachment to the home may provide a bankruptcy motive for some. Mortgage-delinquent homeowners who file for bankruptcy to retain their home apply some degree of human agency to influence the situation, and they do so despite the stigma typically associated with bankruptcy.

Contributions

To assess the link between bankruptcy and foreclosure auction, we limit our sample to borrowers whose mortgage servicers initiated foreclosure proceedings. These homeowners have a pressing motive to file for bankruptcy to delay an auction of their home. We analyze these events over the 2003–2012 period of financial turbulence in house prices and the broader economy. Our data include information on mortgage origination and performance, loan servicing, house price valuations, foreclosure starts and auctions, and bankruptcy filings.

To our knowledge, no other study disaggregates the effects of chapters 7 and 13 bankruptcy filings on foreclosure auctions in the context of state foreclosure laws. Our study addresses this gap and makes four contributions. First, it provides evidence that mortgage servicing influences home foreclosure auctions. Second, it shows that compared with nonfilers in foreclosure, those who file for bankruptcy delay the auction of their home. Third, it shows that this delay is substantially longer for Chapter 13 bankruptcies than for Chapter 7. Fourth, it identifies how federal bankruptcy laws interact with state foreclosure laws and shows that the mentioned effects of bankruptcy are strongest in states that permit power-of-sale foreclosure or withdraw homeowners' right of redemption at the time of auction.

These contributions are important given that foreclosure sales reduce nearby house prices (Immergluck & Smith, 2006). Housing scholars have devoted much attention to the foreclosure crisis. They have also studied interventions such as mortgage modifications, workouts, and other foreclosure-prevention efforts. Yet, despite the longstanding legal connection of bankruptcy to home foreclosure, few empirical studies explore this link.

Methods

Data

We use data collected by Self-Help for the Community Advantage Program (CAP). CAP began as a secondary mortgage market program developed out of a partnership of the Ford Foundation, Fannie Mae, and Self-Help, a leading community development financial institution in North Carolina. CAP's goal is to purchase conventional, fixed-rate prime mortgages originated to low- to moderate-income families in the United States who, given their credit profile, would otherwise have received a subprime mortgage or been unable to purchase a home.

Mortgages have to meet one of the following criteria for consideration: (1) borrowers have an annual income of no more than 80% of the area median income (AMI), (2) borrowers are a minority with an income not in excess of the 115% of the AMI, or (3) borrowers purchased the home in a high-minority ($>30\%$) or low-income ($<80\%$ of the AMI) census tract and have an income not in excess of 115% of the AMI. As of 2013, CAP contains about 50,000 mortgage originations that meet the above criteria. CAP homeowners have been compared to two nationally representative surveys that were administered in 2003 by the Census Bureau: the Current Population Survey (CPS) and the American Housing Survey (AHS). The CPS collects information about demographics and household characteristics. The AHS surveys housing units and gathers demographic characteristics on the inhabitants. The greatest difference between CAP homeowners and lower income homeowners in the CPS and AHS concerns geographic coverage. CAP has little coverage in the Northeast and overrepresents the South (Riley & Feng, 2013).

Self-Help provides loan-level data on mortgage originations, servicing, performance, and bankruptcies. Fannie Mae provides current property values. Addresses are geo-coded and linked to secondary data sources such as those of the U.S. Bureau of the Census. All mortgages originated as home purchase loans with fixed interest rates and without prepayment penalties or balloon payments (Riley, Ru, & Quercia, 2009).

Sample

We create a cross-sectional data set to analyze foreclosure time. Households enter the data set once mortgage servicers initiate foreclosure proceedings. Households leave the data set once a foreclosure auction occurs. With this design, all bankruptcies follow foreclosure initiation yet precede foreclosure auction.

Only 6% of the foreclosure starts end as modifications, workouts, or cures; we remove these loans from further analysis. We also reduce the influence of outliers by removing 1% of the data from each tail of the time that the loans were in foreclosure. Thus, we remove a total of 8% of the homeowners in foreclosure during data construction. List-wise deletion of missing data removes only three more loans. The final sample size is 4,280 households.

Mortgage origination data indicate that 51% of the sample are male-headed households, while 44% are minority households. Approximately 27% are Black, 12% are Hispanic, and 5% are classified as other minority households. Home purchases occured in the early 2000s, and the median home price was $81,000. At the time of home purchase, the median borrower was 32 years old, and the median household income was $29,268. The mortgages entered foreclosure proceedings from 2003:Q1 to 2012:Q4.

Measures

We use the date of the foreclosure auction to indicate the end of foreclosure proceedings. From the perspective of the homeowner, the auction is the end of the foreclosure process

because that is when the homeowner loses ownership of the property. There are potential exceptions that we described earlier. For example, borrowers in redemption-right states can reclaim property after auction by exercising their redemption rights; however, we find little evidence that this actually occurs. As a practical matter, then, a foreclosure auction ends the period in which bankruptcy can preserve homeownership.

We construct two foreclosure outcomes. The first measures whether a foreclosure auction occurred. The second measures the duration of time between the foreclosure start and either foreclosure auction or right censoring of the data. (Right censoring refers to loans in active foreclosure at the end of the study period.)

We include the year of foreclosure start to adjust for the fact that servicers initiated foreclosure proceedings at different times during the study period. Prior work suggests that the pace of foreclosure sales may decrease at the start of a weakening housing market (Lee & Immergluck, 2012). As a covariate, the year of foreclosure start adjusts for left censoring (Allison, 2010). (Left censoring indicates that households enter the data set at different times.)

Nineteen percent of the bankruptcies are missing data for which chapter was filed. To maximize statistical power, we keep these unknown-chapter records in the analysis. We create a separate dummy variable for "unknown chapter" so that in our disaggregation of chapter effects, we can analyze these filings along with the Chapter 7 and Chapter 13 filings. The unknown-chapter category behaves as expected, in that most parameter estimates fall between the two known chapters, suggesting that there are some of each.

To assess the current value of the mortgage loan relative to house value, we combine Self-Help's mortgage principal repayment data with house price valuations from Fannie Mae. With these data, we calculate the current loan-to-value (CLTV) ratio. We link CLTV to the time that the house entered foreclosure proceedings.

We use Self-Help's mortgage portfolio to identify the mortgage servicer. This information is proprietary; thus, we do not disclose servicer names. We choose as a reference group the mortgage servicer with the largest proportion (17.5%) of foreclosure starts. We model 19 individual servicers plus an "Other" category that combines the remaining organizations, each of which had less than 30 loans and therefore could not be assessed individually.

We test neighborhood and economic conditions, as well as state and federal laws. We include a measure we call "neighborhood disadvantage" derived from 2000 census data. This is a standardized index within census tracts that we create from the summed percentages of four characteristics: single parent, unemployed, on public assistance, and income below the poverty line.

To gauge economic conditions during the sample period, we use the county monthly unemployment rates from the U.S. Bureau of Labor Statistics and the metropolitan area quarterly house price indices from the Federal Housing Finance Agency. We match these local economic measures at the time that the house entered foreclosure proceedings. We consider economic trends by calculating year-on-year percentage changes for these variables; however, we use the actual unemployment rate and the house price index because these measures fit the data better than the trend variables.

Foreclosure activity at the state level could also matter. Starting in 2008, the ensuing foreclosure crisis was exacerbated by inadequate resources within the state courts. To the extent that some states could handle the foreclosure workload, the rate of foreclosure starts could influence foreclosure auctions. Using data from the Mortgage Bankers Association, we average quarterly foreclosure starts per loans serviced and create annual rates of foreclosure starts for all 50 states.

State laws might also impact the decision by mortgage servicers to auction the home. We match addresses to state laws based on maps of 2003 state foreclosure laws as referenced by Pence (2006). We analyze three state foreclosure laws:

1. *Power of Sale vs. Judicial Review*: Foreclosure proceedings may unfold either by judicial foreclosure, in which the court supervises auction of the property, or by power-of-sale foreclosure, in which the mortgage servicer may auction the property without filing a lawsuit. Judicial review of homes sold in foreclosure takes longer, on average, than power-of-sale foreclosure. Thus, we expect a lower likelihood of foreclosure auctions among people who live in judicial-review states. Following Pence (2006), we use a categorical indicator and code states that require judicial review as 1 and all other states as 0.
2. *Statutory Right of Redemption*: Some states permit people to reclaim their home even after a foreclosure auction, through a process called statutory right of redemption. Right of redemption periods refer to the number of days that each state allows for people to reclaim their foreclosed home. We expect a lower likelihood of foreclosure auction among people who live in states that permit property redemption. Following Pence (2006), we code states with statutory right of redemption as 1 and all other states as 0.
3. *Deficiency Judgments*: Most states allow debt collection from homeowners if the mortgage servicer's costs of foreclosure exceed the proceeds from the home sale. We expect a lower likelihood of auctions among people who live in the few states that prohibit deficiency judgments. Following Pence (2006), we code states that prohibit a deficiency judgment as 1 and all other states as 0.

Analysis

We present two complementary analyses. One set of models estimates whether a foreclosure auction is held during the study period. These models present an event-history analysis of the likelihood of foreclosure auction versus right censoring. Let P_{iy} be the probability that household i has a mortgage servicer who initiates foreclosure in year y and experiences a foreclosure auction as of 2012:Q4. Then, our full logistic regression model indicates that P_{iy} relates to the covariates as follows:

$$\log\left(\frac{P_{iy}}{1-p_{iy}}\right) = \beta_0 + \beta_1 \text{Year\_FC\_Started}_i + \beta_2 \text{Servicer}_i + \beta_3 \text{State\_FC\_Rate}_y + \beta_4 \text{CLTV}_{iy} + \beta_5 \text{Local\_Economy}_y + \beta_6 \text{State\_FC\_Laws}_y + \beta_7 \text{Bankruptcy}_i$$

where *Year_FC_Started* is a categorical indicator for the year the servicer initiated foreclosure proceedings; *Servicer* is a categorical indicator for the mortgage servicer; *State_FC_Rate* is the annual foreclosure rate for each state; *CLTV* is a continuous variable for the current house value as it relates to the mortgage; *Local_Economy* is a vector of three variables that consist of the census-tract index of neighborhood disadvantage, the local unemployment rate, and the house price index; *State_FC_Laws* is a vector of categorical indicators for the three laws, identifying whether the respondent lives in a state that requires judicial review, provides for right of redemption, and/or prohibits deficiency judgments; and *Bankruptcy* is a vector of two categorical indicators of the homeowner's bankruptcy decision: whether a bankruptcy is recorded (filed | did not file) and the

disaggregation of bankruptcies into bankruptcy chapter choice (filed Chapter 7 | filed Chapter 13 | filed but chapter unknown | did not file).

The second set of models estimate the hazard of foreclosure auction as the duration of time between the foreclosure start and either a foreclosure auction or right censoring. Let $h_i(t)$ be the hazard function of household i experiencing foreclosure auction at time t since the foreclosure started in year y. The Cox proportional hazards model can be written as follows:

$$\log h_i(t) = \alpha(t) + \beta_1 \text{Year\_FC\_Started}_i + \beta_2 \text{Servicer}_i + \beta_3 \text{State\_FC\_Rate}_y + \beta_4 \text{CLTV}_{iy} + \beta_5 \text{Local\_Economy}_y + \beta_6 \text{State\_FC\_Laws}_y + \beta_7 \text{Bankruptcy}_i$$

where $\alpha(t) = \log\lambda_0(t)$ (and $\lambda_0(t)$ is an unspecified baseline hazard function, which can be regarded as the hazard function for an individual whose covariates all have values of 0).

We predict the mortgage servicer's decision to auction a home in foreclosure. We do not observe any way that the homeowner might influence the foreclosure auction except by filing for bankruptcy. Because it is the homeowner who decides whether to file for bankruptcy, we model this bankruptcy decision as independent from the mortgage servicer's decision to auction the foreclosed home.

Findings

We investigate whether and how bankruptcy decisions among homeowners in foreclosure influence foreclosure auctions. We first examine the incidence of bankruptcy by chapter filed and foreclosure auction. We then turn to inferential models of how foreclosure auctions relate to mortgage servicers, bankruptcy decisions, and state foreclosure laws.

Table 1 displays univariate statistics for categorical indicators, while Table 2 provides statistics for the continuous variables. The tables include background characteristics that we omit from the inferential analysis. For example, Table 2 shows 1962 as the median year that the foreclosed houses were built; we exclude this variable from the models we present because of missing data. The tables also give descriptive statistics for gender, but we exclude it from the inferential analysis for theoretical reasons: We do not hypothesize that mortgage servicers consider the homeowner's gender, race, ethnicity, or other household characteristics when deciding whether to auction a foreclosed home.

Nearly 59% of the homes in the sample were sold by the mortgage servicer through foreclosure auction; 41% were still in foreclosure proceedings at the end of 2012. Roughly two-thirds of the foreclosures were initiated between 2008 and 2012. The median time to foreclosure auction from foreclosure start was nine months.

About 45% of the homeowners were located in states that require judicial review, that is, court supervision of foreclosure proceedings. Roughly 6% were located in states that permit homeowners to redeem their property following a foreclosure auction. Less than 3% were located in states that prohibit deficiency judgments.

How Often Do Homeowners in Foreclosure File for Bankruptcy?

Nearly 8% of homeowners in foreclosure filed for bankruptcy. We know the bankruptcy chapter for 81%, or 270 of the filers. Of these 270 bankruptcies, 191 (70%) were Chapter 13 filings. This figure is noteworthy because the reverse proportion characterizes bankruptcies in the United States: Roughly one-third are Chapter 13 filings, while two-thirds are Chapter 7 (Lefgren & McIntyre, 2009). While others have noted that Chapter 7/13 filing preferences

Table 1. Categorical indicators—univariate statistics.

Variable	Category	Frequency	Percentage	Cumulative frequency	Cumulative percentage
Foreclosure auction	No	1,768	41.31	1,768	41.31
	Yes	2,512	58.69	4,280	100.00
Bankruptcy chapter filed	Did not file	3,947	92.22	3,947	92.22
	Ch. 13	191	4.46	4,138	96.68
	Ch. 7	79	1.85	4,217	98.53
	Ch. unknown	63	1.47	4,280	100.00
State laws: Judicial review	Not required	2,333	54.51	2,333	54.51
	Required	1,947	45.49	4,280	100.00
Postsale redemption rights	Prohibited	4,015	93.81	4,015	93.81
	Exist	265	6.19	4,280	100.00
Deficiency judgments	Permitted	4,162	97.24	4,162	97.24
	Prohibited	118	2.76	4,280	100.00
Year foreclosure started	2003	207	4.84	207	4.84
	2004	246	5.75	453	10.58
	2005	243	5.68	696	16.26
	2006	311	7.27	1,007	23.53
	2007	428	10.00	1,435	33.53
	2008	573	13.39	2,008	46.92
	2009	781	18.25	2,789	65.16
	2010	642	15.00	3,431	80.16
	2011	523	12.22	3,954	92.38
	2012	326	7.62	4,280	100.00
Servicer of mortgage	Servicer_1	748	17.46	748	17.46
	Servicer_2	84	1.96	832	19.42
	Servicer_3	69	1.61	901	21.03
	Servicer_4	380	8.87	1,281	29.90
	Servicer_5	175	4.09	1,456	33.99
	Servicer_6	53	1.24	1,509	35.23
	Servicer_7	544	12.70	2,053	47.93
	Servicer_8	158	3.69	2,211	51.62
	Servicer_9	63	1.47	2,274	53.09
	Servicer_10	355	8.29	2,629	61.38
	Servicer_11	274	6.40	2,903	67.78
	Servicer_12	226	5.28	3,129	73.06
	Servicer_13	255	5.95	3,384	79.01
	Servicer_14	134	3.13	3,518	82.14
	Servicer_15	129	3.01	3,647	85.15
	Servicer_16	92	2.15	3,739	87.30
	Servicer_17	121	2.83	3,860	90.13
	Servicer_18	72	1.68	3,932	91.81
	Servicer_19	186	4.41	4,118	96.22
	Servicer_Others	162	3.78	4,280	100.00

vary by race, geography, and lawyer specialization (Braucher, Cohen, & Lawless, 2012; Cohen & Lawless, 2011; Lefgren & McIntyre, 2009; Lefgren, McIntyre, & Miller, 2010), the special home-protection provisions of Chapter 13 may influence the decision.

Next, we turn to the overlap of bankruptcy decisions with two outcomes. Table 3 compares foreclosure auctions with bankruptcy filings. Among the 8% of homeowners who filed for bankruptcy, foreclosure auctions were less common (49%) compared with those who did not file (59%). Table 4 shows the time in months to foreclosure auction by bankruptcy overall and by chapter filed. The median number of months among bankruptcy

Table 2. Continuous variables—univariate statistics.

Variable	Used in models?	Minimum	Maximum	Mean	Median	Standard deviation	Kurtosis	Skew
Months to foreclosure auction	Yes	1.00	57.00	12.71	9.00	11.67	1.60	1.45
Current loan to house value	Yes	7.35	452.14	97.39	94.03	27.27	12.44	2.01
Local unemployment rate	Yes	2.56	18.82	7.97	7.75	2.65	−0.50	0.35
Local house price index	Yes	110.66	659.80	203.45	167.71	78.46	2.94	1.62
Neighborhood disadvantage index	Yes	0.02	0.38	0.11	0.10	0.05	1.22	1.04
State foreclosure rate (annual)	Yes	0.16	3.46	1.00	0.93	0.47	3.13	1.49
Background characteristics								
Borrower age	No	18.00	91.00	34.82	32.00	11.65	1.70	1.22
Borrower gender (male = 1)	No	0.00	1.00	53.83	1.00	n/a	n/a	n/a
Annual income at origination	No	0.00	$98,424	$31,031	$29,256	$11,995	1.99	0.99
Area median income	No	$24,100	$105,500	$55,064	$54,900	$11,014	0.46	0.18
Income at origination as a percentage of AMI	No	0.15	1.97	0.56	0.55	0.18	2.08	0.82
Is either borrower minority?	No	0.00	1.00	0.44	0.00	n/a	n/a	n/a
Is either borrower African American?	No	0.00	1.00	0.27	0.00	n/a	n/a	n/a
Is either borrower Hispanic?	No	0.00	1.00	0.12	0.00	n/a	n/a	n/a
Year house built	No	1814	2008	1961	1962	37.68	226.02	−9.29
Unpaid balance at time of foreclosure start	No	$3,647	$384,427	$81,990	$73,345	$42,346	4.40	1.57
Original loan-to-value	No	0.09	1.03	0.96	0.97	0.07	34.67	−4.83
Purchase price of house	No	$10,500	$420,000	$90,575	$81,000	$44,580	5.03	1.66

Table 3. Bankruptcy filings and foreclosure auctions.

	Did not file		Filed		Total	
Foreclosure status	*N*	%	*N*	%	*N*	%
House remains in foreclosure	1,597	40.5	170	51.1	1,767	41.3
Foreclosure auction held	2,350	59.5	163	48.9	2,513	58.7
Total	3,947	100.0	333	100.0	4,280	100.0

Table 4. Months to foreclosure auction by bankruptcy chapter.

Bankruptcy decision	*N*	By chapter	Median	Mean	Std. Dev.
Did not file for bankruptcy	3,947		8.00	11.85	11.03
Filed for bankruptcy	333		20.00	22.97	14.07
Filed for Chapter 13		191	26.00	26.40	14.35
Filed for Chapter 7		79	16.00	19.77	13.17
Filed but chapter unknown		63	15.00	16.60	10.98
Sum/average	4,280	333	n/a	12.71	n/a

filers is more than twice that of nonfilers: 20 months for filers versus 8 months for nonfilers. Among filers, the median time for Chapter 13 filings is 26 months, compared with 16 months for Chapter 7 filers.

These descriptive findings suggest an association between filing for bankruptcy and our two outcomes: whether the home was sold in foreclosure and the months between foreclosure start and auction. Yet, these patterns could be affected by factors unrelated to bankruptcy, such as the economic upheaval of the past decade. We therefore perform inferential analysis. Our multicollinearity diagnostics identify variance inflation factors below 2.0, which points toward minimal empirical overlap between predictors. Thus, our independent variables may jointly explain different aspects of the variation in home foreclosure auctions.

How Do State Laws Influence Home Foreclosure Auctions?

Table 5 provides the base specifications of factors that might impact the mortgage servicer's decision to auction a property. The specifications exclude the homeowner's bankruptcy decision in order to first gauge the impact of state foreclosure laws, economic conditions, and mortgage servicing. We show two hazard models that differ in only one way: Mortgage servicers are omitted from the first specification (No Servicing) and added to the second (Mortgage Servicing). Both specifications indicate that when compared with the reference group of foreclosures started in 2003, the hazard of foreclosure auction is smaller later in the study period. Thus, while two-thirds of the foreclosures started in 2008 or later, the hazard of foreclosure auction through 2012 diminishes during the housing downturn, recession, and foreclosure crisis.

Table 5 also shows the effects of state foreclosure laws. Compared with power-of-sale states, the hazard of foreclosure auction is significantly reduced in judicial-review states. This judicial-review effect persists while controlling for the state foreclosure rate. The negative impact of the foreclosure rate in the No Servicing specification suggests that the flood of foreclosures that accompanied the start of the housing downturn in 2006 reduced the hazard of foreclosure auction by overwhelming state resources. However, the fact that

Table 5. Time to foreclosure auction regressed on state laws, economic conditions, and mortgage servicing.

		1. No servicing		2. Mortgage servicing	
Predictor	Category	Coefficient (std. err.)	Hazard ratio	Coefficient (std. err.)	Hazard ratio
State laws: Judicial review	Required	−0.281 (0.046)***	0.76	−0.582 (0.068)***	0.56
Right of redemption	Exists	0.637 (0.087)***	1.89	0.298 (0.103)**	1.35
Deficiency judgments	Prohibited	0.017 (0.128)	1.02	0.13 (0.146)	1.14
State foreclosure rate (annual)		−0.363 (0.076)***	0.70	−0.08 (0.089)	0.92
Current loan to house value		0.001 (0.001)	1.00	0 (0.001)	1.00
Local unemployment rate		0.019 (0.017)	1.02	0.03 (0.018)	1.03
House price index		−0.001 (0)***	1.00	−0.001 (0)**	1.00
Neighborhood disadvantage index		−0.762 (0.389)*	0.47	−0.455 (0.401)	0.63
Year foreclosure started	2004	0.02 (0.099)	1.02	0.005 (0.101)	1.01
	2005	0.035 (0.101)	1.04	0.055 (0.104)	1.06
	2006	−0.25 (0.103)*	0.78	−0.184 (0.107)*	0.83
	2007	−0.24 (0.098)*	0.79	−0.228 (0.103)*	0.80
	2008	−0.678 (0.094)***	0.51	−0.682 (0.101)***	0.51
	2009	−0.904 (0.111)***	0.40	−0.975 (0.121)***	0.38
	2010	−0.584 (0.115)***	0.56	−0.66 (0.123)***	0.52
	2011	−0.402 (0.114)***	0.67	−0.441 (0.119)***	0.64
	2012	−0.629 (0.158)***	0.53	−0.641 (0.162)***	0.53
Servicer of mortgage (dummies)		NO		YES	
Intercept		n/a		n/a	
AIC		37,121.032		37,005.496	
−2 Log L		37,087.032		36,933.496	
Cox & Snell's pseudo-R^2		0.126		0.157	
Pseudo-R^2 difference		n/a		0.031	
Pseudo-R^2 change (%)		n/a		24.603%	

Note. $N = 4{,}280$ households in foreclosure proceedings.
*$p < .10$. **$p < .05$. ***$p < .01$.

judicial review is significant over and above state foreclosure rates indicates that its impact extends beyond a mere clogging of the court system. Rather, the findings suggest that there is something about court supervision during foreclosure that reduces the hazard that a mortgage servicer will auction a home.

Homeowners who live in states that permit redemption after foreclosure auction experience a higher hazard of auction. This finding runs counter to our expectation. We anticipated that the threat of homeowners in foreclosure redeeming their property would reduce the incidence of foreclosure auctions. We return to this finding in the discussion.

Neither of the models in Table 5 yields an effect for deficiency judgments. Only 3% of our sample is located in states that prohibit them. It is possible that rather than policy driving this null finding, the statistical power of this test is reduced by the small portion of our sample that is located in states that prohibit deficiency judgments.

Do Mortgage Servicers Influence Home Foreclosure Auctions?

The Mortgage Servicing specification in Table 5 is identical to the No Servicing specification with one exception: It accounts for mortgage servicing. The servicing indicators consist of two dozen mortgage-servicing organizations, for which we develop dummy variables. (The effects for these individual servicers are shown in Table 6.) Table 5 shows only whether each specification includes estimates for the individual mortgage servicers. Our goal in Table 5 is to evaluate the overall impact of mortgage servicing on foreclosure auctions by comparing model-level statistics. We do this through a Type 3 analysis of effects: We compare the Mortgage Servicing specification to the No Servicing specification.

We find that the overall effect of mortgage servicing is significant in explaining foreclosure auctions. With the addition of servicers, the Cox and Snell pseudo-R^2 values increase from 0.126 to 0.157, a difference of 0.031 and an increase of 24.6%. Thus, adding mortgage servicing to the models of foreclosure auction adds about 3.1% in explanatory value that provides a 25% increase in model fit. This 25% increase in fit due to mortgage servicing is comparable to the 17% increase identified by Ding (2013).

In the Mortgage Servicing specification in Table 5, the annual foreclosure rate drops from statistical significance. This change suggests that mortgage servicing mitigates the influence of state foreclosure rates. Overall, the Table 5 specifications show that foreclosure auctions are impacted by mortgage servicing and two state laws that govern foreclosure: judicial review and statutory redemption rights.

Table 6 disaggregates the overall mortgage servicing effect observed in Table 5. When compared with the reference group and while controlling for all else, about a third of the mortgage servicers differ significantly in their probability of auctioning the home. This indicates that there is something about individual mortgage-servicing organizations that influences the decision during foreclosure proceedings to bring a property to auction.

Does Filing for Bankruptcy Influence Foreclosure Auctions?

Table 6 provides two complementary analyses: a logit model of whether a foreclosure auction occurred (Probability of Auction) and a hazard model of the time to a foreclosure auction (Hazard of Auction). These two estimations provide a robustness check by using two different outcomes. The models yield similar findings; for brevity, we continue focusing on the hazard models during interpretation.

In Table 6, we assess the influence of bankruptcy decisions on foreclosure auctions. With the addition of the bankruptcy predictor, the Cox and Snell pseudo-R^2 values

Table 6. Foreclosure auction regressed on mortgage servicers and bankruptcy filings.

		3. Probability of auction		4. Hazard of auction	
Predictor	Category	Coefficient (std. err.)	Odds ratio	Coefficient (std. err.)	Hazard ratio
Filed for bankruptcy	Yes	−1.271 (0.135)***	0.28	−1.472 (0.087)***	0.23
State laws: Judicial review	Required	−0.762 (0.121)***	0.47	−0.659 (0.068)***	0.52
Right of redemption	Exists	0.249 (0.208)	1.28	0.307 (0.103)**	1.36
Deficiency judgments	Prohibited	0.231 (0.263)	1.26	0.156 (0.145)	1.17
State foreclosure rate (annual)		−0.05 (0.134)	0.95	−0.069 (0.089)	0.93
Current loan to house value		−0.001 (0.002)	1.00	0 (0.001)	1.00
Local unemployment rate		0.074 (0.031)*	1.08	0.027 (0.018)	1.03
House price index		−0.001 (0)**	1.00	−0.001 (0)**	1.00
Neighborhood disadvantage index		−0.156 (0.694)	0.86	−0.383 (0.4)	0.68
Year foreclosure started (dummies)		YES		YES	
Servicer of mortgage	Servicer_2	0.377 (0.446)	1.46	0.146 (0.14)	1.16
	Servicer_3	0.273 (0.294)	1.31	−0.085 (0.158)	0.92
	Servicer_4	−0.654 (0.181)***	0.52	−0.028 (0.101)	0.97
	Servicer_5	0.414 (0.212)*	1.51	0.452 (0.103)***	1.57
	Servicer_6	−0.653 (0.38)*	0.52	−0.018 (0.187)	0.98
	Servicer_7	−1.169 (0.161)***	0.31	−0.287 (0.103)**	0.75
	Servicer_8	−1.186 (0.236)***	0.31	−0.236 (0.137)*	0.79
	Servicer_9	−0.465 (0.336)	0.63	0.105 (0.167)	1.11
	Servicer_10	−0.214 (0.188)	0.81	−0.03 (0.099)	0.97
	Servicer_11	−1.024 (0.186)***	0.36	−0.778 (0.126)***	0.46
	Servicer_12	0.5 (0.205)*	1.65	0.651 (0.103)***	1.92
	Servicer_13	−0.186 (0.162)	0.83	0.076 (0.098)	1.08
	Servicer_14	−0.714 (0.228)**	0.49	−0.27 (0.138)*	0.76
	Servicer_15	−0.404 (0.262)	0.67	−0.027 (0.133)	0.97
	Servicer_16	−1.438 (0.312)***	0.24	−0.615 (0.209)**	0.54

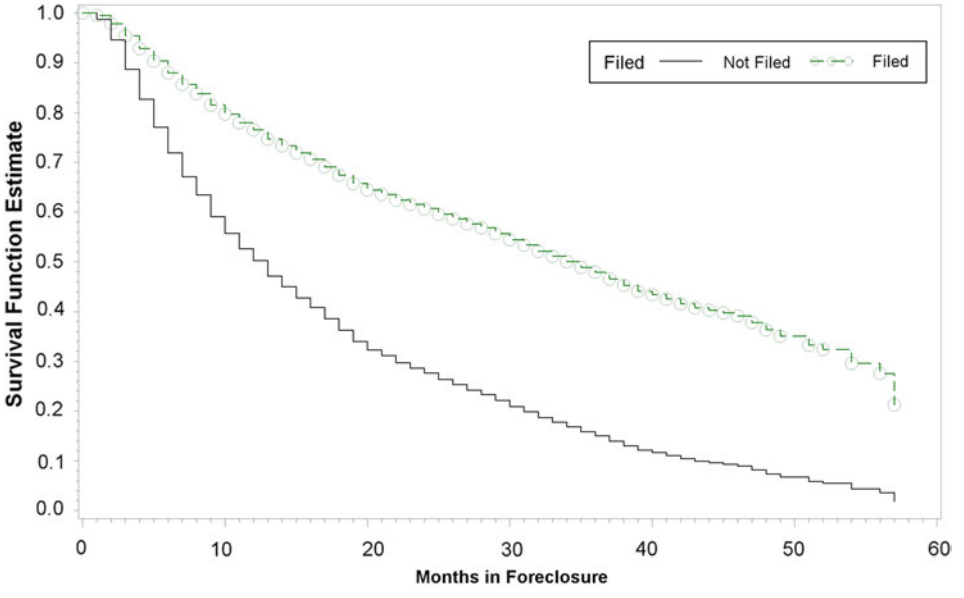
(*Continued*)

Table 6 – *continued*

Predictor	Category	3. Probability of auction		4. Hazard of auction	
		Coefficient (std. err.)	Odds ratio	Coefficient (std. err.)	Hazard ratio
	Servicer_17	−0.519 (0.264)*	0.60	0.046 (0.135)	1.05
	Servicer_18	0.248 (0.286)	1.28	0.292 (0.154)*	1.34
	Servicer_19	−0.292 (0.18)	0.75	−0.097 (0.119)	0.91
	Servicer_Others	−0.28 (0.207)	0.76	−0.015 (0.117)	0.99
Model statistics					
AIC		4,748.592		36,615.554	
−2 Log L		4,672.592		36,541.554	
Cox & Snell's pseudo-R^2		0.232		0.230	

Note. $N = 4{,}280$ households in foreclosure proceedings.

Figure 1. Foreclosure auction by bankruptcy decision.



increase from 0.157 to 0.230, a 0.073 difference and a 46.5% increase in model fit over the comparable Mortgage Servicing specification in Table 5. Thus, adding the homeowner's bankruptcy decision adds about 7.3% in explanatory value and provides a 46% increase in model fit.

At the parameter level, Table 6 shows that the direction of the bankruptcy effect is negative and statistically significant, with a hazard ratio below 0.30. That is, homeowners who filed for bankruptcy reduced by more than 70% the probability that their home would be sold through foreclosure auction. Figure 1 shows the survival function of the hazard model by the homeowner's bankruptcy decision: While controlling for all else, the time to foreclosure is substantially longer for bankruptcy filers compared with nonfilers.

Does the Type of Bankruptcy Filed Influence Home Foreclosure Auctions?

Next, we test whether foreclosure auctions are differentially impacted by the type of bankruptcy filed. These specifications are identical to those in the prior section, except that we disaggregate filers into Chapter 7, Chapter 13, or unknown chapter. Table 7 and Figure 2 show that with a hazard ratio of 0.12, filing for Chapter 13 delays foreclosure auction. The impact is remarkable: Homeowners who filed for Chapter 13 bankruptcy reduced the hazard that the servicer would auction their home by 88%.

A Chapter 7 filing also reduced the hazard of a foreclosure auction, but with a hazard ratio of 0.60, this effect is 5 times smaller than the Chapter 13 effect. In the logit specification on Table 7, the Chapter 7 filing is not significant. These Chapter 7 differences between the logit and hazard models are the most notable inconsistency across all specifications.

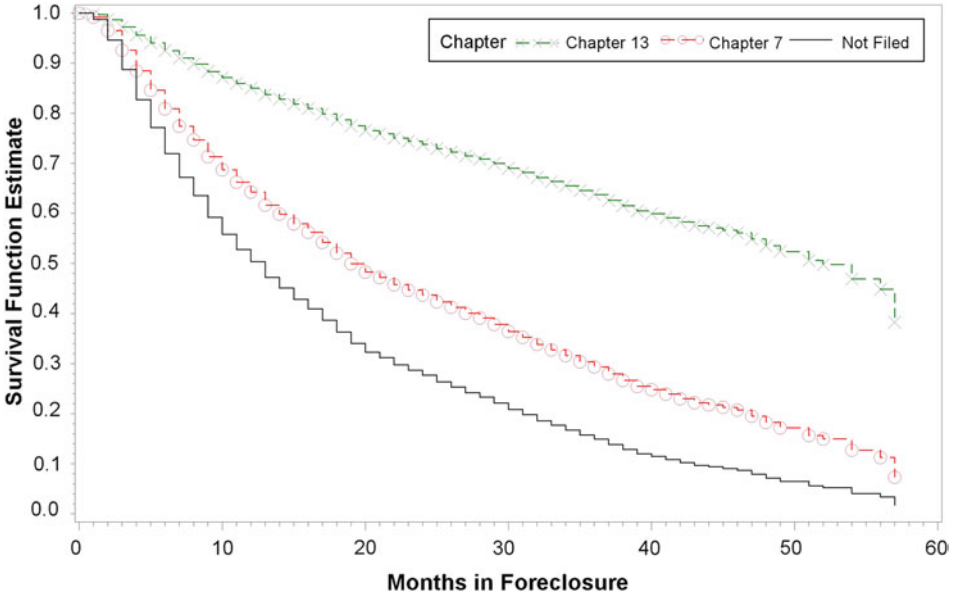
Table 7 also displays estimates for a third category of bankruptcy filers. These unknown-chapter filings are also bankruptcies, which significantly delay a foreclosure auction. The estimates fall between those of Chapter 7 and Chapter 13, which suggests that the unknown chapters are a mixture of the two. We model this category, yet for clarity of

Table 7. Foreclosure auction regressed on bankruptcy chapter.

		5. Probability of auction		6. Hazard of auction	
Predictor	Category	Coefficient (std. err.)	Odds ratio	Coefficient (std. err.)	Hazard ratio
Bankruptcy chapter filed	Chapter 13	−2.107 (0.183)***	0.12	−2.083 (0.13)***	0.12
	Chapter 7	0.168 (0.268)	1.18	−0.503 (0.137)***	0.60
	Chapter unknown	−0.842 (0.301)**	0.43	−1.000 (0.162)***	0.37
State laws: Judicial review	Required	−0.801 (0.122)***	0.45	−0.678 (0.068)***	0.51
Right of redemption	Exists	0.221 (0.209)	1.25	0.293 (0.103)**	1.34
Deficiency judgments	Prohibited	0.191 (0.264)	1.21	0.126 (0.145)	1.13
State foreclosure rate (annual)		−0.032 (0.135)	0.97	−0.065 (0.089)	0.94
Current loan to house value		−0.001 (0.002)	1.00	0 (0.001)	1.00
Local unemployment rate		0.074 (0.031)*	1.08	0.029 (0.018)	1.03
House price index		−0.001 (0)**	1.00	−0.001 (0)**	1.00
Neighborhood disadvantage index		0.077 (0.701)	1.08	−0.276 (0.399)	0.76
Year foreclosure started (dummies)		YES		YES	
Servicer of mortgage (dummies)		YES		YES	
Model statistics					
AIC		4,692.735		36,544.760	
−2 Log L		4,612.735		36,466.760	
Cox & Snell's pseudo-R^2		0.243		0.244	

Note. $N = 4{,}280$ households in foreclosure proceedings.

Figure 2. Foreclosure auction by bankruptcy chapter choice.



presentation, we exclude it from Figure 2, which displays the effect of filing for Chapter 13 in delaying foreclosure as compared with Chapter 7 and with not filing.

How Does Bankruptcy Relate to State Foreclosure Laws?

Next, we investigate whether federal bankruptcy law might interact with state mortgagor protection laws. In Table 8, we test the interaction of filing for bankruptcy by state judicial-review laws. We create a four-category dummy variable and use "Did not file in power-of-sale state" as the omitted reference group. Perhaps the most interesting finding of this interaction is that a bankruptcy filing's delay of foreclosure auction is much more pronounced in power-of-sale states than in judicial-review states. Judicial review does reduce the probability of foreclosure auction. However, in power-of-sale states, bankruptcy has a stronger effect in preserving foreclosed homes from auction. Figure 3 provides a graphical display.

We explore this interaction further by considering how each type of bankruptcy filing interacts with judicial review. We create an eight-category dummy variable that maintains "Did not file in power-of-sale state" as the reference group and disaggregates bankruptcy filings into the three categories: Chapter 13, Chapter 7, and unknown chapter. Cell sizes equal 30 or more households for all categories of this interaction. Table 9 shows that the hazard of foreclosure auction is smaller for all groups when compared with nonfilers in power-of-sale states. The effects of delaying a foreclosure auction are stronger in power-of-sale states for both Chapters 7 and 13. In a power-of-sale state, the impact of filing for Chapter 13 bankruptcy reduces the hazard of foreclosure auction by more than 90%.

Finally, we test the interaction of bankruptcy with state laws that allow borrowers the opportunity to redeem property after foreclosure auctions. Due to the small cell sizes (< 30 households), we do not test the eight-category disaggregated interaction of state redemption rights with the chapter filed. Instead, we test the four-category dummy

Table 8. Foreclosure auction regressed on bankruptcy decision by judicial review.

Predictor	7. Probability of auction		8. Hazard of auction	
	Coefficient (std. err.)	Odds ratio	Coefficient (std. err.)	Hazard ratio
Did not file in judicial-review state	−0.894 (0.123)***	0.41	−0.726 (0.068)***	0.48
Filed in judicial-review state	−1.063 (0.238)***	0.35	−1.394 (0.132)***	0.25
Filed in power-of-sale state	−1.974 (0.173)***	0.14	−1.912 (0.116)***	0.15
State laws: Right of redemption exists	0.289 (0.209)	1.33	0.317 (0.103)**	1.37
Deficiency judgments prohibited	0.186 (0.264)	1.20	0.139 (0.145)	1.15
State foreclosure rate (annual)	−0.016 (0.135)	0.98	−0.041 (0.089)	0.96
Current loan to house value	−0.001 (0.002)	1.00	0 (0.001)	1.00
Local unemployment rate	0.062 (0.031)*	1.06	0.019 (0.018)	1.02
House price index	−0.001 (0)**	1.00	−0.001 (0)**	1.00
Neighborhood disadvantage index	−0.104 (0.696)	0.90	−0.366 (0.401)	0.69
Year foreclosure started (dummies)	YES		YES	
Servicer of mortgage (dummies)	YES		YES	
Model statistics				
AIC	4,703.958		36,564.044	
−2 Log L	4,625.958		36,488.044	
Cox & Snell's pseudo-R^2	0.240		0.240	

*$p < .10$. **$p < .05$. ***$p < .01$.

variable with "Did not file in no-right-of-redemption state" as the omitted reference group. Table 10 shows that, when compared with this reference group, nonfilers in states with right of redemption experience a significantly higher hazard of foreclosure auction. Filing for bankruptcy mitigates the hazard of redemption rights to a level about twice that of filers in states that do not offer postauction redemption rights. Figure 4 graphically displays this interaction.

Figure 3. Foreclosure auction by bankruptcy and judicial review.

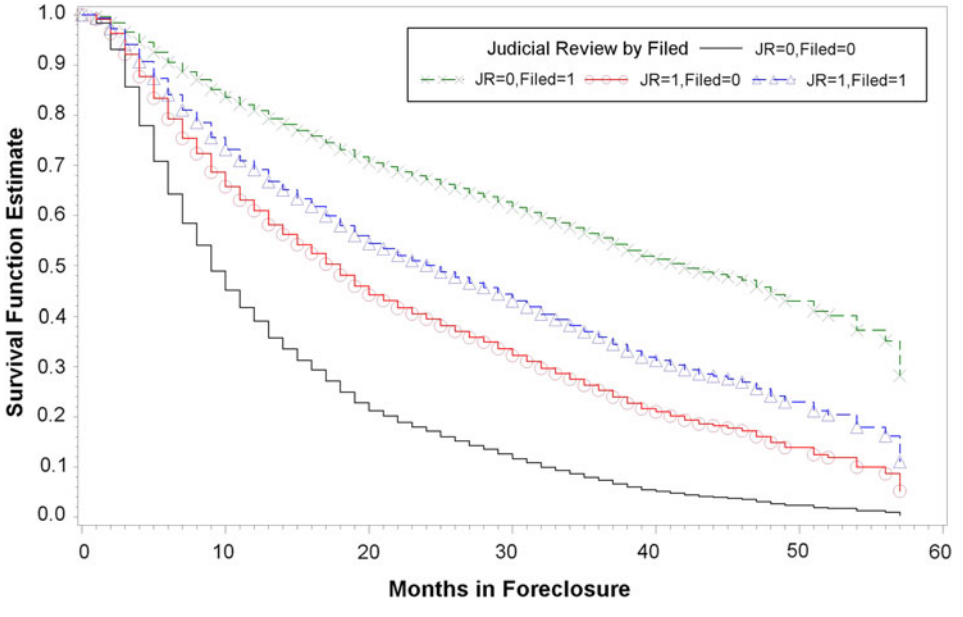


Table 9. Foreclosure auction regressed on bankruptcy chapter by judicial review.

	9. Probability of auction		10. Hazard of auction	
Predictor	Coefficient (std. err.)	Odds ratio	Coefficient (std. err.)	Hazard ratio
Did not file in judicial-review state	−0.888 (0.124)***	0.41	−0.724 (0.068)***	0.48
Chapter 13 in judicial-review state	−1.687 (0.351)***	0.19	−1.93 (0.22)***	0.15
Chapter 7 in judicial-review state	−0.279 (0.383)	0.76	−0.802 (0.191)***	0.45
Chapter unknown in judicial-review state	−1.317 (0.423)**	0.27	−1.363 (0.224)***	0.26
Chapter 13 in power-of-sale state	−2.585 (0.217)***	0.08	−2.379 (0.159)***	0.09
Chapter 7 in power-of-sale state	−0.393 (0.389)	0.67	−0.895 (0.209)***	0.41
Chapter unknown in power-of-sale state	−1.352 (0.425)**	0.26	−1.32 (0.236)***	0.27
State laws: Right of redemption exists	0.245 (0.21)	1.28	0.308 (0.103)**	1.36
Deficiency judgments prohibited	0.166 (0.264)	1.18	0.121 (0.145)	1.13
State foreclosure rate (annual)	−0.012 (0.135)	0.99	−0.045 (0.089)	0.96
Current loan to house value	−0.001 (0.002)	1.00	0 (0.001)	1.00
Local unemployment rate	0.065 (0.031)*	1.07	0.023 (0.018)	1.02
House price index	−0.001 (0)**	1.00	−0.001 (0)**	1.00
Neighborhood disadvantage index	0.09 (0.702)	1.09	−0.282 (0.4)	0.75
Year foreclosure started (dummies)	YES		YES	
Servicer of mortgage (dummies)	YES		YES	
Model statistics				
AIC	4,673.258		36,521.487	
−2 Log L	4,587.258		36,437.487	
Cox & Snell's pseudo-R^2	0.247		0.249	

*$p < .10$. **$p < .05$. ***$p < .01$.

Discussion

In this study of homeowners in foreclosure, we assessed the incidence and impact of filing for bankruptcy on home foreclosure auctions. By federal law, filing for bankruptcy immediately halts foreclosure proceedings through "automatic stay." We investigated the influence of bankruptcy and the type of bankruptcy filed (Chapter 7 or Chapter 13). Both trigger the automatic stay, but Chapter 7 relieves unsecured debts, while Chapter 13 contains provisions for home protection through a debt-repayment plan that cures mortgage arrears.

We studied a decade of foreclosure starts, from 2003 through 2012. We find that foreclosure auctions are influenced by mortgage servicing and two state foreclosure laws: judicial review and redemption rights. We also find that bankruptcy filers choose Chapter 13 over Chapter 7 at a rate twice as high as that in the general population. This preference suggests that homeowners undergoing foreclosure file Chapter 13 in order to keep their home. When we analyze the impact of bankruptcy decisions, we find that filing for bankruptcy reduces by more than 70% the probability of a foreclosure auction. Chapter 13 filings are 5 times more potent than Chapter 7 in reducing the hazard of auction. The home-preservation effect of both bankruptcy types is stronger in power-of-sale states.

The homeowners in our sample were all in foreclosure, and therefore the findings do not necessarily apply to the period that precedes foreclosure initiation. Another caveat is that these homeowners had lower incomes at origination of their 30-year fixed mortgages, and the findings may not generalize to other mortgage products or higher-income homeowners. Finally, we omitted the 6% of foreclosure starts that ended in mortgage

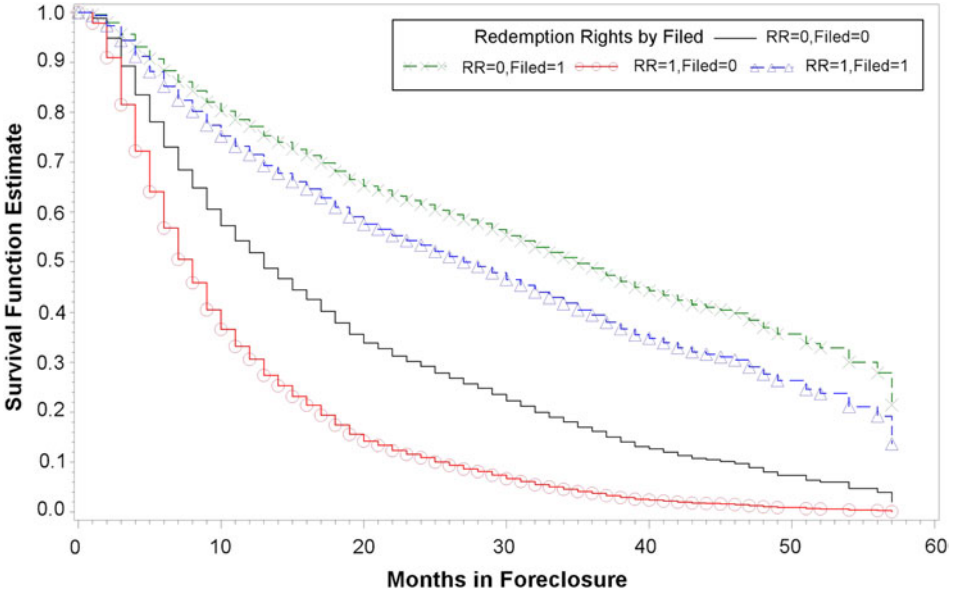
Table 10. Foreclosure auction regressed on bankruptcy by state redemption rights.

	11. Probability of auction		12. Hazard of auction	
Predictor	Coefficient (std. err.)	Odds ratio	Coefficient (std. err.)	Hazard ratio
Did not file in redemption-right state	0.201 (0.213)	1.22	0.28 (0.105)**	1.32
Filed in redemption-right state	−0.419 (0.683)	0.66	−0.759 (0.302)*	0.47
Filed in no-right-of-redemption state	−1.297 (0.138)***	0.27	−1.502 (0.09)***	0.22
State laws: Judicial review required	−0.762 (0.121)***	0.47	−0.664 (0.068)***	0.51
Deficiency judgments prohibited	0.23 (0.263)	1.26	0.141 (0.145)	1.15
State foreclosure rate (annual)	−0.052 (0.134)	0.95	−0.068 (0.089)	0.93
Current loan to house value	−0.001 (0.002)	1.00	0 (0.001)	1.00
Local unemployment rate	0.074 (0.031)*	1.08	0.027 (0.018)	1.03
House price index	−0.001 (0)**	1.00	−0.001 (0)**	1.00
Neighborhood disadvantage index	−0.15 (0.695)	0.86	−0.386 (0.4)	0.68
Year foreclosure started (dummies)	YES		YES	
Servicer of mortgage (dummies)	YES		YES	
Model statistics				
AIC	4,749.577		36,615.639	
−2 Log L	4,671.577		36,539.639	
Cox & Snell's pseudo-R^2	0.232		0.231	

Note. $N = 4{,}280$ households in foreclosure proceedings.
*$p < .10$. **$p < .05$. ***$p < .01$.

workouts or modifications. We omit modifications because they introduce endogeneity between borrowers and servicers, given that both parties must cooperate for mortgages to undergo modification. Our focus and sample selection minimize endogeneity concerns, for reasons that we discuss next.

Figure 4. Foreclosure auction by bankruptcy and redemption rights.



Is Bankruptcy Endogenous to Foreclosure Auction?

At the junction of bankruptcy and foreclosure is the question of whether homeowners are filing for bankruptcy in an attempt to retain their homes or in reaction to their broader insolvency. Given data constraints, Carroll and Li (2011) presumed that their sample of Chapter 13 filers were trying to save their homes. Jacoby et al. (2011) tackled the issue in part by asking survey respondents why they filed for bankruptcy. They found that self-identified mortgage problems predict mortgage delinquency, but their data lack a comparison group of nonfilers, as well as actual foreclosure auctions.

It makes sense that homeowners would file for bankruptcy to stop mortgage servicers from auctioning their homes during foreclosure proceedings. However, it is not clear whether someone would be motivated to file for bankruptcy simply to stop the servicer from *initiating* foreclosure. Bankruptcies that precede foreclosure initiation signal someone who is filing due to general insolvency rather than attempting to keep a home.

We limit our sample of low- to moderate-income households to homeowners who were more than 90 days delinquent on their mortgage payments and whose mortgage servicers initiated foreclosure proceedings. The homeowners were financially constrained and, we presume, experiencing financial distress. Facing foreclosure, the homeowners appear to have the greatest incentive to file for bankruptcy to preserve their homes. In fact, the high ratio of Chapter 13 to Chapter 7 filings suggests that a large portion of filers choose Chapter 13 for its home-protection features. However, we do not know whether these homeowners filed for bankruptcy in an attempt specifically to retain their homes.

The fact that we do not observe the bankruptcy motives of homeowners relates to a validity threat: the idea that filing for bankruptcy *during* the foreclosure process is endogenous to foreclosure *auction*. The problem with this critique is that it is not the homeowner but the mortgage servicer who decides whether to auction the foreclosed home.

We acknowledge that homeowners in foreclosure may file for bankruptcy because of their financial circumstances rather than for the purpose of keeping their home. However, the homeowner's bankruptcy motives should not introduce omitted-variable endogeneity into the mortgage servicer's decision to auction the property. In fact, the bankruptcy decision may be endogenous to a foreclosure auction only to the extent that mortgage servicers base their auction decisions on the homeowner's income, credit score, gender, race/ethnicity, and so forth.

The strong influence we find for mortgage-servicing organizations on foreclosure auctions occurs over and above CLTV, local economic conditions, and the state laws governing foreclosure. These findings suggest that additional research is needed on the criteria that mortgage servicers use when deciding to bring a foreclosure to auction. Similarly, more research is needed to understand the motives that underlie the bankruptcy decisions of homeowners in foreclosure.

Future research might also consider simultaneity or nonrecursiveness, given the possibility that borrowers' and servicers' assessments of one another could influence their respective bankruptcy and auction decisions. To the extent that simultaneity influences our bankruptcy estimate, we expect that attenuation bias would result. While bankruptcy exerts a positive effect on foreclosure time for legal reasons, we suspect that if servicers use borrower information when deciding whether to auction property, they do so to maximize profits by accelerating the timing of foreclosure auctions, which would dampen the bankruptcy effect we observe. Thus, we expect that the direction of bias resulting from simultaneity would be downward (toward zero), in which case the true value of the direct effect of bankruptcy in delaying foreclosure auction may be larger than our findings suggest.

Policy Implications

Several policy implications arise from our findings. First, mortgage servicing merits further investigation. Our models show that servicing itself influences the hazard of property auction, and disaggregation of this overall mortgage-servicing effect shows that individual servicers vary in their propensity for auctioning homes that have undergone foreclosure initiation. These findings complement earlier research that associated servicing with mortgage delinquency (Stegman, Quercia, Ratcliffe, Ding, & Davis, 2007) and more recent findings that servicing influences mortgage modifications (Ding, 2013). Our data could not identify why servicing influences foreclosure auctions, but one possibility is that the incentives of servicers are not aligned with those of borrowers, lending institutions, or investors (Levitin & Twomey, 2011; Quercia, Freeman, & Ratcliffe, 2011). Future research might investigate mortgage servicing mechanisms and incentives and whether disparate demographic impacts accompany auction decisions.

A second policy implication relates to state mortgagor-protection and foreclosure laws. Our findings suggest that states can apply or adopt these laws as policy levers that influence the likelihood that foreclosure starts will become auctions. State mortgagor-protection laws may deliver home preservation effects more cheaply than bankruptcy.

While more research is needed to understand what it is about court supervision that delays foreclosure auction, a judicial foreclosure process may increase the likelihood that a state's homeowners receive due process before losing their homes. The implications for redemption rights are less clear. Redemption rights are generally understood as mortgagor protection. Presumably, policymakers intended such rights to encourage servicers to deter foreclosure auctions. Yet, we found that in redemption-right states, homeowners in foreclosure experienced a higher hazard of auction. If postauction redemption rights cost servicers money, then it is possible that servicers in these states hasten auctions to minimize the likelihood that the homeowners in foreclosure will reclaim their home. More research is needed to understand how servicers and homeowners perceive the risks and benefits of postauction redemption rights.

Perhaps the most important policy implication is that regardless of a state's foreclosure laws, homeowners in foreclosure can take advantage of federal bankruptcy options. Servicers may react to a homeowner's bankruptcy by requesting that a judge lift the automatic stay and reinstate the foreclosure. Our findings suggest that even if this occurs, filers dramatically reduce their hazard of losing their home, compared with nonfilers who have experienced a foreclosure start. This bankruptcy effect is most pronounced for Chapter 13 bankruptcies and in power-of-sale states.

What is surprising is that more people do not file for bankruptcy during foreclosure; we find that only 8% did so. While not every homeowner wants to stay in their home, the percentage of filers in our study seems low, given the stakes. One possible explanation is that the social stigma that surrounds bankruptcy deters many people from filing—possibly hastening the loss of their home.

Even without mortgage principal reduction of the primary residence, bankruptcy law provides a way for homeowners in foreclosure to reduce the likelihood of losing their home. Given the deleterious effects of foreclosure sales on nearby house prices, this effect may be beneficial in a broader social-welfare sense. Whether bankruptcy generally, and Chapter 13 specifically, is in the best interest of the individuals who seek it cannot be answered by this study.

Note

Funding for this study was provided by the Ford Foundation. Geolytics, Inc. supplied Census data.

Notes on Contributors

Mark R. Lindblad is the research director at the Center for Community Capital at the University of North Carolina at Chapel Hill. He conducts research on financial default, housing, homeownership, and community economic development.

Roberto G. Quercia is the director of the Center for Community Capital at the University of North Carolina at Chapel Hill and a professor in and the chair of the Department of City and Regional Planning. Quercia conducts research on low-income homeownership, mortgage lending, and financial services.

Melissa B. Jacoby is the Graham Kenan Professor at the University of North Carolina at Chapel Hill, where she studies and teaches bankruptcy and commercial law. She is an elected member of the American Law Institute and the National Bankruptcy Conference, and a Fellow of the American College of Bankruptcy.

Ling Wang is a doctoral candidate in the Department of Statistics, and a research assistant at the Center for Community Capital, at the University of North Carolina at Chapel Hill, where she also completed her master's in economics with a concentration on health.

Huifang Zhao is a master's candidate in the Department of Statistics, and a research assistant at the Center for Community Capital, at the University of North Carolina at Chapel Hill.

References

Allison, P. D. (2010). *Survival analysis using SAS: A practical guide* (2nd ed.). Cary, NC: SAS Institute.

Anthony, J. (2012). Home burdens: The high cost of homeownership. In K. Porter (Ed.), *Broke: How debt bankrupts the middle class* (pp. 65–84). Stanford, CA: Stanford University Press.

Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Psychological Science*, *1*, 164–180. doi:10.1111/j.1745-6916.2006.00011.x

Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005, Pub. L. No. 109-8, 119 Stat. 23 (codified as amended in scattered sections of 11 U.S.C.).

Braucher, J., Cohen, D., & Lawless, R. M. (2012). Race, attorney influence, and bankruptcy chapter choice. *Journal of Empirical Legal Studies*, *9*, 393–429. doi:10.1111/j.1740-1461.2012.01264.x

Capone, C. A. (1996). *Providing alternatives to mortgage foreclosure: A report to Congress*. Washington, DC: U.S. Department of Housing and Urban Development.

Carroll, S. W., & Li, W. (2011). The homeownership experience of households in bankruptcy. *Cityscape*, *13*, 113–134.

Cohen, D., & Lawless, R. M. (2011). Less forgiven: Race and Chapter 13. In K. Porter (Ed.), *Broke: How debt bankrupts the middle class* (pp. 175–191). Stanford, CA: Stanford University Press.

Culhane, M. B. (2012). No forwarding address: Losing homes in bankruptcy. In K. Porter (Ed.), *Broke: How debt bankrupts the middle class* (pp. 119–135). Stanford, CA: Stanford University Press.

Cutts, A. C., & Merrill, W. A. (2008). *Interventions in mortgage default: Policies and practices to prevent home loss and lower cost* (Freddie Mac Working Paper No. 08-01). McLean, VA: Freddie Mac.

Ding, L. (2013). Servicer and spatial heterogeneity of loss mitigation practices in soft housing markets. *Housing Policy Debate, 23*, 521–542. doi:10.1080/10511482.2013.782886

Eggum, J., Porter, K. M., & Twomey, T. (2008). Saving homes in bankruptcy: Housing affordability and loan modifications. *Utah Law Review, 2008*, 1123–1168.

Gerardi, K., Lambie-Hanson, L., & Willen, P. S. (2013). Do borrower rights improve borrower outcomes? Evidence from the foreclosure process. *Journal of Urban Economics*, *73*(1), 1–17. doi:10.1016/j.jue.2012.06.003

Immergluck, D. (2013). Too little, too late, and too timid: The federal response to the foreclosure crisis at the five-year mark. *Housing Policy Debate*, *23*, 199–232. doi:10.1080/10511482.2012.749933

Immergluck, D. & Smith, G. (2006). The external costs of foreclosure: The impact of single-family mortgage foreclosures on property values. *Housing Policy Debate*, *17*, 57–79. doi:10.1080/10511482.2006.9521561

Jacoby, M. B. (2007). Bankruptcy reform and homeownership risk. *University of Illinois Law Review*, *2007*, 323–346.
Jacoby, M. B. (2008). Home ownership risk beyond a subprime crisis: The role of delinquency management. *Fordham Law Review*, *76*, 2261–2295.
Jacoby, M. B., McCue, D. T., & Belsky, E. S. (2011). In or out of mortgage trouble? A study of bankrupt homeowners. *American Bankruptcy Law Journal*, *85*, 291–322.
Lawless, R. M., Littwin, A. K., Porter, K. M., Pottow, J. A. E., Thorne, D. K., & Warren, E. (2008). Did bankruptcy reform fail? An empirical study of consumer debtors. *American Bankruptcy Law Journal*, *82*, 349–405.
Lee, Y. S., & Immergluck, D. (2012). Explaining the pace of foreclosed home sales during the US foreclosure crisis: Evidence from Atlanta. *Housing Studies*, *27*, 1100–1123. doi:10.1080/02673037.2012.728576
Lefgren, L., & McIntyre, F. (2009). Explaining the puzzle of cross-state differences in bankruptcy rates. *The Journal of Law and Economics*, *52*, 367–393.
Lefgren, L., McIntyre, F. L., & Miller, M. (2010). Chapter 7 or Chapter 13: Are client or lawyer interests paramount? *The B.E. Journal of Economic Analysis & Policy*, *10*(1). Retrieved November 22, 2013, from doi:10.2202/1935-1682.2512
Levitin, A. J., & Twomey, T. (2011). Mortgage servicing. *Yale Journal on Regulation*, *28*(1), 1–90.
Li, W., & White, M. J. (2009). *Mortgage default, foreclosure, and bankruptcy* (National Bureau of Economic Research Working Paper No. W15472). Cambridge, MA: National Bureau of Economic Research.
Li, W., & White, M. J. (2012, January). *Does bankruptcy reduce foreclosure?* Paper presented at the annual meeting of th American Economic Association, Chicago, IL.
Pence, K. (2006). Foreclosing on opportunity: State laws and mortgage credit. *The Review of Economics and Statistics*, *88*, 177–182.
Quercia, R. G., Freeman, A., & Ratcliffe, J. (2011). *Regaining the dream: How to renew the promise of homeownership for America's working families*. Washington, DC: Brookings Institution Press.
Riley, S. F., Ru, H., & Quercia, R. G. (2009). The Community Advantage Program database: Overview and comparison with the current population survey. *Cityscape*, *11*, 247–256.
Riley, S. F., & Feng, Q. (2013, April). *Community advantage panel survey technical sampling report: Owners, 2003–2012*. Center for Community Capital, University of North Carolina at Chapel Hill. Retrieved from http://ccc.sites.unc.edu/files/2013/05/CAPOwners2013.pdf
Stegman, M. A., Quercia, R. G., Ratcliffe, J., Ding, L., & Davis, W. R. (2007). Preventive servicing is good for business and affordable homeownership policy. *Housing Policy Debate*, *18*, 243–278.
Sullivan, T. A., Warren, E., & Westbrook, J. L. (1989). *As we forgive our debtors: Bankruptcy and consumer credit in America*. New York, NY: Oxford University Press.
White, A. M., & Reid, C. (2013). Saving homes? Bankruptcies and loan modifications in the foreclosure crisis. *Florida Law Review*, *65*(6).
White, M. J. (2009). Bankruptcy: Past puzzles, recent reforms, and the mortgage crisis. *American Law and Economics Review*, *11*(1), 1–23. doi:10.1093/aler/ahp002
White, M. J., & Zhu, N. (2010). Saving your home in Chapter 13 bankruptcy. *The Journal of Legal Studies*, *39*, 33–61.