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In or Out of Mortgage Trouble? A Study of Bankrupt Homeowners

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by

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INTRODUCTION

For decades, homeowners have populated the bankruptcy system in significant numbers.[1] Today's prevalent narrative features a delinquent mortgage, and a race against time to enlist the bankruptcy system in the fight to keep the family home. Yet, many bankrupt homeowners do not see themselves reflected in that narrative. In 2007, only about half of bankrupt homeowners identified explicit home- or mortgage-related reasons for filing bankruptcy.[2] The rest told different stories about their paths to bankruptcy court.

This project investigates what makes homeowners more or less likely to have mortgage troubles as they head into bankruptcy. We studied factors that distinguish the non-delinquent from the delinquent, the severely delinquent,[3] and then those who reported foreclosure initiation.[4] To our knowl-

edge, this is the first econometric study of these questions among bankruptcy filers. We used the 2007 Consumer Bankruptcy Project (2007 CBP), which is a nationally representative dataset about families who filed for bankruptcy in early 2007.[5] Our paper is the first to incorporate substantial information from a homeowner subsample who answered in-depth questions over the telephone about their mortgages, their relationships with their loan servicers, and other issues surrounding homeownership. We also incorporated state-level information on foreclosure laws and comparative information about American homeowners from the American Housing Survey.[6]

Notwithstanding the documented financial stresses on respondents in the two years prior to bankruptcy,[7] roughly half of our homeowner sample had not missed a single mortgage payment in that period. Those who did stumble on mortgage payments averaged four missed payments—which, if serial, fell into the danger zone of serious delinquency.[8] Overall, slightly under a third of the homeowners in our sample reported a foreclosure initiation.

Most notably, we found that credit access had a significant effect on keeping mortgages current across all of our models.[9] Respondents who relied heavily on credit card debt to manage financial distress were less than half as likely to have missed a mortgage payment. Among debtors who missed at least one payment, relying on credit cards made them nearly half as likely to enter severe mortgage delinquency (e.g., four or more missed payments). Those who were recently unable to refinance a home mortgage or who re-sorted to fringe credit were more than twice as likely to have missed one or more mortgage payments. Credit access also was a statistically significant determinant of foreclosure initiation. In one of the models, heavy reliance on credit cards lowered the probability of foreclosure initiation by nineteen per-cent. Our findings add to the complex picture of the intersections between consumer credit, homeownership, and mortgage default that are important to regulatory design.[10]

Missed mortgage payments also were associated with a substantial drop in income—a problem that also has been documented outside the bankruptcy

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[4]Because foreclosure initiation and missed payments can influence each other, we tried two different models. See infra Part IIIC and Appendix C.

[5]Robert M. Lawless et al., *Did Bankruptcy Reform Fail? An Empirical Study of Consumer Debtors*, 82 AM. BANKR. L.J. 349 (2008).

[6]U.S. Census Bureau, American Housing Survey 2005, http://www.census.gov/hhes/www/housing/ahs/ahs.html (last visited May 20, 2011).

[7]Lawless et al., *supra* note 5, at 382.

[8]The home mortgage industry regards 90+ day delinquencies as "serious." Bankrupt homeowners who were at or above the average reported foreclosure initiations at a rate of 60%.

[9]*See infra* Part III.C.

[10]*See infra* Part IV.A.

field[11]—and with the use of a mortgage broker, which may have signified that the loan carried particularly high costs.[12] These characteristics decreased the feasibility of saving a home in bankruptcy. Bankruptcy law offers a debtor a valuable right to cure a home mortgage,[13] but high-cost loans or many months of back payments plus penalty fees make doing so quite difficult.[14] Debtors must make cure payments while also resuming monthly mortgage payments. The price tag for this relief is high for other reasons as well: the homeowners' right to cure in bankruptcy is conditioned on payment of substantial administrative costs and other debts. Thus, our findings suggest that the filers most in need of curing a mortgage have other financial hardships, which lean in favor of several reforms to chapter 13.[15]

We also found that foreclosure initiation among bankruptcy filers was significantly associated with the timelines for foreclosure established by state law.[16] Under one model approach, foreclosure initiation was less likely in states with long foreclosure timelines. An alternative model found initiation more likely in states with short timelines, holding all else constant. Although these results are more tentative due to limitations of our data, these findings support a functional analysis of federal bankruptcy and state debtor-creditor laws as an integrated system. In such a system, innovations to state foreclosure laws can improve the operation of consumer bankruptcy law.[17]

Part I situates our project within the scholarly literature on home mortgage default and homeowners in bankruptcy. Part II explains our dataset and methods. Part III contains our findings and discusses the limits of our project. Part IV considers the implications of the findings for consumer credit regulation, bankruptcy law, and state foreclosure law reform.

I. MORTGAGE DEFAULT, CURE AND BANKRUPTCY: AN ABBREVIATED LITERATURE REVIEW

Real estate finance scholars have long been interested in the risk factors

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[11]*See infra* text accompanying note 97.

[12]*See infra* note 100.

[13]11 U.S.C. §§ 1322, 1325(a)(5) (2010).

[14]*See, e.g.*, Jean Braucher, *Humpty Dumpty and the Foreclosure Crisis: Lessons from the Lackluster First Year of the Home Affordable Modification Program (HAMP)*, 52 ARIZ. L. REV. 727, 782 (2010); John Eggum, Katherine Porter & Tara Twomey, *Saving Homes in Bankruptcy: Housing Affordability and Loan Modification*, 2008 UTAH L. REV. 1123, 1164-67 (2008); Susan E. Hauser, *Cutting the Gordian Knot: The Case For Allowing Mortgage Modification in Bankruptcy*, 5 J. BUS. & TECH. L. 207 (2010); Adam J. Levitin, *Resolving the Foreclosure Crisis: Modifications of Mortgages in Bankruptcy*, 2009 WIS. L. REV. 565 (2009); Juliet M. Moringiello, *Mortgage Modification, Equitable Subordination, and the Honest but Unfortunate Creditor*, 79 FORDHAM L. REV. 1599 (2011); Rich Leonard, *A Win-Win Bankruptcy Reform*, WASH. POST, Nov. 28, 2008, at A29.

[15]*See infra* Part IV.B.

[16]*See infra* Part III.C.

[17]*See infra* Part IV.C.

for residential mortgage default and its consequences.[18] Many studies find negative home equity to be a major determinant of mortgage default.[19] None-theless, only a small fraction of homeowners with negative net equity actu-ally default, so equity levels cannot fully explain the patterns.[20] Other factors that have been studied include the role of consumer credit availabil-ity,[21] expectations of future house price appreciation, household income and wealth,[22] adverse events such as job loss or health problems,[23] whether or not the applicable state law requires that foreclosure be accomplished

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[18]Roberto Quercia & Spencer M. Cowan, *The Impacts of Community-based Foreclosure Prevention Programs*, 23 HOUSING STUD. 461, 464 (2008); *see also* Amy Crews Cutts & Richard K. Green, *Innovative Servicing Technology: Smart Enough to Keep People in their Houses?*, *in* BUILDING ASSETS, BUILDING CREDIT: CREATING WEALTH IN LOW-INCOME COMMUNITIES 348, 362 (Nicolas S. Retsinas & Eric S. Belsky eds., 2005).

[19]Robert Avery et al., *Credit Risk, Credit Scoring, and the Performance of Home Mortgages,* FED. RES. BULL., 1996, at 621- 648; Raisa Bahchieva, Susan Wachter & Elizabeth Warren, *Mortgage Debt, Bank-ruptcy, and the Sustainability of Homeownership, in* CREDIT MARKETS FOR THE POOR 73, 92 (Patrick Bolton & Howard Rosenthal eds., 2005); Michael LaCour-Little, *Equity Dilution: An Alternative Perspec-tive on Mortgage Default*, 32 R.E. ECON. 359 (2004); Thomas M. Springer & Neil G. Waller, *Termination of Distressed Residential Mortgages: An Empirical Analysis*, 7 J. R.E. FIN. & ECON. 43 (1993); Michael A. Stegman, *An Affordable Homeownership Strategy that Promotes Savings Rather than Risk*, *in* ENDING POVERTY IN AMERICA: HOW TO RESTORE THE AMERICAN DREAM 165 (John Edwards, Marion Crain & Arne L. Calleberg eds., 2007).

[20]*See* Cutts & Green, *supra* note 18, at 359; Ronel Elul et al., *What 'Triggers' Mortgage Default?* 2 (Fed Res. Bank Phila., Working Paper No. 10-13, Apr. 2010). Even in an extreme case like Boston in the early 1990s, less than ten percent of those with negative net equity defaulted. Kristopher Gerardi, Manuel Adelino, & Paul S. Millen, *Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclo-sure* (Fed. Res. Bank Bos., Working Paper No. 07-12, 2007).

[21]Ethan Cohen-Cole & Jonathan Morse, *Your House or Your Credit Card, Which Would You Choose? Personal Delinquency Tradeoffs and Economic Spillovers* (Fed. Res. Bank Bos., Working Paper No. QAU09-5, 2009). This study of decisions made in 2006 and 2007 of homeowners with at least one credit card and under moderate financial strains suggests that cash-strapped homeowners with falling home val-ues chose mortgage default over credit card default to preserve access to liquidity for everyday living expenses. *Id.* at 3, 18. However, mortgage affordability is also an important consideration. *Id.* at 18; *see also* Elul et al., *supra* note 20, at 8-9 (using credit card utilization as proxy for illiquidity and finding illiquidity to be significantly associated with mortgage default).

[22]Gerardi, Adelino, & Millen, *supra* note 20.

[23]For studies suggesting that trigger-events (such as job loss, health problems, death, and divorce or other family breakup) may play a strong role if they impact household incomes for an extended period of time, see, e.g., Terrence M. Clauretie, *State Foreclosure Laws, Risk Shifting, and the PMI Industry*, 56 J. OF RISK & INS. 544 (1989); Amy C. Cutts. *Facts and Figures on New Mortgage Products Protecting Consum-ers in the New Mortgage Marketplace* (F.T.C. Workshop 2006); Peter J. Elmer & Steven A, Seelig, *The Rising Long-Term Trend of Single Family Mortgage Foreclosure Rates* (Fed. Deposit Ins. Corp., Working Paper No. 88-2, 1998). For studies finding a less clear relationship, see, e.g., Dennis R. Capozza & Thomas A. Thomson, *Subprime Transitions: Lingering or Malingering in Default?,* 33 J. R.E. FIN. & ECON. 241 (2006); Roberto Quercia & Michael Stegman, *Residential Mortgage Default: A Review of the Literature*, 3 J. OF HOUSING RES. 341 (1992). Ambrose & Capone reconciled these studies by suggesting the existence of multiple types of defaulters, and recommended that servicers offer consensual workouts to trigger event defaulters who have a demonstrated desire to avoid foreclosure. Brent Ambrose & Charles Capone, *Mod-eling the Conditional Probability of Foreclosure in the Context of Single-Family Mortgage Foreclosure Reso-lutions*, 26 R.E. ECON. 391, 394 (1998).

through the filing of a law suit,[24] and the state's mandatory timeline for foreclosure.[25]

Scholars also have examined determinants of curing mortgages *after* default. Researchers and policymakers often assert that lenders should preserve homeownership wherever possible because foreclosure imposes steep costs.[26] In theory (and perhaps only in theory), servicers will seek loss mitigation and workouts if the expected net present value of facilitating them is greater than that of pursuing foreclosure.[27] For example, in an important study of delinquent mortgages in Freddie Mac's portfolio, Cutts and Merrill made the following observations: loss of income is more detrimental to cure than extreme debt obligations; a state law foreclosure timeline may have a "sweet spot" that promotes cure; lack of servicer-borrower communication is common among the accounts that result in foreclosure; actual loan modifications (e.g., reduction of principal) lower the failure rate of workouts; shorter repayment plans are more successful than longer plans; and post-delinquency counseling as well as early intervention (e.g., shorter delinquency period) improved the odds of cure.[28] Concluding that loan modifications were successful tools for

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[24]Clauretie, *supra* note 23; Terrence M. Clauretie & Thomas Herzog, *The Effect of State Foreclosure Laws on Loan Losses: Evidence from the Mortgage Insurance Industry*, 22 J. OF MONEY, CREDIT & BANKING 221 (1990); Amy C. Cutts & William A. Merrill, *Interventions in Mortgage Default: Policies and Practices to Prevent Home Loss and Lower Costs, in* BORROWING TO LIVE: CONSUMER & MORTGAGE CREDIT REVISITED 203, 207, 230, 241 (Nicolas P. Retsinas & Eric S. Belsky eds., 2008); Karen M. Pence, *Foreclosing on Opportunity: State Laws and Mortgage Credit*, 88 REV. ECON. & STAT. 177 (2006).

[25]Cutts & Merrill, *supra* note 24, at 231-37.

[26]Quercia & Cowan, *supra* note 18.

[27]Manuel Adelino, Kristopher Gerardi & Paul S. Willen, *Why Don't Lenders Renegotiate More Home Mortgages? The Effect of Securitization* (Fed. Res. Bank Bos. & NBER Working Paper No. 2009-17a, 2010). For arguments that principal-agent problems have prevented this theory from bearing out in practice in recent years, see Adam J. Levitin & Tara Twomey, *Mortgage Servicing*, 28 YALE J. ON REG. 1 (2011). The financial crisis highlighted other potential barriers to mortgage curing, including structural barriers and alleged constraints on servicers created by the legal contracts that govern the securitization of mortgages. *See* Gregory Scott Crespi, *The Trillion Dollar Problem of Underwater Homeowners: Avoiding a New Surge of Foreclosures by Encouraging Principal-Reducing Loan Modifications*, 51 SANTA CLARA L. REV. 153, 169-78 (2011); *see also* Michelle J. White, *Bankruptcy: Past Puzzles, Legal Reforms, and the Mortgage Crisis*, 11 AM. L. & ECON. REV. 1, 15-17 (2009).

[28]Cutts & Merrill, *supra* note 24, at 203; *see also* Anthony Pennington-Cross, *The Duration of Foreclosures in the Subprime Mortgage Market: A Competing Risks Model with Mixing*, 40 J. R.E. FIN. & ECON. 109 (2010) (finding that loans delinquent for longer periods of time before entering a repayment plan were more likely to fail than those with shorter delinquency periods). *But see* Lei Ding, Roberto G. Quercia & Janneke Ratcliffe, *Post-purchase Counseling and Default Resolutions among Low-and-Moderate Income Borrowers*, 30 J. R.E. RES. 315 (2008) (using different dataset, finding that longer periods of delinquency led to lower likelihood of loan termination through foreclosure). For additional research on the role of borrower-servicer communication in fostering workouts, see Jay Brinkman, *An Examination of Mortgage Foreclosures, Modifications, Repayment Plans, and other Loss Mitigation Activities in the Third Quarter of 2007*, Mortgage Bankers Ass'n, Jan. 2008; *Home Ownership Preservation Initiative (HOPI): Partnership Lessons & Results*, THREE YEAR FINAL REPORT (July 17, 2006) http://www.nw.org/network/neighborworks Progs/foreclosuresolutions/pdf_docs/hopi3YearReport_071706.pdf.

curing mortgages, Cutts and Merrill argued that lawmakers should consider reducing barriers to modifications.[29]

Scholars have wrestled with the role of race and ethnicity in many dimensions of homeownership, including the propensity for mortgage cure.[30] For example, Quercia and Cowan found that black homeowners who were delinquent on their mortgages were forty percent less likely to avoid foreclosure than white homeowners, but, as the authors note, they lacked controls for variables (interest rate, home equity) that studies have shown to correlate with minority affiliation.[31] Other papers have suggested that the racial identity of the borrower could be a proxy for neighborhood characteristics such as house price trends that affect lender and servicer behavior.[32] Among papers that study homeownership and racial identity of bankruptcy filers, the studies illustrate, without controls, that black homeowners (and to a lesser extent Hispanic homeowners) have a far greater likelihood of filing for bankruptcy than white homeowners.[33] Indeed, black homeowners have been

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[29]Cutts & Merrill, *supra* note 24, at 221. *But see* Adelino, Gerardi & Willen, *supra* note 27 (arguing that true costs of modification cannot easily be determined beforehand because delinquent loans may self-cure without modification and modified loans may default).

[30]For a recent example, see J. Michael Collins & Carolina Reid, *Who Receives a Mortgage Modification? Race and Income Differentials in Loan Workouts* 18 (Fed. Res. Bank of S.F. Cmty. Dev. Working Paper No. 2010-07, 2010) (finding "no evidence of racial disparities among those who receive loan modifications" under the Home Affordable Modification Program (HAMP), and noting contrast with other race-related mortgage research). *See generally* Kathleen C. Engel & Patricia A. McCoy, *From Credit Denial To Predatory Lending: The Challenge of Sustaining Minority Homeownership, in* SEGREGATION: THE RISING COSTS FOR AMERICA 81-123 (James H. Carr & Nandinee K. Kutty, eds. 2008) (discussing a range of homeownership-related challenges for African American and Latino households).

[31]Quercia & Cowan, *supra* note 18, at 464. For the studies showing correlation, see, e.g., Ambrose & Capone, *supra* note 23; Mickey Lauria, Vern Baxter, & Bridget Bordelon, *An Investigation of the Time Between Mortgage Default and Foreclosure*, 19 HOUSING STUD. 581 (2004).

[32]Harold Black, Breck Robinson & Robert Schweitzer, *Do Lenders Discriminate Against Low-Income Borrowers*, 28 REV. BLACK POL. ECON. 73-94 (2001); Robert T. Clair, *The Performance of Black-Owned Banks in their Primary Market Areas*, ECONOMIC REVIEW (Federal Reserve Bank of Dallas, Nov. 1988) 11-20; David K. Horne, *Mortgage Lending, Race, and Model Specification*, 11 J. OF FIN. SERV. RES. 43 (1997); Edward C. Lawrence, *The Viability of Minority-Owned Banks*, 37 Q. REV. OF ECON. & FIN. 1 (1997); Anthony M. Yezer, Robert F. Phillips & Robert P. Trost, *Bias in Estimates of Discrimination and Default in Mortgage Lending: The Effects of Simultaneity and Self Selection*, 9 J. R.E. FIN. & ECON. 197 (1994); Raphael W. Bostic & Glenn B. Canner, *Do Minority-Owned Banks Treat Minorities Better? An Empirical Test of the Cultural Affinity Hypothesis* (Bd. of Governors of the Fed. Res. Sys., Working Paper No 94-2, 1997).

[33]TERESA A. SULLIVAN, ELIZABETH WARREN & JAY LAWRENCE WESTBROOK, THE FRAGILE MIDDLE CLASS: AMERICANS IN DEBT 214-15, 221, 234 (2000) (reviewing data from 1991); ELIZABETH WARREN & AMELIA WARREN TYAGI, THE TWO-INCOME TRAP: WHY MIDDLE-CLASS MOTHERS & FATHERS ARE GOING BROKE 159 (2003); Elizabeth Warren, *The Economics of Race: When Making it to the Middle is No Longer Enough*, 61 WASH. & LEE L. REV. 1777, 1789 (2004) (reviewing data from 2001). For a parallel finding for black college graduates in the 2007 CBP, see Abbye Atkinson, *Race, Educational Loans, & Bankruptcy*, 16 MICH J. RACE & L. 1, 10-12 (2010). Black bankruptcy filers in the 2007 CBP also were less likely to be represented by a lawyer in their filings, increasing the likelihood that they would run into challenges obtaining debt relief. Angela Littwin, *The Affordability Paradox: How Consumer*

more likely to file for bankruptcy than black renters.[34]

Although real estate finance scholarship historically has not given detailed consideration to bankruptcy law,[35] literally millions of homeowners with mortgages have passed through the bankruptcy system.[36] The landmark studies by Sullivan, Warren and Westbrook offered a glimpse of these households' demographics.[37] Homeowners who filed for bankruptcy in 1981 had higher incomes and greater debt than non-homeowners.[38] Furthermore, 7.5% of bankrupt homeowners had mobile homes.[39] A third of bankrupt homeowners reported at least a second mortgage, and some reported three or more—far outstripping the general population at that time.[40] Homeowners experienced significant disruptions in income in the two years prior to filing and were more likely to be self-employed than renters.[41] The homeowners reported relatively high *non*-mortgage debts, which might indicate an attempt to free up cash for mortgage payments.[42]

From their study of homeowners who filed for bankruptcy in 1991, Sullivan, Warren and Westbrook reported some of the same story: the homeowners had higher incomes but greater debts than non-homeowners, a third also

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Bankruptcy's Greatest Weakness May Account for its Surprising Success, 52 WM. & MARY L. REV. 1933, 1966 (2011). A different study illustrates the overrepresentation of African American households in bankruptcy more generally. Jay L. Zagorsky & Lois R. Lupica, *A Study of Consumers' Post-Discharge Finances: Struggle, Stasis, or Fresh Start?*, 16 AM. BANKR. INST. L. REV. 283, 300 (2008). For an analysis of how bankruptcy law generally has a disparate impact on white and black filers, see A. Mechele Dickerson, *Race Matters in Bankruptcy*, 61 WASH & LEE L. REV. 1725 (2004); Rory Van Loo, *A Tale of Two Debtors: Bankruptcy Disparities by Race*, 72 ALB. L. REV. 231 (2009).

[34]Warren, *The Economics of Race*, *supra* note 33, at 1791.

[35]Melissa B. Jacoby, *Bankruptcy Reform and Homeownership Risk*, 2007 U. ILL. L. REV. 323, 332-33 (2007) ("Some researchers clearly are aware that bankruptcy plays some role, but tend not to build bankruptcy – and certainly not chapter 13 in particular – into their analyses. Thus, very few real estate studies even acknowledge the existence of chapter 13 and its antiforeclosure provisions, let alone try to study its impact or compare it to state law and other approaches."). *See* Capozza & Thomson, *supra* note 23, at 248 (from their sample reporting that "bankrupt loans rarely find their way to cure" but failing to distinguish between chapters 7 and 13 and thus putting too short a time horizon on their study). An unpublished working paper using the very small sample of bankruptcy filers in the Panel Study of Income Dynamics found a negative effect of bankruptcy on homeownership, especially in chapter 7. Cheryl Long, *Negative Effects of Personal Bankruptcy for Homeowners: Lost Homes and Reduced Credit Access* (Conference Draft, Fed. Res. Board of Chi., 2005), *available at* http://www.chicagofed.org/cedric/files/2005_conf_paper_session2_long.pdf.

[36]SULLIVAN, WARREN & WESTBROOK, *supra* note 1, at 142; Bahchieva, Wachter & Warren, *supra* note 19, at 92. More than half of the filers in the 2007 CBP are homeowners. Lawless et al., *supra* note 5, at 365 n.63; *see also* Zagorsky & Lupica, *supra* note 33, at 296 (reporting 59% homeownership rate among bankruptcy filers in their sample).

[37]SULLIVAN, WARREN & WESTBROOK, *supra* note 1. However, saving homes may have been the filers' goal even if their mortgage was current. *Id.* at 135.

[38]*Id.* at 131.

[39]*Id.* at 129.

[40]*Id.* at 133-34.

[41]*Id.* at 136-37.

[42]*Id.*

had a second mortgage or more, and a quarter had no equity in their homes.[43] Younger homeowners had a greater propensity to be in bankruptcy than older homeowners.[44] Job loss outpaced mortgage problems as the precipitating event leading to bankruptcy for this group: fourteen percent of the homeowners reported a specific mortgage problem as a reason for bankruptcy in response to an open-ended question, but more than half reported job losses.[45]

A study of homeowners who filed for bankruptcy in 2001 revealed that more than half had little or no home equity; the authors surmised that second mortgages contributed to this finding.[46] The prevalence of second mortgages and corresponding lack of equity presumably made attempts to retain homes more tenuous.[47]

Given the tools that bankruptcy law offers, a growing number of theoretical and empirical papers have discussed the role of bankruptcy in saving homes from foreclosure.[48] One empirical study observed that debtors are hindered in their efforts to save their homes, finding that there were inflated fees and improper mortgage documentation in a substantial portion of the cases.[49] Using the same dataset of chapter 13 homeowners, another study found that "more than two-thirds of bankrupt families live in unaffordable or severely unaffordable housing according to standards used by the Department of Housing and Urban Development."[50] In other words, home-saving was not feasible without more substantial debt restructuring and reduction.

Now that it is common knowledge that chapter 13 filers often do not complete their multi-year payment plans, scholars have examined the success of mortgage curing and homeownership sustainability *after* a bankruptcy filing. For example, in a study of Delaware bankruptcy filings in 2001 and 2002, researchers found bankruptcy delayed home loss due to foreclosure by approximately one year, but 28% of the homeowners had lost their homes to

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[43]SULLIVAN, WARREN & WESTBROOK, *supra* note 33, at 224.

[44]*Id.* at 207.

[45]*Id.* at 227, 229.

[46]Bahchieva, Wachter & Warren, *supra* note 19, at 95-96.

[47]*See* sources cited, *supra* note 19.

[48]*See, e.g.*, Jacoby, *supra* note 35, at 332-33; Eric S. Nguyen, *Parents in Financial Crisis: Fighting to Keep the Family Home*, 82 AM. BANKR. L.J. 229 (2008); Katherine Porter, *Misbehavior & Mistake in Bankruptcy Mortgage Claims*, 87 TEX. L. REV. 121 (2008); Michelle J. White & Ning Zhu, *Saving Your Home in Chapter 13 Bankruptcy*, 39 J. LEGAL STUD. 33 (2010) (discussing prominence of home saving as reason for homeowners to file for chapter 13 bankruptcy).

[49]Porter, *supra* note 48, at 123 ("The data revealed in this Article suggest, however, that home-mortgage lenders often disobey the law . . . [t]hese problems can cripple a family's efforts to save its home and undermine policies that promote sustainable home ownership."); *id.* at 129, 133 (explaining that several months of missed mortgage payments can lead to default charges, penalty fees, and foreclosure costs, all of which must be paid to cure the mortgage in chapter 13).

[50]Eggum, Porter & Twomey, *supra* note 14.

foreclosure by October 2007.[51] Another study estimated that less than 1% of those who would have defaulted are able to save their home through chapter 13, but this percentage would rise to over 10% if debtors could modify mortgages based on the home's current market value as some lawmakers have proposed.[52]

II. A STUDY OF THE DETERMINANTS OF MISSED PAYMENTS AND FORECLOSURE INITIATION: DATA AND METHODS

A. DATA

As previous articles have explained, the 2007 Consumer Bankruptcy Project is a national random sample of people who filed for chapter 7 or chapter 13 bankruptcy from February through April of 2007.[53] The CBP draws on a written questionnaire completed by all respondents, bankruptcy schedules submitted by filers under penalty of perjury, other court record data relating to motions filed and judicial orders entered, and telephone interviews for a subset of respondents that were completed between September 2007 and February 2008. Table A-1 in Appendix A provides descriptive statistics for this subsample on variables used in our analysis. As explained later, we also used geographic data, including categories of state foreclosure law, for some of our analysis, and used American Housing Survey data to understand how bankrupt homeowners in 2007 differed from the general population.[54]

The 2007 CBP includes demographic and socioeconomic data typically not available in studies that rely on mortgage servicing databases. Examples include age, education, race/ethnicity, family history, other debts, forms of borrowing, specific triggers of financial problems, and stated reasons for delinquency. However, we lacked some information frequently used in other non-bankruptcy studies. Although we had expected to construct loan-to-value ratios, the number of missing values in our homeowner sub-sample was too great and the bias too systematic between the cases with and without missing variables to include them in our models. When possible, we created proxies or used self-reported information to substitute for variables commonly found in servicing databases. For example, because we lacked credit scores, we constructed additional proxy variables to approximate creditworthiness.

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[51]Sarah W. Carroll & Wenli Li, *The Homeownership Experience of Households in Bankruptcy*, 13 CITYSCAPE 113, 115, 124 (2011); *see also* Cutts & Green, *supra* note 18, at 370 (finding that bankruptcy reduced the probability of mortgage failure within the study period because foreclosure proceedings were enjoined during the bankruptcy case).

[52]White & Zhu, *supra* note 48, at 57 ("if cram down of mortgages in Chapter 13 were introduced, the proportion of Chapter 13 filers who save their homes rather than default would increase 10-fold").

[53]For an in-depth explanation of the methods, including tests for sample bias, *see* Lawless et al., *supra* note 5.

[54]Appendix A, Table A-2.

"Bad access to credit" is a simple binary variable to identify those who were recently unable to refinance their homes or who had taken out a car-title or payday loan. These circumstances indicate impaired or limited access to mainstream credit options.

B. MODELS

1. *Missed Payments*

To explore determinants of missed payments among homeowners, we fit a logistic model with a set of variables intended to capture various potentially relevant aspects of each filer's situation available from the three 2007 CBP sources (bankruptcy court files, written questionnaire, and housing telephone survey).[55] We ran the logistic model on all homeowners with a mortgage in our sample. The binary decision in the first model is whether or not the debtor missed any mortgage payments in the two years before bankruptcy.[56]

We also modeled the probability of being severely delinquent (missing four or more payments) among those who missed at least one mortgage payment. While the number of reported missed payments were not necessarily consecutive (a limitation of the data), the latter model reflects what causes filers to miss multiple payments once they missed at least one.[57]

2. *Foreclosure Initiation*

Studying determinants of foreclosure initiations is challenging. A borrower missing one or more mortgage payments may influence the decision of a loan servicer to initiate foreclosure, and vice versa. The more payments a borrower misses, the more likely a lender will threaten or initiate foreclosure. Once foreclosure has been initiated or seems likely, the debtor may not see much point to making subsequent payments. The 2007 CBP does not establish an exact week-by-week timetable of the events within the two-year period. This makes it difficult to distinguish between missed payments before and after foreclosure initiation.

To deal with this issue, we constructed two different models of foreclosure initiation. First, in the absence of a suitable exogenous instrument for the number of missed mortgage payments, we created an instrument through a first-stage ordinary least squares regression.[58] In our second specification, we controlled for the number of missed payments on the propensity of lend-

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[55]We also ran models as simple linear regressions and the results were not substantially different.

[56]The logistic model is particularly suitable given our interest in the determinants of the likelihood of missing a payment, a binary outcome, as well as our use of a number of dichotomous covariates from the survey.

[57]Descriptive statistics on these variables are presented in Appendix A, Table A-1.

[58]Because so many variables that drive missed payments also drive lenders' decisions about initiating foreclosures, the first stage must use a parsimonious specification that attempts to meet the tests of a sound instrument while allowing variables that likely influence both decisions to be preserved for use in

ers to initiate a foreclosure by using a subsample of delinquent borrowers who missed a similar number of payments (three to five payments).

To study foreclosure initiation, we also included additional geographic variables not associated with missed payments. Using categories discussed in the work of Cutts and Merrill, we took into account the length of the foreclosure process in the homeowner's state of residence.[59] Whether the state allows for a non-judicial foreclosure process was added as a dependent variable.[60] To control for geographic factors to the greatest extent possible, we also added variables for high- and low- income counties.[61]

III. FINDINGS

A. Descriptive Findings About Bankrupt Homeowners

We compared this homeowner sample to national American Housing Survey data.[62] A higher percentage of bankrupt homeowners identified themselves as black compared to national data, consistent with prior research on this issue.[63] The sample also contained a higher percentage of divorced homeowners and women than in the general population. A greater percentage of respondents had some college (but no degree), and a lower percentage were college graduates, than in the general population.

Table A-1 identifies the descriptive statistics for variables used in the models. It includes the following notable findings:

- Slightly over half (54%) missed at least one mortgage payment in the two years prior to filing for bankruptcy, and the average among those who missed at least one payment was four.

- One in four had an adjustable rate mortgage, higher than the national average.

- A third used mortgage brokers to originate their mortgage loans.

- One out of five had a mobile home, a substantially higher proportion than found in an earlier study.[64]

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the second-stage model. The resulting instrument was rather weak and still included variables that may have independent influence on initiation of foreclosure.

[59]Cutts & Merrill, *supra* note 24, at 203. Fast foreclosure states are the third of states with the shortest foreclosure timeline, while slow foreclosure states are the third of states with the longest timeline.

[60]This has a low correlation with the length of foreclosure timelines. *Id.*

[61]We defined these as those with median household incomes that are respectively greater than 110% and less than 90% of their relevant state median incomes according to the 2000 U.S. Census.

[62]Appendix A, Table A-1. Table A-2 compares this homeowner sub-sample to others in the 2007 CBP.

[63]*See supra* text accompanying notes 33 & 34.

[64]*See supra* note 39.

- Half of the homeowners in our sample were first-time homebuyers, higher than the national average.

Additional descriptors of note include the following:

- Half of the homeowners in the housing telephone survey sample reported refinancing a loan at some point.[65]

- Thirty percent reported taking out a home equity line of credit.[66]

- Sixty percent reported either taking out a home equity line of credit or refinancing at some point.

- Paying off credit cards was the most popular reason debtors offered for refinancing a mortgage or taking out a home equity loan.

- Reverse mortgages were virtually non-existent in this sample.

Respondents also reported a very high level of contact with their mortgage servicers, which is key to the possibility of workouts.[67] Slightly over four out of five respondents said that their mortgage servicers contacted them about missed payments, and this resulted in communication for nearly all of these respondents.[68] This is a much higher rate of contact than is discussed in the general literature.[69] As a consequence, though, there was insufficient variation in this factor for inclusion in the models.

B. RESULTS FROM MISSED PAYMENTS MODELS

1. *Determinants of missing at least one payment*

The results of the model are presented fully in Appendix B, Table B-1, including factors often discussed but not found significant in our model. The findings reveal several factors that are statistically significant in their impact on missing payments, after controlling for the independent influence of each other variable:

- **Credit access**: Respondents who relied heavily on credit card debt to manage financial distress were less than *half* as likely to have missed a mortgage payment. At the same time, those who

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[65]The question was "Before filing for bankruptcy, was there ever a time that you refinanced your mortgage loan? In other words, did you ever pay off your mortgage loan and replace it with another one?" 2007 CBP Housing Telephone Survey, H28 (2007) (on file with authors).

[66]The question was "Before filing for bankruptcy, was there ever a time that you took out a home equity loan, home equity line of credit or a home improvement loan? In other words, did you ever take out a loan or line of credit IN ADDITION to your primary mortgage?" 2007 CBP Housing Telephone Survey, H31 (2007) (on file with authors).

[67]*See supra* text accompanying note 28.

[68]2007 CBP Housing Telephone Survey, H42 & H43 (2007) (on file with authors).

[69]*See generally* Collins & Reed, *supra* note 30, at 7 (reviewing research on borrower-servicer contact, and reporting that about half of foreclosure sales lack "reciprocal contact"); Porter, *supra* note 48, at 132 (discussing examples of difficulties experienced by homeowners in reaching their loan servicers).

were recently unable to refinance their homes or who had taken out a car-title or payday loan were more than *twice* as likely to have missed a mortgage payment than other filers.

- **Income problems**: Homeowners who reported that their household income "decreased significantly" in the two years prior to filing bankruptcy were nearly *twice* as likely to miss a mortgage payment in that period as other respondents.

- **Mortgage broker**: Using a mortgage broker increased a filer's likelihood of missing at least one mortgage payment by 64%.

- **Chapter 13**: Chapter 13 filers were nearly *twice* as likely to have missed a mortgage payment as chapter 7 filers. This is consistent with a now-common characterization of chapter 13 as a form of mortgagor protection.

- **Self-identified mortgage problems**: Our model illustrated a strong connection between missed mortgage payments and reporting mortgage payment problems as a reason for a bankruptcy filing.[70] Those who identified mortgage payment problems as a reason for their bankruptcies were *three times* as likely to have missed a payment as those not claiming this as a reason. These findings reinforce the relevance of asking debtors why they filed for bankruptcy, which is one of the CBP's signature methodologies. Debtors exercise discretion when characterizing their reasons for bankruptcy and do not merely point to all reasons that might be potentially available.[71]

We found no significant relationship between missing a mortgage payment and any of our demographic variables such as race, age, and education. The model produced no significant association between missing a mortgage payment and having an adjustable rate mortgage despite the potential for rate adjustments to create payment shocks that trigger loan defaults.

2. *Determinants of missing four or more payments*

In Appendix B, table B-1's right-most column reports the odds of a debtor missing four or more payments ("severe delinquency") among those who missed at least one. This model is less robust—very few variables appear significant and only one of these also appears as significant in the first model

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[70]The 2007 CBP gave all respondents a list of reasons for filing for bankruptcy and asked them to check any that applied to them. Several on the list related to housing or mortgage problems. *See supra* note 2.

[71]Melissa B. Jacoby & Mirya Holman, *Managing Medical Bills on the Brink of Bankruptcy*, 10 YALE J. OF HEALTH, POL'Y L. & ETH. 239, 273 (2010).

of any missed payments—but we report some key findings here:[72]

- **Self-employment**: Being self-employed was the strongest determinant of severe delinquency among this group. Self-employed debtors were more than *two and a half times* as likely to go into severe delinquency as other debtors. This may reflect income fluctuations that reduced the ability to keep up payments.

- **Credit**: Access to credit cards again appeared as an important determinant. Relying heavily on credit cards made a debtor who had missed at least one mortgage payment nearly *half* as likely to go into severe delinquency.

- **College degree**: Although demographic factors were not significant in the first model, having a bachelor's degree made a borrower who missed a payment *half* as likely to become severely delinquent compared to those who went to college but did not earn a bachelor's degree.

C. Foreclosure Initiation Models

Appendix C contains complete results for these models. As previously noted, our first foreclosure initiation model, an Ordinary Least Squares model, used a two-stage approach to address the interrelatedness of decisions to miss payments and foreclosure initiation. Our second model focused on a subsample of borrowers who missed three to five payments (half the sample that missed payments) and thus should have similar probabilities of foreclosure initiation. Several factors were significant in both models:

- **Credit**: Credit access factors were statistically significant determinants of foreclosure initiation. In the subsample model, heavy reliance on credit cards lowered the probability of foreclosure initiation by nineteen percentage points. In the two-stage model, bad access to mainstream credit raised the probability of foreclosure initiation by twenty percentage points.[73]

- **State foreclosure law**: In the two-stage model, living in a state with a long foreclosure timeline was associated with an eighteen percentage point decrease in the propensity of foreclosure initiation. In the subsample model, living in a state that permits quick foreclosure increased the probability of foreclosure initiation. The

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[72]For a discussion of the robustness of this model and the difficulties introduced by our inability to determine the timing of missed payments, see Appendix B.

[73]Heavy reliance on credit cards was not included directly in the two-stage model for comparison because the two-stage model used it to form a proxy for missed mortgage payments. Its significance in the subsample model supports the assertion that heavy credit card use was individually associated with both missed mortgage payments and foreclosure initiation.

findings of the two models are consistent, though it is interesting to note that the long foreclosure timeline dummy variable was not statistically significant in the subsample model and the quick fore-closure dummy variable was not statistically significant in the two-stage model.

- **Age:** Relative to adults aged thirty-six to fifty-five, both models showed adults over age fifty-five to have significantly *lower* probabilities of foreclosure initiation. Being over fifty-five years old was the most statistically significant negative covariate in the three-to-five-missed-payment subsample model, lowering the probability of foreclosure initiation by forty-nine percentage points.[74] Age could proxy for several factors, such as longer credit history and better credit score, or steadier income, making older respondents seem to servicers to be a safer bet to cure. Older homeowners could also have had more time to build equity in their homes, which could translate into lower debt-equity ratios and po-tentially greater access to funds.[75]

- **Self-identified mortgage problems:** In both models, there was a significant positive relationship between foreclosure initiation and identifying mortgage payment burdens as a reason for bank-ruptcy. As with the missed payments model, these findings rein-force the relevance of, and internally validate, debtors' own direct descriptions of their problems.

These two models produced inconsistent results on racial identity and having children in the household. Minority status was significant to foreclosure ini-tiation in the two-stage model, consistent with other research.[76] Self-identifi-cation of the primary petitioner as African American or another racial or ethnic minority increased the probability of foreclosure initiation by eighteen percent even after controlling for our credit access variables and county-level geographic controls. This variable was not significant in the subsample model. We were unable to determine whether this variable is a proxy for credit score and therefore reduces the significance of other credit proxies in the model.[77] Alternatively, minority status could be a proxy for neighbor-

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[74]Although the overall likelihood of bankruptcy is thought to decrease with age, comparisons of Con-sumer Bankruptcy Project data over time suggest that Americans aged fifty-five and older have had the sharpest increases in bankruptcy filings from 1991 to 2007. Deborah Thorne, Teresa A. Sullivan & Eliza-beth Warren, *Generations of Struggle*, AARP Pub. Pol'y Inst. (2008), *available at* http://assets.aarp.org/rgcenter/consume/2008_11_debt.pdf.

[75]Filers in our sample who were fifty-five and older were the most likely to refinance or take out a home equity line of credit.

[76]Quercia & Cowan, *supra* note 18, at 464.

[77]There is some evidence that credit scores are lower on average for black and Hispanic borrowers

hood location that affects loan servicer decisions, as concluded in previous studies.[78] We were unable to control for some financial, employment, and neighborhood characteristics that studies have shown to reduce, though not always eliminate, disparities in outcomes between distressed black and white homeowners.[79] In addition, the relatively small sample size limited the ability to test certain characteristics of race and ethnicity.[80]

The two-stage model found that having children in the household was associated with a significantly lower probability of foreclosure initiation even after controlling for the number of missed payments. The finding may reflect parents' especially strong desire to avoid foreclosure that leads to other actions that we cannot measure.[81] In the subsample model, though, having children in the household did not rise to the level of statistical significance.

D. Limits of Our Study

Our study's primary limit was that we were missing some important vari-

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than for white borrowers, though one careful study found that the independent variables used in credit scoring models do not have a disparate impact on how minorities are scored. For studies that suggest credit scores vary systematically by race and ethnicity, see Raphael W. Bostic et al., *Hitting the Wall: Credit as an Impediment to Homeownership*, in Building Assets, Building Credit 155-172 (Nicolas P. Retsinas & Eric S. Belsky eds., 2005); Board of Governors of the Fed. Reserve Sys., *Report to the Congress on Credit Scoring and Its Effects on the Availability and Affordability of Credit*, submitted to the Congress pursuant to § 215 of the Fair and Accurate Credit Transactions Act of 2003 (August 2007), *available at* http://www.federalreserve.gov/boarddocs/rptcongress/creditscore/default.htm. For a study showing that the independent variables used in credit scoring models are correlated with future loan performance within each group rather than serving as a proxy for representation within a single group, see Robert B. Avery, Kenneth P. Brevoort, & Glenn B. Canner, *Does Credit Scoring Produce a Disparate Impact?* (Fed. Reserve Bd. Divisions of Res. & Stat. & Monetary Aff., Fin. & Econ. Discussion Series 2010-58, 2010).

[78]*See supra* note 32.

[79]*E.g.*, Alicia H. Munnell et. al., *Mortgage Lending in Boston: Interpreting HMDA Data* (Fed. Res. Bank Bos., Working Paper No. 92-7, 1992).

[80]*See infra* note 120.

[81]Some research has examined the special difficulties faced by families with school-aged children when they are involuntarily relocated, suggesting that they might fight harder to keep their homes even after they stumble in their mortgage payments. Melissa B. Jacoby, *The Value(s) of Foreclosure Law Reform*, 37 Pepp. L. Rev. 511, 521-23 (2010); Nguyen, *supra* note 48, at 250 ("parents who filed for consumer bankruptcy were likely to behave differently than their childless counterparts. They went out of their way to save their homes, even when their incomes were far outpaced by those of non-parents."). Other studies have found an increased likelihood of families with children to be in bankruptcy, *see* Elizabeth Warren, *Bankrupt Children*, 86 Minn. L. Rev. 1003, 1019 (2002), or to revolve credit card debt. Haejeong Kim & Sharon A. DeVaney, *The Determinants of Outstanding Balances among Credit Card Revolvers*, 12 Fin. Counseling Plan. 67 (2001); Carol C. Bertaut & Michael Haliassos, *Debt Revolvers for Self Control,* (HERMES Center, Working Paper No. 01-11, 2001) *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=276052; *see also* Glenn Canner & Charles Luckett, *Consumer Debt Repayment Woes: Insights from a Household Survey*, 12 J. of Retail Banking 55 (1990) (finding more missed consumer debt payments for those with children). A study of earlier CBP data found higher loan-to-value ratios—and thus more risk of default—to be associated with having children in the household. Bahchieva, Wachter & Warren, *supra* note 36, at 97. However, this study also found high LTVs to be associated with lower consumer debt, while filers with lower LTVs were significantly more likely to report out-of-control credit card debt as a reason for filing. *Id.* at 98-99,102.

ables. For example, we lacked proprietary credit scores. Although other studies of bankrupt homeowners also do not have credit scores,[82] credit scores are, at least in theory and often in practice, important determinants of the likelihood of mortgage default and foreclosure initiation.[83] In addition, we were not able to construct valid debt-to-value ratios for the group of respondents who completed the homeownership telephone survey. The 2007 CBP collected this information but the number of missing values for this sub-sample was too great and the bias too systematic between the cases with and without missing variables to include them in our models.[84] Our "bad access to credit" variable was an imperfect proxy for credit score.

We also did not have a precise timeline of missed payments and foreclo-sure initiation. There is potential endogeneity not only between missing pay-ments and foreclosure initiation, but between filing for bankruptcy and missing payments. In a time of financial stress, a homeowner may miss some mortgage payments, decide to file a chapter 13 bankruptcy case, and then miss additional mortgage payments before actually submitting the filing paperwork to the bankruptcy court. We did as much as we could to wrestle with these issues. Still, our foreclosure initiation models have shortcomings: the two-stage model used a predicted value for missed mortgage payments from a rather weak proxy, while the three-to-five-missed payment model used a rather small sample, and it is possible (though we think unlikely) that largely two different groups may combine in this single category—those who missed all or most of the three to five payments before foreclosure was initi-ated and those who missed all or most of their three to five payments after.

Some readers might object more generally to the reliance on self-reported data from debtors.[85] Self-reported data are often the only way to get rich detail, perhaps explaining why survey data are so frequently used in the social sciences. The key is careful design of the survey instruments. Furthermore, given the recent evidence of errors made in data collection by loan servicers, including in the bankruptcy context,[86] it is not obvious that servicer data

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[82]*See, e.g.*, Carroll & Li, *supra* note 51, at 118-19 (describing data sources for a study of whether bankrupt homeowners lost their homes to foreclosure, and appearing not to have individual credit scores).

[83]*See, e.g.*, Canner & Luckett, *supra* note 81; Sonia M. Livingstone & Peter K. Lunt, *Predicting Personal Debt and Debt Repayment: Psychological, Social and Economic Determinants*, 13 J. ECON. PSYCHOL. 111 (1992); Diann C. Moorman & Steven Garansky, *Consumer Debt Repayment Behavior as a Precursor to Bankruptcy*, 29 J. FAM. & ECON. ISSUES 219 (2008).

[84]We tried running models using these variables to see if we could extract usable information about them despite the number of missing values and systematic bias in missing values. Results were volatile, but suggested that having a high original mortgage payment-to-income ratio had a positive impact on the number of missed payments, and low loan levels at bankruptcy had a negative impact.

[85]Melissa B. Jacoby & Elizabeth Warren, *Beyond Hospital Misbehavior: An Alternative Account of Medical-Related Financial Distress*, 100 NW. U. L. REV. 535, 547-48 (2006) (discussing and responding to self-reporting critique).

[86]Porter, *supra* note 48.

would have been inherently more reliable than data from other sources. In the future, researchers will have some improved access to information about mortgage delinquency among bankruptcy filers; in December 2011, new rules and forms will come into effect that require a lender claiming a security interest in a debtor's principal residence to carefully document the components of the debt and costs.[87] However, this may not be helpful for studying chapter 7 cases because mortgage holders do not always file proofs of claim in such cases.[88] Thus, self-reported data by debtors will remain relevant and useful.

Notwithstanding these limits, our study found strength in the breadth and depth of the primary dataset, the 2007 CBP, which enabled us to both paint a richer picture of bankrupt homeowners and to test variables that are unavailable in other types of studies. More specifically, we were able to look at the influence of household characteristics, coping behavior when faced with financial crisis, and a variety of demographic variables. We hope our findings will provoke researchers to undertake additional studies that can combine the benefits of these datasets with the important variables that we were missing.

IV. IMPLICATIONS AND CONCLUSIONS

We found that a significant portion of financially distressed homeowners in bankruptcy managed to avoid mortgage delinquency and that they differed from the bankrupt homeowners with mortgage problems in several important respects. Although our study was exclusively of bankruptcy filers, the findings raise questions relevant to consumer credit policy, the operation of chapter 13, and state foreclosure law reform.

A. Consumer Credit Regulation and Policy

Mainstream consumer credit access was consistently an important factor in reducing the likelihood of mortgage trouble. The very fact of continued access to mainstream credit may indicate better credit histories and/or a stronger financial position relative to other distressed families. These filers may have had greater ability to keep secured debts current, and, when they did not, they may have appeared as stronger candidates for a workout to avoid slipping into serious delinquency. This was consistent with our finding that older respondents were less likely to become seriously delinquent even if they missed a mortgage payment.

There is an alternative explanation: credit card usage may itself have been

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[87]See Official Bankr. Form B-10 (Proposed Amendments 2011), and Fed. R. Bankr. P. 3011(c) (Proposed Amendments 2011), available at http://www.uscourts.gov/uscourts/RulesAndPolicies/rules/proposed%200810/Proposed%20Rules%20and%20Forms%20Amendments.pdf.

[88]See generally Porter, supra note 48, at 141-42 (discussing why mortgage claims are filed more frequently in chapter 13 than in chapter 7).

the lever, filling in other financial gaps so that a debtor could keep a mortgage current.[89] Indeed, on the telephone survey, about a quarter of filers who missed mortgage payments specifically reported using credit card cash advances as a method of getting caught up on their mortgages.[90]

Given the already-complicated intersections between consumer credit, mortgage problems, and sustainable homeownership, our findings arguably raise more questions than they answer. Whereas credit card access is associated with a lower risk of mortgage problems in our study, other writings suggest that high credit card debt burdens arise because housing is, in fact, unaffordable without subsidizing expenses with high-cost debt.[91] This is perhaps a darker, but not implausible, interpretation of our findings.

Other studies have connected the issues entirely differently. For example, some researchers have identified circumstances under which homeowners were actually more likely to pay their credit card bills than their mortgages.[92] In addition, some authors have raised concerns that, before the financial crisis, homeowners accepted offers of cash-out mortgage refinancing, putting their homes at greater risk, for the very purpose of paying credit card debt.[93] As reported in Part IIIA, payment of credit card debts was the most popular reason reported by the respondents in our sample for taking out a second mortgage or doing a cash-out refinancing. To the extent these findings illustrate that homeowners were anxious to retain consumer credit liquidity to deal with other key expenses, they can be seen as consistent with our results showing that debtors leaned heavily on credit cards in exactly that circumstance.

In the aftermath of the financial crisis, the intersection between consumer credit and mortgage debt is sure to evolve further. For example, the CARD Act and associated regulations should affect the quality, and possibly the quantity, of the credit card opportunities available to households of modest

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[89]*See* Cohen-Cole & Morse, *supra* note 21, at 2 (describing insurance function of consumer credit). *See generally* Eric S. Belsky, Ren S. Essene & Nicolas P. Retsinas, *Consumer and Mortgage Credit at the Crossroads, in* BORROWING TO LIVE, *supra* note 24, at 11, 59 (discussing role of consumer credit in smoothing consumption).

[90]The question was "When you got behind on the mortgage payments, did you do, *or try to do*, any of the following things to get caught up? Did you: [followed by a list of pre-coded responses]." 2007 CBP Housing Telephone Survey, H46 (2007) (emphasis in original) (on file with authors).

[91]Tamara Draut & Javier Silva, *Borrowing to Make Ends Meet: The Growth of Credit Card Debt in the '90s* 31 (Demos Working Paper 2003). *See generally* Belsky, Essene & Retsinas, *supra* note 89, at 7 (reviewing arguments that consumer debt loads are amplified by cost of living, including housing costs).

[92]*See, e.g.*, Cohen-Cole & Morse, *supra* note 21.

[93]Lisa James & Jabrina Robinson, *Risking Homes to Pay Credit Cards: Debt-consolidation Mortgage Refinancing Is Not a Winning Financial Formula for Many Families* 4 (Ctr. for Responsible Lending Issue Paper No. 12, 2005); Tamara Draut et al., *The Plastic Safety Net: The Reality Behind Debt in America* 14-15 (Demos & Ctr. For Responsible Lending, Report, 2005).

means.[94] Likewise, the Dodd-Frank Act, a financial reform law, will affect mortgages not only substantively, but through the introduction of a new regulator, the Bureau of Consumer Financial Protection, and the reinvigoration of the rights of state-level actors to engage in enforcement of their own.[95] It is too soon to predict the overall impact of these legal changes, but one should not merely assume that these reforms will effectuate a blunt decline in credit access.[96] In any event, our findings emphasize the potential linkages between consumer credit and mortgage credit markets, and the importance to regulatory design of being attentive to these relationships.

B. Chapter 13 Repayment Plans

Our findings emphasize the importance of stable incomes for homeownership sustainability. Those with big declines in income were significantly more likely to miss a mortgage payment, and the self-employed were more likely to fall into serious delinquency after missing one payment. The findings are consistent with research in the general population illustrating the significant incidence of unemployment or curtailment of income among homeowners who become delinquent on mortgages.[97] The results also echo larger trends of income volatility in the general population documented by Jacob Hacker and others.[98] However important income stability may be in general, it is even more important if a debtor is to have any hope of curing a mortgage in chapter 13. Chapter 13 eligibility is explicitly contingent on having "regu-

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[94]Credit Card Accountability Responsibility and Disclosure Act of 2009, Pub. L. No. 111-24, 123 Stat. 1734 (2009); Elizabeth Warren, The CARD Act: One Year Later, Consumer Financial Protection Bureau CARD Act Conference (Feb. 22, 2011) (transcript available at http://www.consumerfinance.gov/speech/the-card-act-one-year-later/).

[95]Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010). *See generally* Susan Block-Lieb & Edward J. Janger, *Reforming Regulation in the Markets for Home Loans*, 38 Fordham Urb. L.J. 681 (2011) (exploring how Dodd-Frank affects home mortgage markets, with a particular focus on Parts X and XIV of the legislation); Melissa B. Jacoby, *Dodd-Frank, Regulatory Innovation, and the Safety of Consumer Financial Products*, 15 N.C. Banking Inst. 99, 106-07 (2011) (discussing Dodd-Frank's reinvigoration of state consumer protection efforts).

[96]*See, e.g.*, Raphael W. Bostic et al., *The Impact of State Antipredatory Lending Laws: Policy Implications and Insights*, in Borrowing To Live, *supra* note 24, at 153-54, 162 (finding counterintuitive but robust effects of broader coverage of anti-predatory lending laws); *see also* Proposed Definitions of Qualified Mortgage for Dodd-Frank Safe Harbors, 76 Fed. Reg. 27,390, 27,391 (proposed May 11, 2011) (to be codified at 12 C.F.R. pt. 226).

[97]Belsky, Essene & Retsinas, *supra* note 89, at 53 (reviewing Freddie Mac data from 2001-2005 and 2006, and noting "[t]hese data plainly show that unemployment or other income curtailment is the principal reason that borrowers, or at least borrowers of prime mortgage credit, default on their loans.").

[98]Jacob Hacker, *The Risky Outlook for Middle-Class America*, in Ending Poverty In America, *supra* note 19, at 66, 73 (using Panel Study of Income Dynamics data to study income trends of American households over time). In addition to providing systematic empirical support, Hacker specifically tied income with homeownership sustainability when he highlighted a story of a man with greatly fluctuating income who was losing his home. *Id.* at 68.

lar income."[99]

The observed association between missed payments and mortgage broker use underscores the potential benefits of regulating the licensing and registration of brokers for reducing problem loans. Mortgage broker use, at least among those with modest means, has been associated with higher rates of high-cost features.[100] Because curing a mortgage requires full payment of costs under the mortgage,[101] we see even more of a mismatch between the structure of chapter 13 and the circumstances of people who have mortgages in need of curing.

Some homeowners may have sufficiently changed circumstances that keeping a home is truly not feasible under any reasonable set of laws. However, for others, permitting mortgage loans to be restructured and reduced to the value of the collateral could improve sustainability by reducing associated monthly mortgage payments.[102] As a separate matter, the bundled legal tools in chapter 13 could be disaggregated.[103] Currently, a debtor's mortgage relief is conditioned on payment of a wide range of other costs, most of which are unrelated to housing policy objectives.[104] Congress could reduce the amount of unsecured debt required to cure a mortgage, or could establish a single-chapter bankruptcy system in which the obligation to repay unsecured debt is delinked from the right to restructure a mortgage.[105] The latter has the advantage, at least in theory, of substantially reducing the administrative costs associated with mortgage curing.

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[99]11 U.S.C. § 109(e) (2010) (conditioning eligibility for chapter 13 on regular income, among other criteria).

[100]Engel & McCoy, *supra* note 30, at 89 (discussing how compensation structure and regulatory gaps create incentives for brokers "to maximize their profits at the expense of borrowers."); Michael S. Barr, Sendhil Mullainathan & Eldar Shafir, *Behaviorally Informed Home Mortgage Credit Regulation*, *in* BORROWING TO LIVE, *supra* note 24, at 170, 196-97 (reviewing data on use of yield spread premiums by brokers, noting that brokers dominated the subprime mortgage market, and arguing that incentives of creditors and investors must change so as to better monitor brokers); *id.* at 193 (evaluating reforms in which brokers would have to make disclosures about the pricing of the loan and the borrower's qualification for other credit products).

[101]*See supra* note 14.

[102]Eggum, Porter & Twomey, *supra* note 14, at 1131 (studying mortgage burdens among chapter 13 filers and noting that "bankruptcy law's current prohibition on modifying home mortgage loans is a serious limitation on bankruptcy's usefulness as a home-saving device."). For an explanation of how a debtor can seek to modify a mortgage without legislative change using equitable subordination principles, see Moringiello, *supra* note 14. For an example of a more automated zip-code-based modification approach that is not dependent on a bankruptcy filing, see Eric Posner & Luigi Zingales, *A Loan Modification Approach to the Housing Crisis*, 11 AM. L. & ECON. REV. 577 (2009).

[103]Melissa B. Jacoby, *The Legal Infrastructure of Ex Post Consumer Debtor Protections*, 38 FORDHAM URB. L. J. 751, 759-60 (2011).

[104]*Cf.* SULLIVAN, WARREN & WESTBROOK, *supra* note 1, at 142-43 (observing another way in which bankruptcy law does not protect the objective of homeownership expansion).

[105]*See, e.g.,* Jean Braucher, *A Fresh Start for Personal Bankruptcy Reform: The Need for Simplification and a Single Portal*, 55 AM. U. L. REV. 1295, 1327-28 (2006).

C. State Foreclosure Law Reform

We found that longer foreclosure timelines were associated with a lower probability of foreclosure initiation and shorter timelines were associated with a higher probability of foreclosure initiation.[106] Notwithstanding the limits of our models, these results are consistent with the view that state foreclosure laws that impose greater expense on lenders and servicers—as longer foreclosure timelines do—deter foreclosures and may encourage workouts.[107]

More generally, our results highlight the connection between federal bankruptcy law and state mortgage law, and the importance of continued innovation in the latter category. Long treated as two entirely separate systems because they were produced through different formal channels, bankruptcy and state foreclosure law function together as an integrated system.[108] Our results suggest that state foreclosure laws that are more protective of homeowners, at least on an *ex post* basis, may increase the effectiveness of bankruptcy by allowing filers to focus on their unsecured debt problems, which are far simpler to address.[109] Just as state wage garnishment laws may affect how many of a state's citizens go bankrupt,[110] state foreclosure timelines may affect the quality and cost of debt relief achieved if they cannot avoid bankruptcy.

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[106]The real estate literature suggests that servicer contact could be driving the results, but we did not see signs in our sample that this is the case. As previously noted, this sample had a high level of reported servicer contact (approximately 80%), making this unsuitable to be used in the modeling. However, while respondents in slow foreclosure states reported a higher rate of contact than those in the middle-speed foreclosure states, a simple descriptive analysis illustrated no correlation between servicer contact and foreclosure initiation. In states with fast foreclosure timelines, foreclosures were initiated in half of delinquencies regardless of whether or not delinquent borrowers reported servicer contact. In slow foreclosure states, foreclosures were initiated approximately 40% of the time, again whether or not the debtor reported contact. In the middle third of states, borrower-lender contact lowered the average foreclosure initiation rate from 73% to 61%, but this difference was well within the large margin of error due to the small sample size.

[107]*See* Melissa B. Jacoby, *Home Ownership Risk Beyond a Subprime Crisis: The Role of Delinquency Management*, 76 Fordham L. Rev. 2261, 2293-94 (2008) ("By making and keeping foreclosure laws more cumbersome, the government tilts the cost-benefit analysis in favor of private resolutions in a wide range of circumstances. Phrased more directly, if legislatures implemented proposals to greatly streamline foreclosure, lenders likely would pursue formal debt enforcement in a greater proportion of delinquencies.").

[108]Jacoby, *supra* note 103.

[109]Some readers may lament that state foreclosure laws which make the process more cumbersome increase the cost of credit *ex ante* but some researchers who find an association between mortgagor protection and higher costs or reduced access recognize that the social insurance benefits may outweigh such costs. *See, e.g.,* Pence, *supra* note 24, at 182.

[110]*See, e.g.,* Lars Lefgren & Frank McIntyre, *Explaining the Puzzle of Cross-State Differences in Bankruptcy Rates*, 52 J. L. Econ. 367 (2009) (analyzing state differences in bankruptcy filing rates using zip-code level data and finding that states with lower wage garnishment exemptions had higher rates of bankruptcy filings).

APPENDIX A: Descriptive Statistics

Table A-1: Characteristics of Bankrupt Homeowners, 2007 CBP Housing Survey

Dummy Variables	Number in Sample	Number in Category	Percentage in Category (of Universe)
Race/Ethnicity – Minority [not non-Hispanic white]	639	157	0.25
Family Type – Married	658	345	0.52
Family Type – Children in household	654	285	0.44
Age of Bankruptcy Filer – Age 35 and under	622	117	0.19
Age of Bankruptcy Filer – Age 36 to 55	622	363	0.58
Age of Bankruptcy Filer – Over age 55	622	142	0.23
Education – High school graduate or less	639	205	0.32
Education – Some college	639	309	0.48
Education – College graduate or higher	639	125	0.20
Employment – Household head was self employed	614	124	0.20
Income – Head or spouse experienced a gap	652	360	0.55
Income – Household experienced a drop	655	304	0.46
Home was a mobile home	658	131	0.20
First time homebuyer	656	357	0.54
Mortgage Loan – Used a mortgage broker for original loan	550	182	0.33
Mortgage Loan – Original loan was an adjustable rate mortgage	556	140	0.25
Filed Chapter 13 bankruptcy	658	272	0.41
State foreclosure process timeline[111] in quickest 33% of states	658	207	0.31
State foreclosure process timeline in slowest 33% of states	658	238	0.36
State law allows non-judicial foreclosure process	658	371	0.56
Low-income county (county median income<90% of state median)	614	142	0.22
High-income county (county median income>110% of state median)	614	174	0.27
Filed bankruptcy because of burden of mortgage payments	658	148	0.22

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[111]Fast and slow foreclosure states are derived from Cutts & Merrill, *supra* note 24, at 203.

Table A-1 (cont'd)

Dummy Variables	Number in Sample	Number in Category	Percentage in Category (of Universe)
Filed bankruptcy because of constant debt collectors calls	658	288	0.44
Filed bankruptcy because of medical reasons	658	309	0.47
Coped with bills by borrowing from family/ charity	658	436	0.66
Coped with bills by relying heavily on credit cards	658	429	0.65
Had bad access to mainstream credit[112]	658	287	0.44
Missed a mortgage payment in the 2 years prior to bankruptcy	575	312	0.54
Missed 4 or more mortgage payments in 2 years prior to bankruptcy[113]	283	149	0.53
Lender initiated the foreclosure process	570	182	0.32
Continuous Variable			
Mortgage Payments Missed in 2 yrs Prior to Bankruptcy[114] – Number(#)	582	n/a	1.98

Table A-2: Demographic Comparison of Primary Petitioner Homeowners in 2007 CBP with American Housing Survey Homeowner Householders

	Percent Distribution of Homeowners	
	CBP Housing Phone Survey	American Housing Survey
Marital Status		
Married	53.0	63.9
Widowed	6.9	11.3
Divorced	23.0	13.6
Separated	5.7	1.4

	Percent Distribution of Homeowners	
	CBP Housing Phone Survey	CBP Mail Survey Only Sample
Marital Status		
Married	53.0	52.3
Widowed	6.9	7.1
Divorced	23.0	24.8
Separated	5.7	5.5

[112]This proxy variable reflects those who coped with their bills through payday or car title loans or filed bankruptcy because they could not refinance their current mortgage.

[113]The universe drops from 312 to 283 because 29 respondents reported having missed a payment but did not report the number of payments they missed.

[114]The number of missed payments was top-coded at seven to reduce the over-influence of a small number of outliers with an extreme number of missed payments.

Table A-2 (cont'd)

	Percent Distribution of Homeowners			Percent Distribution of Homeowners	
	CBP Housing Phone Survey	American Housing Survey		CBP Housing Phone Survey	CBP Mail Survey Only Sample
Marital Status			**Marital Status**		
Never married	11.4	9.8	Never married	11.4	10.2
Total	N=651	100.0	Total	N=651	N=854
X^2 probability	< 0.01		X^2 probability	0.902	
Sex			**Sex**		
Male	35.8	60.2	Male	35.8	41.0
Female	64.2	39.8	Female	64.2	59.0
Total	N=656	100.0	Total	N=656	N=859
X^2 probability	< 0.01		X^2 probability	0.041	
Age			**Age**		
Under 25	1.6	1.4	Under 25	1.6	1.5
25–34	15.6	11.5	25–34	15.6	19.6
35–44	27.3	20.6	35–44	27.3	29.9
45–54	30.1	23.7	45–54	30.1	24.8
55–64	17.7	18.8	55–64	17.7	15.8
65 and Over	7.7	23.9	65 and Over	7.7	8.3
Total	N=622	100.0	Total	N=622	N=815
X^2 probability	< 0.01		X^2 probability	0.125	
Race / Ethnicity			**Race / Ethnicity**		
White	75.4	79.6	White	75.4	70.0
Black	18.9	8.0	Black	18.9	21.7
Other	5.6	12.4	Other	5.6	8.2
Total	N=639	100.0	Total	N=639	N=837
X^2 probability	< 0.01		X^2 probability	0.042	
Education			**Education**		
Less than High School	7.5	13.4	Less than High School	7.5	9.6
High School Graduate	24.7	27.1	High School Graduate	24.7	30.8
Some College	47.2	28.0	Some College	47.2	41.1
College Degree or Higher	20.6	31.6	College Degree or Higher	20.6	18.6
Total	N=655	100.0	Total	N=655	N=867
X^2 probability	< 0.01		X^2 probability	0.013	

Notes: CBP data reported here include all respondents who owned a home at some time during the five years before filing bankruptcy. AHS includes all homeowners. For sake of comparison to marital status categories in AHS, "other" marital status records are excluded from this comparison.

Sources: 2007 Consumer Bankruptcy Project; US Census Bureau, American Housing Survey, 2005.

Appendix B: Modeling Approach for Missed Payments

We constructed logit models that draw on a common set of covariates intended to capture observable information that might bear on the mortgage payment behavior of homeowners who file for bankruptcy. Specifically, our delinquency models take the form of the log odds ratio of missing at least one payment P (or four or more payments) as a linear combination of a vector of variables X that influence whether or not payments are missed. We included demographic variables, income-related variables, mortgage-related variables, bankruptcy-related variables, access to credit, and type of foreclosure law in the states in which they resided. While most variables entered into the model are binary variables by definition, other variables such as age and education were transformed into categorical binary variables in order to identify more complex relationships that may be categorical and nonlinear, as opposed to simply incremental. This reflects demographic research on bankruptcy indicating that the propensity to file bankruptcy did not simply decrease with years of education; rather, it began low for those who did not graduate high school, was highest for high school graduates and then decreased with additional years of higher education.[115] The results of the logit model of the odds of ever having missed a mortgage payment in the two years leading up the filing are presented in table B-1. Coefficients are shown as odds ratio estimates rather than logged odds in order to more directly show the independent effect of each variable on the likelihood of missing a mortgage payment.

Table B-1 also reports the results of the logit model of the odds of four or more payments missed by delinquent borrowers only (conditional on missing at least one payment). Among just those having been delinquent, the relationship to missing four or more payments is less clear. Results show the strict model is nowhere near as robust as the previous model on missing any payments, but still it fits reasonably well as judged by the Hosmer & Lemeshow Goodness of Fit chi-square statistic, and it does not suffer from high variance inflation among any collinear covariates.

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[115]Elizabeth Warren, *Financial Collapse and Class Status: Who Goes Bankrupt?*, 41 Osgoode Hall L.J. 115 (2003).

Table B-1: Modeled Probabilities of Missing Mortgage Payments

Variable	Missed a Payment[116]	Missed Four or More Payments
Universe	All Borrowers	Delinquent Borrowers
	Odds Ratio Estimates	Odds Ratio Estimates
Race/Ethnicity – Minority [not non-Hispanic white]	1.08	1.01
Family Type – Married	0.91	0.83
Family Type – Children in household	1.54	1.15
Age of Bankruptcy Filer – Age 35 and under	0.74	0.53
Age of Bankruptcy Filer – Over age 55	1.10	0.73
Education – High school graduate or less	0.98	0.63
Education – College graduate or higher	1.35	0.53*
Employment – Household head was self employed	1.04	2.54**
Income – Head or spouse experienced a gap	1.05	1.27
Income – Household experienced a drop	1.91***	1.22
First-time homebuyer	0.95	1.24
Mortgage Loan – Used a mortgage broker for original loan	1.64**	0.72
Mortgage Loan – Original loan was an adjustable rate mortgage	1.11	0.58
Filed Chapter 13 bankruptcy	1.94***	0.62
Filed bankruptcy because of burden of mortgage payments	3.03***	1.03
Filed bankruptcy because of constant debt collectors calls	1.89***	0.83
Filed bankruptcy because of medical reasons	0.92	1.05
Coped with bills by borrowing from family/charity	1.88**	1.36
Coped with bills by relying heavily on credit cards	0.44***	0.57*
Had bad access to mainstream credit	2.17***	1.24
N	425	217
R^2	0.23	0.11
Adjusted R^2	0.31	0.15
Likelihood Ratio	111.3	25.8
Hosmer & Lemeshow Goodness of Fit (Pr > ChiSq)	0.87	0.91

*** : significant at the 99% level
** : significant at the 95% level
* : significant at the 90% level

[116]Logit model coefficients displayed are estimated odds ratios. Logistic models display maximum-likelihood-based 'pseudo' R-squared measures of goodness of fit. The adjusted R-squared re-scales the pseudo R-squared measure to enable a maximum value of 1, which is not possible otherwise.

Appendix C: Modeling Approach for Foreclosure Initiation

We deployed a two-stage least squares approach to handle the endogeneity between missed mortgage payments (decisions made by borrowers) and foreclosure initiations (decisions made by lenders). The models are fit only for borrowers that missed at least one payment.[117]

The two-stage least squares procedure cannot be extended to non-linear models, so we shifted to OLS modeling. The first stage is a streamlined OLS model similar to the logistical delinquency models presented above but on the number of payments missed. To determine our streamlined model, we performed stepwise selection on the covariates, requiring all variables to have F-statistics significant to the 90% level to be entered or to remain within the model, meaning that each variable must account for a significant reduction in model error. At the same time, we looked to maximize a balance between the overall F-statistic of the model and the adjusted r-squared value of overall fit. In this process, variables found to be insignificant in the previous delinquency models such as race, family type and age drop out of the model and the instrument for the number of payments missed is streamlined to the following reduced-form equation:

$$\text{Stage 1: } P = bX + u \qquad\qquad (1)$$

In this equation, P is the number of mortgage payments missed and X is reduced to a vector of four instrumental variables: being self employed, having experienced a gap in income either by the household head or spouse, having originally had an adjustable rate mortgage, and having coped with bills prior to bankruptcy by relying heavily on credit cards. The strength of the four instruments in predicting the number of mortgage payments missed is shown in table C-1.

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[117]There was a very small number of unusual cases in which filers reported foreclosure initiation without reporting missed mortgage payments.

Table C-1: Stage 1 Model of Missed Mortgage Payments among Delinquent Homeowners

Instrument Variable	Regression Coefficient
Intercept	4.04***
Employment – Household head was self employed	0.87***
Income – Head or spouse experienced a gap	0.56**
Mortgage Loan – Original loan was an adjustable rate mortgage	−0.55*
Coped with bills by relying heavily on credit cards	−0.51*
Number of Observations	217
R-Square	0.08
Adj R-Sq	0.06
F-Value	4.5
Pr > F	0.002

*** : significant at the 99% level
** : significant at the 95% level
* : significant at the 90% level

Note: Significance levels of covariates and F-statistic of model reflect HC4 controls for heteroskedasticity. See Hayes and Cai (2007).

The instrument is rather weak, and relies on variables that have their own individual associations with initiation of foreclosure. For these reasons, interpretation of the significance of missed payments within the second stage model must be taken with some caution.

Our alternative model controlled for the number of payments missed by restricting the sample to those borrowers who missed three to five mortgage payments. The predicted value for the number of missed mortgage payments of delinquent homeowners from the stage one model was entered into a second stage equation as a non-endogenous covariate that will proxy for the number of missed payments. We ran a second-stage model to assess the relevant factors associated with the propensity of delinquent homeowners being initiated with foreclosure under the following equation:

$$\text{Stage 2:} FC_{\text{initiated}} = \alpha_0 + \alpha_1 P^* + \alpha_2 Z + \varepsilon \tag{2}$$

where P^* is the predicted number of missed payments resulting from the first stage equation, while Z is a vector of socio-economic covariates. Because the model is linear, including both the predicted value of missed payments and the instruments used to gain that predicted value would result in high variance inflation that would bias the significance of these variables in the second-stage equation. Therefore, Z does not include the covariates used in stage one. It does, however include additional geographic variables not asso-

ciated with missed payments. Two are related to the legal duration of the foreclosure process in the homeowner's respective state. Also of interest, and therefore added as a dependent variable, is whether or not the state allows for a non-judicial foreclosure process, which has a low correlation with the length of foreclosure timelines. Lastly, to control for geographic factors to the greatest extent possible, we added in two binary variables for high- and low- income counties, which are defined as those with median household incomes that are respectively greater than 110% and less than 90% of their relevant state median incomes according to the 2000 US Census.

The results of the two-stage model are shown in column one of Table C-2.[118]

As noted, the proxy for missed payments used in the above model may be too weak to be conclusive, and the covariates used in building the proxy could be associated with foreclosure initiation.

Our second model was a single-stage model but narrowed the sample to those having missed between three and nine mortgage payments (more than half of the respondents missed that many) and model foreclosure initiation by adapting equation (2) as the following:

$$\text{Stage 2: } FC_{initiated} = \beta_0 + \beta_2 Z + \varepsilon \tag{3}$$

Here Z now includes the stage 2 model covariates from above plus the stage 1 socio-economic variables formerly used to proxy for number of missed payments. The results of the single-stage model on foreclosure initiation, in the right-most column of table C-2, show several covariates with significant associations.

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[118]Because the second stage model uses OLS to form a linear approximation of a binary system, thorough investigation of significance of the independent variables requires controls for heteroskedasticity. To check for the impact of heteroskedasticity within our model, we used the HC4 method described in Andrew F. Hayes & Li Cai, *Using Heteroskedasticity-Consistent Standard Error Estimators in OLS Regression: An Introduction and Software Implementation*, 39 BEHAV. RES. METHODS 709 (2007). Our tests found that heteroskedasticity has no significant impact on any variables found to be significant in the first or second stages of the foreclosure initiation model. However, the F values and covariate significance levels reported in the models reflect the HC4 heteroskedasticity consistency controls.

Table C-2: Results of 2 Stage Least Squares Models – Delinquent Borrowers Only[119]

Universe	2SLS Foreclosure Initiated (Stage 2) All Delinquent: 1+ Missed Payments Probability Coefficient	OLS Foreclosure Initiated Moderately Delinquent: 3-5 Missed Payments Probability Coefficient
Intercept	−0.48	0.21
Number of Mortgage Payments Missed (Predicted)	0.23***	
Race/Ethnicity – Minority [not non-Hispanic white][120]	0.18**	0.15
Family Type – Married	−0.08	−0.19
Family Type – Children in household	−0.16**	−0.16
Age of Bankruptcy Filer – Age 35 and under	0.19**	0.23
Age of Bankruptcy Filer – Over age 55	−0.20*	−0.49***
Education – High school graduate or less	−0.07	−0.02
Education – College graduate or higher	−0.03	0.18
Employment – Household head was self employed		0.21**
Income – Head or spouse experienced a gap		0.43***
Income Household experienced a drop	−0.00	−0.00
Home was a mobile home	−0.11	−0.08
First time homebuyer	0.02	0.13
Mortgage Loan Used a mortgage broker for original loan	0.17***	0.04
Mortgage Loan Original loan was an adjustable rate mortgage		−0.14
Filed Chapter 13 bankruptcy	0.05	−0.15
State foreclosure process timeline in quickest 33% of states	−0.04	0.24*
State foreclosure process timeline in slowest 33% of states	−0.18**	0.02

[119]Significance of coefficients were obtained from heteroskedasticity-consistent regressions using methods HC4. *Id.* F statistics and coefficient significances displayed use heteroskedasticity-consistent controls.

[120]After eliminating records with missing data, our final sample included sixty-six respondents who were the primary petitioner on the written questionnaire and self-identified as minorities, fifty-two of whom identified themselves as black. We concluded that it was necessary to look at all sixty-six respondents as a group to retain as many observations as possible, recognizing that this approach is far from ideal. Note that this group was especially small because it encompassed only those who participated in the homeownership telephone survey sample and not all minority homeowners in the entire 2007 CBP.

Filed bankruptcy because of burden of mortgage payments	0.18***	0.35***
Non Judicial Foreclosures Permitted	−0.02	−0.03
Low-Income County	0.18**	0.21
High-Income County	0.02	0.12
Filed bankruptcy because of constant debt collectors calls	−0.06	0.06
Filed bankruptcy because of medical reasons	−0.01	0.19
Coped with bills by borrowing from family/charity	−0.03	0.04
Coped with bills by relying heavily on credit cards		−0.19*
Had bad access to mainstream credit	0.20***	−0.09
Number of Observations	213	85
R-Square	0.32	0.53
F-Value	9.15	10.56
Pr > F	<.001	<.001

*** : significant at the 99% level
** : significant at the 95% level
* : significant at the 90% level

This study considered several variables relating to medical problems in the models based on the literature on bankruptcy trigger events.[121] Two variables came closest to significance: reporting medical bills as a reason for having filed bankruptcy and having more than $5,000 in medical bills in the two years prior to filing not covered by insurance. Neither was significant in the missed payments model and results were ambiguous for the foreclosure initiation model. Inclusion of these variables also had little effect on the coefficients and significance of the other covariates.

[121]See, e.g., Melissa B. Jacoby, Teresa A. Sullivan & Elizabeth Warren, Rethinking the Debates over Health Care Financing: Evidence from the Bankruptcy Courts, 76 N.Y.U. L. REV. 375 (2001); Jacoby & Holman, supra note 71; David M. Himmelstein, Deborah Thorne, Elizabeth Warren & Steffie Woolhandler, Illness and Injury as Contributors to Bankruptcy, HEALTH AFF. W5-63 (Web Exclusive Feb. 2, 2005), available at http://health-equity.pitt.edu/509/1/Illness_and_Injury_As_Contributors_to_Bankruptcy.pdf; David M. Himmelstein, Deborah Thorne, Elizabeth Warren & Steffie Woolhandler, Medical Bankruptcy in the United States. 2007· Results of a National Study, 122 AM. J. MED. 741 (2009), available at http://www.pnhp.org/new_bankruptcy_study/Bankruptcy-2009.pdf.