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Using Bankruptcy to Reduce Foreclosures: Does Strip-Down of Mortgages Affect the Supply of Mortgage Credit?*

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Abstract

We assess the credit market impact of mortgage “strip-down” — reducing the principal of underwater residential mortgages to the current market value of the property for homeowners in Chapter 7 or Chapter 13 bankruptcy. Strip-down of mortgages in bankruptcy was proposed as a means of reducing foreclosures during the recent mortgage crisis but was blocked by lenders. Our goal is to determine whether allowing bankruptcy judges to modify mortgages would have a large adverse impact on new mortgage applicants. Our identification is provided by a series of U.S. Court of Appeals decisions during the late 1980s and early 1990s that introduced mortgage strip-down under both bankruptcy chapters in parts of the U.S., followed by two Supreme Court rulings that abolished it throughout the U.S. We find that the Supreme Court decision to abolish mortgage strip-down under Chapter 13 led to a reduction of 3% in mortgage interest rates and an increase of 1% in mortgage approval rates, while the Supreme Court decision to abolish strip-down under Chapter 7 led to a reduction of 2% in approval rates and no change in interest rates. We also find that markets react less to circuit court decisions than to Supreme Court decisions. Overall, our results suggest that lenders respond to forced renegotiation of contracts in bankruptcy, but their responses are small and not always in the predicted direction. The lack of systematic patterns evident in our results suggests that introducing mortgage strip-down under either bankruptcy chapter would not have strong adverse effects on mortgage loan terms and could be a useful new policy tool to reduce foreclosures when future housing bubbles burst.

JEL Classifications: G14, G18, K10

Keywords: Mortgage credit, strip-down, creditor protection, bankruptcy

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Introduction

Since the mortgage crisis began in 2008, an unprecedented 4.2 million home foreclosures have been completed in the U.S. — an average of 850,000 per year compared with the 250,000 per year from 2000 to 2006.¹ The government tried various measures to reduce the number of foreclosures: Programs under the second Bush and Obama administrations offered compensation to lenders if they modified underwater mortgages by reducing homeowners' monthly payments.² But these programs were largely unsuccessful because few lenders were willing to cut mortgage debt. We examine an alternative approach to reducing foreclosures called mortgage strip-down, which would allow bankruptcy judges to reduce the principal owed on underwater mortgages to the current market value for homeowners in bankruptcy. This approach has the advantage that underwater mortgages can be modified regardless of whether lenders consent, thus giving homeowners with underwater mortgages an alternative to defaulting, going through foreclosure, and moving out of their homes. The Obama administration proposed legislation in 2009 to allow strip-down of residential mortgages in Chapter 13 bankruptcy, but it was not enacted due to opposition by mortgage lenders.³

Mortgage strip-down is attractive from an economic-efficiency perspective, since it could make homeowners better off without making lenders worse off. Lenders would not be harmed because they would receive as much as if they foreclosed, and homeowners would be made better off because they would not be forced to move. Also, mortgage strip-down would reduce an inefficiency in the mortgage market: Lenders foreclose too often because some of the costs of foreclosure are externalized.⁴ Nearby homeowners bear part of the cost since foreclosed homes cause blight and reduce property values in the neighborhood, and local governments also bear

¹ Completed foreclosures are those in which the title to the property passes to the mortgage lender, and the homeowner either moves out or becomes a tenant. Data are from CoreLogic.

² The Bush and Obama administrations programs to reduce foreclosures were, respectively, "HOPE for Homeowners" and the "Making Home Affordable Program." The latter required participating lenders to lower homeowners' monthly payments to 38% of their gross income; the government then paid the cost of lowering monthly payments to 31% of gross income. Neither program aided more than a few thousand homeowners. See Bajaj (2008), Bernard (2009), and Stolberg and Andrews (2009).

³ The proposed bills were the Helping Families Save Their Homes Act of 2009 (H.R. 1106, 111 Congress), introduced in the House, and the Helping Families Save Their Homes in Bankruptcy Act of 2009 (S. 61, 111 Cong.), introduced in the Senate.

⁴ This is because homes in foreclosure remain vacant for long periods and fall into disrepair. Campbell et al. (2011) find that homes located 1/20th of a mile away from a foreclosure lose 1% of their value, using residential sale data from Massachusetts in the 1990s. Craig (2014) discusses "zombie homes" in foreclosure causing blight.

part of the cost since they lose property tax revenue and are forced to cut spending on local public goods. Another argument for allowing mortgage strip-down has been made by economists including Summers (2014) and Mian and Sufi (2014): The government's bank-oriented response to the financial crisis left households with too much debt, leading to low consumer spending levels and years of stagnation for the economy. They argue that using mortgage strip-down to reduce household indebtedness would speed up economic growth by cutting household debt and raising household spending levels.

But mortgage strip-down has a drawback: It would erode creditor protection by forcing lenders to give up one of their most important contractual remedies for default, and this may cause lenders to reduce the supply of mortgage credit. The Mortgage Bankers Association, an advocacy group for mortgage lenders, opposed the reform and argued that allowing mortgage strip-down in bankruptcy would raise mortgage interest rates by at least 1.5 percentage points, which would amount to a huge increase of 30% or more (Kittle 2007).

In this paper, we assess the strength of the link between strip-down of mortgages in bankruptcy and the terms of mortgage loans. Drawing this causal connection is empirically challenging since unobserved factors may affect both whether strip-down is allowed in a jurisdiction and what the local mortgage market conditions are. We are able to circumvent this identification problem by making use of a series of plausibly exogenous federal court decisions in the late 1980s to the early 1990s that introduced and then abolished mortgage strip-down in parts of the country. Separate court decisions allowed mortgage strip-down to occur under both Chapter 7 and Chapter 13 of the Bankruptcy Code, with strip-down under the two chapters allowed at different times in different parts of the country. Exploiting the temporal and cross-sectional variation generated by these policy shocks, we use a difference-in-difference approach that compares lenders' responses in affected versus unaffected regions following each court decision.

In addition to providing empirical evidence for the effect of creditor rights on credit market outcomes, our study also provides some novel insights into how markets respond to court decisions that change the law. Economists routinely study how markets respond to legal changes adopted by legislatures or regulatory agencies,⁵ but there are far fewer studies of how markets

⁵ Examples in the labor economics and finance fields are Neumark and Wascher (2006) and Balasubramanian and Cyree (2014). These studies examine the effect on employment of changes in federal and state minimum

respond when judges change the law in the process of deciding legal disputes.⁶ In addition, our study is among the first to examine whether markets respond differently to decisions of lower-level courts (federal bankruptcy, district, and circuit court decisions) versus decisions of the U.S. Supreme Court. Market reactions to court decisions might differ from reactions to new legislation or regulations because of the lack of an executive-branch enforcement mechanism for court decisions, and market reactions to lower-level court decisions might differ from reactions to higher-level court decisions because lower-level decisions are more likely to be reversed on appeal.

Our main result is that mortgage markets responded to the Supreme Court decision to abolish mortgage strip-down in Chapter 13 bankruptcy by increasing approval rates for mortgage applications and reducing interest rates on new mortgages, but the changes were uniformly small. Our favored estimates are that approval rates rose by 0.9 percentage point, or 1.1%, and interest rates fell by 23 basis points, or 3.4%. When the Supreme Court abolished mortgage strip-down under Chapter 7, approval rates fell by 1.5 percentage points, or 1.8%, the opposite direction from our predictions. We also find that markets responded little to decisions by lower-level federal courts to introduce mortgage strip-down. Overall, it appears that the market response to mortgage strip-down lacks a systematic pattern — it differs for Supreme Court versus lower-level courts, it differs depending on whether mortgage strip-down is allowed under Chapter 7 versus Chapter 13, and the direction of change is not always in the predicted direction. These findings suggest that introducing mortgage strip-down would not have strong adverse effects on mortgage loan terms and could be a useful new policy tool to reduce foreclosures.

The rest of the paper is organized as follows: Section II supplies some institutional background, Section III provides some theoretical considerations to organize the empirical analysis, Section IV is a brief literature review, Section V outlines the methodology and data, Section VI discusses the empirical results, and Section VII concludes as well as provides some discussion of recent related policy initiatives.

wage laws and the effect on interest rates of the Dodd-Frank Wall Street Reform and Consumer Protection Act.

⁶ An example is Cooper and Tomlin (2008), who analyze the effect on markets of a U.S. Supreme Court decision that gave federal judges the responsibility to exclude unreliable expert testimony.

I. **The U.S. Court System and U.S. Consumer Bankruptcy Law**

We turn first to the organization of U.S. federal courts. Bankruptcy filings must be made in one of the federal bankruptcy courts: Each U.S. state is divided into one to four bankruptcy court regions. If the decision of a bankruptcy court judge is appealed, the appeal goes to the federal district court that covers the same region. If a federal district court decision is appealed, the appeal goes to the U.S. Court of Appeals (circuit court) that covers the relevant region; there are 11 circuit courts in the U.S., and each includes two to nine states. Finally, if there is an appeal from a circuit court decision, it goes to the U.S. Supreme Court. Figure 1 shows a map of the federal district and circuit court regions.⁷

When a district or bankruptcy court case is decided, the judge's decision may change the law. But since the decision applies only in the relevant district, it generates differences of law across districts within a circuit court region. These differences of law within a circuit are often resolved by the circuit court deciding an appeal from the lower court decision. But since circuit court decisions apply only in the relevant region, they create differences of law across circuits. These differences of law across circuits are resolved by the U.S. Supreme Court deciding an appeal on the question. Although the Supreme Court — unlike the circuit courts — may accept or reject appeals, differences of law across circuits are a major reason why it accepts them.

Next, we discuss the two bankruptcy procedures for individual debtors, Chapters 7 and 13, and how they help homeowners in financial distress.⁸ Under Chapter 7, some or all of homeowners' unsecured debts are discharged. Homeowners must give up all of their assets above an exemption level, but they are not obliged to use any of their future income to repay their debt — thus, they receive a “fresh start.” Because mortgage loans are not changed or discharged in Chapter 7, the procedure does not directly help financially distressed homeowners save their homes. Nonetheless, homeowners benefit from filing for bankruptcy since the discharge of unsecured debt increases their ability to pay, and if they wish to keep their homes,

⁷ Some bankruptcy court appeals go to a Bankruptcy Appellate Panel for the district before going to federal district or circuit court. Only a small minority of decisions in bankruptcy cases are appealed.

⁸ This discussion is based on U.S. bankruptcy law before the 2005 bankruptcy reform since our empirical work uses pre-2005 data. See White (2005), Eggum et al. (2008), White and Zhu (2010), and Li et al. (2011) for discussions of bankruptcy law, its effect on homeowners, and the effect of the 2005 bankruptcy reform.

they can use the increase to avoid defaulting on their mortgages or to repay their mortgage arrears.⁹

Homeowners who wish to save their homes benefit more directly by filing under Chapter 13. Here they must propose a plan to repay some of their debt from future income, but they are not obliged to give up any of their assets. Repayment plans must last for three to five years. Homeowners who are in default on their mortgages must repay the arrears in full, but they can spread repayment of arrears over the length of the repayment plan, and if they complete the full schedule of payments, then their original mortgage contracts are reinstated. The plan also covers unsecured debt, and debtors may propose repaying as little as 1% of the amount owed. Only the bankruptcy judge must accept the repayment plan; lenders' consent is not required. Thus, homeowners in financial distress can save their homes in Chapter 13 and can benefit from having some of their unsecured debt discharged. This procedure is valuable to homeowners who are in financial distress but have positive equity in their homes.

There were two separate groups of legal decisions concerning strip-down of mortgages in Chapter 7 versus Chapter 13 bankruptcy.¹⁰ Starting in the 1980s, some bankruptcy courts and district courts began allowing residential mortgages to be stripped down in Chapter 7 bankruptcy and appeals of these decisions led three circuit courts — the Seventh, Eleventh, and Third — to allow mortgage strip-down in Chapter 7 within their regions. These decisions occurred between 1987 and 1989. An additional circuit — the Tenth — decided not to allow strip-down in Chapter 7 in 1990. The Supreme Court accepted an appeal of the Tenth Circuit Court decision, and in 1992, it abolished strip-down in Chapter 7 everywhere in the U.S. There was a similar but slightly later sequence of court decisions concerning strip-down of mortgages in Chapter 13 bankruptcy. Following lower-level court decisions to allow strip-down in Chapter 13, four circuit courts — the Ninth, Third, Tenth, and Second — allowed it within their regions between 1989 and 1992. An additional circuit — the Fifth — decided not to allow it in 1992, and the U.S. Supreme Court abolished it all over the U.S. in 1993. Table 1 gives the dates of the federal court decisions on mortgage strip-down at all levels. We use these two sequences of legal decisions to test the effect of strip-down in bankruptcy on mortgage markets.

⁹ Homeowners who have lost their homes to foreclosure may also benefit from filing under Chapter 7 because deficiency judgments are discharged. See Kuchler and Stroebel (2009) for a discussion.

¹⁰ See Eggum et al. (2008), Levitin (2009), and Scarberry and Reddie (2010) for discussions of mortgage strip-down from a legal perspective. The Appendix gives a brief discussion of the legal issues.

II. Predictions

The availability of mortgage strip-down in bankruptcy affects both the supply and demand sides of the mortgage market. On the demand side, mortgage strip-down reduces the downside risk that homeowners face when they obtain a mortgage because, if housing values fall enough to make their home equity negative, they can increase their wealth by having their mortgage obligations reduced in bankruptcy.¹¹ If there is no strip-down of mortgages in bankruptcy, homeowners can still avoid repaying the underwater portion of their mortgages by defaulting, waiting for the lender to foreclose, and moving somewhere else. But strip-down of mortgages in bankruptcy reduces homeowners' costs, since they do not have to move in order to have the underwater portion of their mortgages discharged. The cost of obtaining mortgage strip-down thus becomes the cost of filing for bankruptcy under Chapter 13 or Chapter 7.¹² Because mortgage strip-down in bankruptcy reduces the cost of default, homeowners are predicted to default on their mortgages more often. The availability of strip-down in bankruptcy also makes borrowing more attractive, thus increasing borrowers' demand for mortgages.

On the supply side, the availability of mortgage strip-down in bankruptcy reduces lenders' profits both by increasing default rates on existing mortgages and by making new borrowers less creditworthy because they demand more mortgage debt. Both factors increase lenders' risk and cause them to reduce credit supply. However, substituting mortgage strip-down for foreclosure when default occurs has ambiguous effects on lenders' default costs. Because the stripped-down mortgage principal is set equal to the current market value of the property, the new mortgage principal should be the same, on average, as the amount the lender would receive in a foreclosure sale. Therefore, if homeowners pay the modified mortgages in full, lenders would be better off because strip-down avoids the costs and delays of selling a property in foreclosure. But homeowners whose mortgages are stripped down may redefault on their modified mortgages within a few years, and in the absence of strip-down, some might have "self-cured" and repaid the original mortgage in full. These possibilities imply that lenders' default

¹¹ This is similar to the insurance effect of bankruptcy itself, which reduces the downside risk that borrowers face by discharging some debt when their ability to pay falls. See White (2005) for discussion.

¹² The cost of obtaining strip-down in bankruptcy is even lower if homeowners would have filed for bankruptcy anyway or if they also obtain discharge of nonmortgage debt in bankruptcy. See White and Zhu (2010) for discussion.

costs could be either higher or lower under strip-down than in foreclosure.¹³ Thus, allowing strip-down of mortgages in bankruptcy makes lenders worse off because default rates rise but has ambiguous effects on their costs conditional on default. Assuming that lenders' costs conditional on default rise when strip-down is allowed or that the adverse effect of strip-down on default rates more than offsets any fall in lenders' costs conditional on default, allowing strip-down is predicted to reduce the supply of mortgage loans and raise interest rates.

These predictions apply to mortgage strip-down in both Chapters 7 and 13. An additional question is, which type of strip-down is predicted to have a larger effect on credit markets? During the early 1990s, less than one-third of personal bankruptcy filings occurred under Chapter 13, and the costs of filing were much higher under Chapter 13 than Chapter 7.¹⁴ Both of these considerations suggest that homeowners would be more likely to seek mortgage strip-down in Chapter 7 bankruptcy and, therefore, that the availability of strip-down under Chapter 7 would have a larger effect on mortgage markets. On the other hand, mortgage debt is accelerated to the present in Chapter 7 bankruptcy, so that the entire amount owed on the mortgage (principal plus interest plus penalties for default) must be repaid immediately. This means that, even with the benefit of strip-down, most homeowners in Chapter 7 would find it impossible to keep their homes because they cannot pay off the entire mortgage balance even at the stripped-down level. This consideration thus goes in the opposite direction and suggests that allowing strip-down in Chapter 13 is likely to have a larger effect on mortgage markets. Overall, it is an empirical question whether strip-down under Chapter 7 or Chapter 13 has a larger effect on mortgage markets.

A similar question is whether Supreme Court or lower court decisions are predicted to have a larger impact on mortgage markets. Because decisions by lower courts versus the Supreme Court have equal and opposite effects on mortgage contracts, we expect that markets will have equal and opposite responses. However, Supreme Court decisions get much more publicity and cannot be appealed, which suggests that they may generate larger responses by

¹³See Adelino et al. (2009) for a discussion of the reasons why mortgage lenders were unwilling to agree voluntarily to mortgage modifications during the mortgage crisis, some of which are also relevant to mortgage strip-down in bankruptcy. Levitin (2009) argues that lenders' costs would be lower if strip-down in bankruptcy were allowed, but he ignores the fact that strip-down is predicted to cause a rise in default rates.

¹⁴A homeowner's bankruptcy costs in the early 1990s were about \$600 for Chapter 7 versus \$1,600 for Chapter 13. See Flynn and Bermant (2002).

lenders. We therefore predict that markets respond more strongly to Supreme Court decisions than lower court decisions.

Our empirical work uses difference-in-difference to examine how the circuit court and Supreme Court decisions concerning strip-down of residential mortgages in Chapters 7 and 13 affected the terms of home mortgages in the regions where strip-down was allowed relative to regions where it was not. For each legal question, we separately examine both the circuit court decisions to allow strip-down and the Supreme Court decisions to abolish strip-down where it was previously allowed.

III. **Literature Review**

Our analysis ties in closely with research that examines the link between creditor protection and financial markets or — more broadly — between legal protection of contracts and the level of financial development. In a seminal work in law and finance, La Porta et al. (1997) show that countries with better investor and creditor protection have broader capital markets. Extending this work, Djankov et al. (2007) show that the supply of private credit depends on creditors' power to force repayment, seize collateral, or take over the firm. In samples of bank loans from multiple countries, Laeven and Majnoni (2005) and Bae and Goyal (2009) find that banks respond to poor enforceability of contracts by increasing interest rates, shortening maturities, and rationing credit. In single-country studies using data from Italy and India, respectively, Jappelli et al. (2005) find higher credit availability in jurisdictions where courts act more quickly when creditors sue to enforce their default rights, and Visaria (2009) finds similar effects when new debt recovery tribunals were introduced in India to speed up the enforcement of creditors' rights.

In the context of U.S. consumer credit markets, several papers exploit cross-state variation in creditor protection to draw a causal link between the level of creditor protection and credit availability. Pence (2006) finds that mortgage sizes are smaller in states with defaulter-friendly foreclosure laws. Gropp et al. (1997), Lin and White (2001), and Berkowitz and White (2004) examine the effect of variable bankruptcy exemptions across U.S. states on credit availability. They find that states with higher exemption levels (which favor debtors by allowing them to keep more of their assets in bankruptcy) have higher rejection rates for home improvement loans, higher interest rates on car loans, and reduced lending to small businesses.

Li et al. (2011) and Kuchler and Stroebel (2009) show that bankruptcy exemption levels also affect households' decisions to default on their mortgages.

Research focusing on the consequences of mortgage strip-down is sparse and mostly limited to qualitative discussion. Levitin (2009) was the first to consider the effects of allowing strip-down of mortgages in Chapter 13 on the terms of new mortgage loans. His article provides a detailed legal and policy analysis. A more recent paper by Goodman and Levitin (2014, henceforth GL 2014) uses a similar approach to ours in examining the effect of allowing mortgage strip-down on mortgage markets, but they examine mortgage strip-down only under Chapter 13 and the effect of mortgage strip-down only on interest rates. They also do not examine how the response of mortgage markets to Supreme Court versus lower-court decisions differs. We compare our results with theirs in greater detail below.

IV. **Data, Specification, and Description**

Data. We use two different data sources in order to get information on both mortgage approval rates and interest rates. The first is the Home Mortgage Disclosure Act (HMDA) data, which include nearly all home mortgage applications in the U.S.¹⁵ For each loan application, we know if the application was approved; the location of the property at the census tract level; the applicant's income, race, sex, and marital status; whether the loan was for purchase or refinance; and the type of lender.¹⁶ We add information on whether strip-down of mortgages in bankruptcy is allowed in the location/month where the property is located and whether the Chapter 7 or 13 bankruptcy filing rate in the relevant district (lagged one month) is in the top 10% of the national distribution. We also add a dummy variable for whether the proportion of households in the census tract that are minorities exceeds 30%, the average income in the metropolitan area where

¹⁵ We restrict our HMDA sample to applications for conventional mortgages to purchase or refinance owner-occupied, single-family homes because vacation homes and investment properties were never subject to the prohibition on strip-down in Chapter 13 bankruptcy. We also drop applications for home improvement loans because they are not secured by the house and applications for nonconventional mortgages. These mortgages are guaranteed by the Federal Housing Administration or the U.S. Department of Veterans Affairs, and lenders are unlikely to vary the terms of guaranteed mortgages in response to legal rules that affect default. We would also have liked to drop applications for mortgages on owner-occupied two- to four-family homes, but HMDA does not distinguish between these and single-family homes. However, the number of mortgage applications of this type is small. We also drop observations in Hawaii and Alaska, and we drop the top and bottom 0.5% of observations based on income and loan size. Finally, to keep sample sizes manageable, we take a 20% random sample of the remaining data.

¹⁶ Lender types include banks, credit unions, thrifts, and independent mortgage banks. Lender type indicators are included in the regressions but not reported.

the property is located, the unemployment rate in the relevant county (lagged one month), and a house price index at the zip code level (lagged one month). Except for the percent minority in the census tract, all these variables are updated monthly.¹⁷ The bankruptcy filing rate is entered because network effects suggest that households are more likely to hear about and file for bankruptcy if they live in districts with higher bankruptcy filing rates.¹⁸

The second data set is the Monthly Interest Rate Survey (MIRS), a smaller monthly sample of conventional mortgages that originated during the last week of each month. The MIRS data include information on interest rates, loan-to-value ratio, lender type, and property location but no individual borrower characteristics. We add the same regional-level variables as for the HMDA data. MIRS data do not include rejected mortgage applications. We nonetheless examine these data because they are the only source of data on interest rates during our period.

Specification. Turn first to our specification for the two Supreme Court decisions to abolish mortgage strip-down in Chapters 7 and 13. We estimate separate models for each decision, using difference-in-difference:

$$\begin{aligned} \text{Mortgage market outcome} = & \alpha + \beta_1 \text{Circuits} * \text{Post} + \beta_2 \text{Districts} * \text{Post} \\ & + \gamma Z + \delta D + \lambda M + \mu T + \varepsilon. \end{aligned} \tag{1}$$

To simplify the notation, we drop subscripts indicating that the observations are for individual mortgages in a given month/district court region. The mortgage market outcomes that we study are whether mortgage applications are approved, using HMDA data, and interest rates on originated mortgages, using MIRS data. *Post* denotes observations after the relevant Supreme Court decisions, which were January 1992 and June 1993 for Chapter 7 and Chapter 13 strip-down, respectively. *Circuits* denotes observations in circuits where strip-down was allowed prior to the Supreme Court decision (see Table 1). *Districts* denotes observations in districts that allowed strip-down prior to the Supreme Court decision but are located in circuits that did not allow strip-down throughout the circuit (see Table 1). Thus, *Circuits*Post* and *Districts*Post* are

¹⁷ The average income by metropolitan area and the percent minority by census tract are constructed from the HMDA data. The county-level unemployment rates are from the Bureau of Labor Statistics. The house price index is from CoreLogic. Chapter 13 filing rates are from the Administrative Office of the U.S. Courts.

¹⁸ We use the Chapter 7 or Chapter 13 filing rate, depending on whether the regression deals with mortgage strip-down under Chapter 7 or 13. See Fay et al. (2002) for empirical evidence that bankruptcy filing rates in general are higher when the aggregate bankruptcy filing rate in the district is higher.

interaction terms that equal one for observations in circuits and districts where the Supreme Court decisions changed the law by abolishing strip-down of mortgages in the relevant bankruptcy chapter. The control group is mortgages everywhere else. Z is the set of covariates mentioned previously. D denotes district-level fixed effects, M denotes month fixed effects, and T denotes district-level linear time trends. Because we include district-level fixed effects, we do not include the variables *Circuits* or *Districts* by themselves.

The main coefficients of interest are β_1 and β_2 , which measure the change in mortgage market outcomes after the Supreme Court decisions in the circuits and districts that previously allowed strip-down, relative to those where strip-down was never allowed. We distinguish between the effects of circuit court versus district court decisions because circuit court decisions are more visible and less likely to be reversed on appeal. We use probit in the regressions explaining approval rates and OLS in the regressions explaining interest rates. Errors are clustered at the district level.¹⁹

For the circuit court decisions to allow strip-down, the specification is:

$$\text{Mortgage market outcome} = \alpha + \beta_3 \text{Circuit} * \text{Post} + \gamma Z + \delta D + \lambda M + \mu T + \varepsilon. \quad (2)$$

Here, we estimate separate regressions for each circuit court decision to allow strip-down under Chapter 7 or Chapter 13. For each regression, *Circuit* is now a dummy that equals one for observations in the relevant circuit court region, and *Post* is a dummy for months after the decision. The treatment group is observations in the relevant circuit, and the control group is observations in circuits and districts that never allowed strip-down.²⁰ The major coefficient of interest is β_3 , which is predicted to have the same absolute value but the opposite sign as β_1 and β_2 in equation (1). The mortgage market outcomes and the controls are the same as in the previous specification. Because HMDA data are only available at the mortgage level starting January 1990, we can only estimate regressions explaining mortgage approval rates for court decisions after that date. As a falsification test, we also estimate equation (2) for the two circuit court decisions *not* to allow mortgage strip-down under either chapter. For these regressions, the interaction term is predicted to be insignificant.

¹⁹ Regressions using MIRS data are weighted to make the sample nationally representative. Regressions using HMDA data are unweighted since the sample itself is nationally representative.

²⁰ Thus, each regression omits observations in circuits that allowed strip-down earlier and observations in districts that allowed strip-down but are not in any of the circuits that ever allowed strip-down.

We use short sample periods of three months before through three months after each court decision. This is, in part, because short periods allow us to distinguish among the various court decisions we study and also because lenders have an incentive to respond quickly to court decisions, if they respond at all. Also, short time periods avoid capturing the effect of divergent trends in treated versus control regions — these are more likely to be a problem for Chapter 13 strip-down decisions because the four circuits that allowed strip-down under Chapter 13 are mainly on the East and West Coasts, which often have divergent economic trends from the middle of the country. (We also use district-level linear time trends to allow for divergent linear trends across districts.) Thus, finding that lenders respond to legal decisions using short sample periods would provide the strongest possible evidence that markets respond to court decisions.²¹

One additional complication is that the legal decisions we study — particularly the Supreme Court decisions — are not a complete surprise to lenders. This is because the Supreme Court announces when it accepts an appeal, holds oral argument on a known date, and then announces its decision several months later. At the oral argument, the justices' questions may give hints as to how they will decide the case. If lenders predicted (correctly) that the Supreme Court would abolish mortgage strip-down in bankruptcy, then they might have responded by adjusting the terms of mortgages in the treated area just after the oral argument rather than waiting for the court's decision. This would cause results using the decision date to be biased downward. Alternately, if lenders predicted (incorrectly) that the Supreme Court would allow mortgage strip-down in bankruptcy, then they might have responded by adjusting the terms of mortgages in the control area just after the oral argument, and this response would also cause our results using the decision date to be biased downward. Because of the possibility of downward bias due to lenders anticipating court decisions, we also run our regressions using the argument dates for the two Supreme Court decisions.

Descriptives. Figure 2 gives monthly average mortgage approval rates and interest rates for the period of three months before to three months after the two Supreme Court decisions to abolish mortgage strip-down under Chapters 7 and 13. These figures are constructed using the raw data. In all of the figures, treated observations are in the circuit and district court regions, where strip-down was allowed prior to the relevant Supreme Court decision, and control

²¹ Because we know the month but not the day of the month when mortgages originated, we assign observations in the month of the court decision to the postperiod if the relevant court decision occurred before the 15th and to the preperiod if the decision occurred on or after the 15th.

observations are everywhere else. We set approval rates and interest rates for both the treated and control groups equal to zero in the month before the decision — December 1991 for the Chapter 7 decision and May 1993 for the Chapter 13 decision. The figures for other months are relative to the levels just before the decision.

The figures for approval rates before versus after the two Supreme Court decisions to abolish strip-down under Chapters 7 and 13 are shown as the top figures of panels A and B, respectively. As predicted, approval rates in the treated groups rise relative to the control groups following both decisions, although the pattern is stronger for the Chapter 13 decision than for the Chapter 7 decision. (For the Chapter 7 decision, there is a surprisingly large drop in approval rates for both groups just before the Supreme Court decision.) The figures for interest rates before versus after the two Supreme Court decisions to abolish strip-down are shown as the bottom figures of panels A and B, respectively. They do not show the expected pattern since interest rates in the treated groups do not fall relative to the control groups following the two decisions.

Table 2 gives summary statistics for the two data sets used to estimate the effect of the two Supreme Court decisions to abolish mortgage strip-down.

V. Results

The regressions explaining the effect of the two Supreme Court decisions to abolish mortgage strip-down are shown in Table 3, panel A, for the Chapter 7 decision and Table 3, panel B, for the Chapter 13 decisions. Figures in parentheses are p -values. The coefficients of *Circuits*Post* in panel A show that, contrary to our predictions, lenders tightened rather than loosened credit rationing in the affected versus unaffected circuits in response to the Supreme Court decision to abolish strip-down in Chapter 7 bankruptcy. The reduction in the approval rate for mortgage applications is 1.5 percentage points ($p = .04$), or 1.8%. This suggests that mortgage strip-down under Chapter 7 did not reduce lenders' profits. Lenders also reduced interest rates following the decision — which is in line with our predictions — but the change was not significant. Turning to the results for the Supreme Court Chapter 13 strip-down decision in panel B, here lenders did respond in the predicted direction, and both changes are statistically significant. Approval rates for mortgage applications rose in the affected relative to unaffected

areas by 0.9 percentage point ($p = .02$), or 1.1%, and interest rates fell by 23 basis points ($p = .01$), or 3.4%. The rise in approval rates is quantitatively small, but the reduction in interest rates is large in the sense that it eliminated about 15% of the risk premium on mortgages at that time, which was around 1.5 percentage points.²²

Among the other variables, the results for the *Districts*Post* interaction terms were never significant, suggesting that lenders in affected districts did not respond to the Supreme Court decisions. We also do not find that approval rates or interest rates differed significantly in districts with high versus low bankruptcy filing rates. Below, we also test whether the interaction terms were larger in districts with high bankruptcy filing rates.²³

To examine whether lenders' responses vary across geographic markets, we reran the same regressions with separate *Circuits*Post* interaction terms for each of the circuits in which the Supreme Court decision changed the law. The results for the interaction terms are shown in Table 4. For the Supreme Court Chapter 7 decision, lenders in all three affected circuits lowered both approval rates and interest rates, but the only significant responses occurred in the Third Circuit Court region, where both changes were large and significant. For the Supreme Court Chapter 13 decision, lenders in three of the four affected regions — the Ninth, Third, and Second — raised approval rates following the decision, and all of their responses were statistically significant. Similarly, lenders in three of the four affected regions lowered interest rates, but only the response in the Ninth circuit court region was statistically significant — here the reduction in interest rates was 31 basis points compared with 23 basis points in the combined regression. These results suggest that lenders' responses to Supreme Court decisions are qualitatively similar in different geographic markets.

Next, we test whether lenders responded in advance to the Supreme Court decisions by seeing whether they responded to the advance signal provided by the oral arguments. The oral arguments before the Supreme Court occurred, respectively, three months and one month before the court's decisions concerning strip-down under Chapter 7 and Chapter 13. Table 5 shows the results of rerunning the regressions in Table 3, using sample periods of three months before to three months after the argument dates. Comparing the results for the *Circuits*Post* interactions

²² The risk premium is defined as the difference between the interest rate on conventional 30-year mortgages minus the 10-year Treasury bond rate.

²³ The large race and sex coefficients in HMDA regressions have been widely discussed; see Canner and Passmore (1994) and Avery et al. (1993).

with those shown in Table 3, we find little evidence that lenders responded to the signal provided by the oral arguments: The results for the argument dates are generally smaller and less significant than the results for the decision dates and sometimes have the opposite signs.

We also did a number of specification checks to test the robustness of our results for the Chapter 13 strip-down decision; they are shown in Table 6, in which each row gives the coefficient of *Circuits*Post* from a separate regression. (Results are only reported for the Supreme Court Chapter 13 decision since those for the Supreme Court Chapter 7 strip-down decision were uniformly insignificant.) The first line of Table 6 reports the same the results as in Table 3, panel B. In the next three lines, we test whether lenders responded more strongly to the abolition of strip-down under Chapter 13 for high-risk applicants than for applicants generally — this is based on our hypothesis that mortgage applicants become less risky when strip-down is abolished. To do so, we reran the benchmark regressions using three subsamples of high-risk applicants: those who live in districts with above-median Chapter 13 filing rates, those who applied for mortgages from independent mortgage banks (which specialize in high-risk loans), and those with income-to-mortgage loan ratios below the median. The results show that following the Supreme Court Chapter 13 decision, lenders increased approval rates more for high-risk applicants than for applicants generally: Approval rates rose by 1.6 percentage points for applicants in areas with high Chapter 13 filing rates, by 1.4 percentage points for applicants to independent mortgage banks, and by 1.0 percentage point for applicants with low income-to-loan ratios. All of these responses are both statistically significant and larger than the increase of 0.9 percentage points for the full sample. But the results for interest rates are contrary to our predictions since lenders do not reduce interest rates by as much for high-risk applicants as for applicants generally. These results imply that, following the Supreme Court Chapter 13 decision, lenders loosened credit rationing for high-risk applicants relative to average applicants by more than they lowered interest rates.

In the lower part of Table 6, we reran the benchmark model using a longer sample period of six months before to six months after the Supreme Court Chapter 13 decision. The result for approval rates remains similar to the results for the three months before/after period, but — surprisingly — the result for interest rates becomes insignificant. We also repeated the analysis using a fake date of one year after the actual Supreme Court decision. As expected, the results were insignificant.

Next, we turn to the results of regressions examining the effect of the circuit court decisions to allow mortgage strip-down under Chapters 7 and 13. We run separate regressions for each of the seven circuit court decisions to allow mortgage strip-down and for the two circuit court decisions not to allow it; each regression uses a sample period of three months before to three months after the relevant circuit court decision date. Because HMDA data at the individual mortgage level are not available prior to 1990, we can only run approval rate regressions for decisions that occurred after April 1990. The predicted signs of the *Circuit*Post* interaction terms are the opposite of those given in Table 3.

The results for the *Circuit*Post* interaction terms are shown in Table 7. The only significant response by lenders occurs in the Ninth Circuit Court region following that court's decision to allow strip-down of mortgages in Chapter 13: Interest rates in this region rose by 9 basis points, and the result is marginally significant ($p = .10$). None of the other results for approval rates or interest rates are significant. Similarly, the placebo test results for the two circuit courts that did not allow mortgage strip-down, shown at the bottom of the table, are also insignificant. Overall, these results suggest that lenders responded little to the circuit court decisions that introduced mortgage strip-down in bankruptcy.

The combined results for the circuit court and Supreme Court decisions allow us to rule out two additional hypotheses concerning lender behavior. One is that lenders did not respond to the introduction of mortgage strip-down because they were uninformed about the circuit court decisions to allow it. This hypothesis is contradicted by the fact that lenders did respond significantly to the first of the circuit court decisions to allow strip-down under Chapter 13 — the Ninth Circuit Court decision. Another hypothesis is that lenders did not respond to the circuit court decisions to allow mortgage strip-down under either chapter because they did not predict that strip-down would affect their profits from lending. But this hypothesis is contradicted by the fact that lenders did in fact respond significantly to the Supreme Court decision to abolish mortgage strip-down under Chapter 13, and they would not have done so if strip-down had no effect on their profits. Together, these results suggest that lenders probably responded gradually over time to the introduction of mortgage strip-down as they learned its effects on profits, which was more negative for strip-down under Chapter 13 than Chapter 7. Then, they responded quickly to the Supreme Court decision to end strip-down under Chapter 13 since they already knew its profit effects.

Goodman and Levitin (2014) also tested the effect of the court decisions to allow and abolish mortgage strip-down under Chapter 13. Their approach is similar to ours in that they also use the MIRS data and a difference-in-difference specification. The main differences between their work and ours are that they examine only the Chapter 13 mortgage strip-down decisions, and they do not examine mortgage approval rates. Also, they use a 10-year sample from January 1987 to December 1996 that starts before the first circuit court decision allowing strip-down under Chapter 13 and ends after the Supreme Court decision to abolish it. Because of their long-period specification, they ignore geographic variation in lenders' responses to legal decisions, and they also constrain lenders to have equal and opposite responses to lower court versus Supreme Court decisions.²⁴ They find that when strip-down under Chapter 13 was allowed, interest rates rose by 12 to 15 basis points in the affected versus unaffected regions. Our results instead suggest a more nuanced effect, with little response by lenders to lower court decisions to allow strip-down, a stronger response by lenders to the Supreme Court decision, and only lenders in the Ninth Circuit Court region responding significantly to the decisions both to allow and to abolish strip-down.

To further examine the effect of mortgage strip-down over a long period, we reran our regressions using the same long time period as G-L. Our *Circuits*Post* and *Districts*Post* interactions are now replaced by a single dummy variable that equals one for mortgages that originated when/where mortgage strip-down was allowed under Chapter 13 and another dummy variable that does the same for mortgage strip-down under Chapter 7. Other details of our specification remain the same as in Table 3.

Table 8 shows the results. In column (1), we report the results of a regression explaining mortgage interest rates using the same time period as GL 2014. Our results are similar to theirs: Mortgage interest rates rose by 16 basis points when strip-down was allowed under Chapter 13 ($p = .042$). We also found that mortgage interest rates fell by 10 basis points when strip-down was allowed under Chapter 7, but the difference is not statistically significant. The fact that the interest rate response is 16 basis points in the long-period regression compared with -23 basis points in the short-period Supreme Court regression suggests that when strip-down was

²⁴ Their specification also differs from ours because they used a slightly different list of districts that allowed strip-down, in using fewer covariates, and state-level rather than district-level fixed effects, and in not using MIRS sample weights.

introduced, lenders did not raise interest rates by as many points as they lowered them when strip-down was abolished.

In columns (2) and (3), we reran the regression explaining interest rates in a way that allows us to separate the effects on interest rates of the circuit court versus Supreme Court decisions. First, we reran the long-period regression without observations that occur before the latest of the circuit court decisions to allow strip-down so that the sample period starts in April 1992. This means that the only court decision during the sample period is the Supreme Court decision to abolish strip-down in Chapter 13 (The Supreme Court decision to abolish strip-down in Chapter 7 drops out because it occurred before April 1992.) Because the dummy variable for strip-down is now coded as one when strip-down is allowed (it was previously coded as one when strip-down was not allowed), the predicted sign for this regression is now positive rather than negative. The result for the Supreme Court decision to abolish strip-down under Chapter 13 is now a drop of 30 basis points in interest rates, which is strongly statistically significant ($p < .01$). Second, we reran the long-period regression without observations that occur before the earliest of the two Supreme Court decisions to abolish strip-down so that the only court decisions during the sample period are the circuit court decisions to allow it. Here, the predicted sign of the strip-down dummy remains positive. The results in column (3) show that the circuit court decisions to allow strip-down under Chapter 13 are associated with a 17 basis point increase in interest rates, which is also highly significant ($p < .01$). These results suggest that lenders both raised interest rates when mortgage strip-down under Chapter 13 was introduced and lowered interest rates when mortgage strip-down under Chapter 13 was abolished, but their responses occurred gradually over time rather than immediately. An alternate interpretation is that the long-period regressions could be capturing the effect of divergent nonlinear economic trends across markets.

Finally, columns (4) and (5) of Table 8 repeat the regressions in columns (1) and (2) for approval rates rather than interest rates. Here, the starting point for the sample is January 1990 rather than January 1987 because HMDA data are not available before 1990. The long-period results show that neither the Chapter 7 nor the Chapter 13 strip-down decisions significantly affected approval rates for mortgage applications. Thus, the long-period results for approval rates hide the fact that lenders did, in fact, increase approval rates for mortgage applications in response to the Supreme Court's decision to abolish strip-down under Chapter 13.

VI. Conclusion

This paper examines whether allowing mortgage strip-down in bankruptcy under Chapter 7 or Chapter 13 affects the terms of mortgage loans. We make use of data from a period in the late 1980s and early 1990s when seven U.S. circuit courts allowed mortgage strip-down in either Chapter 7 or Chapter 13 bankruptcy, and the Supreme Court in two separate decisions abolished strip-down under both chapters. Using difference-in-difference, we separately examine the effect of each of these court decisions on mortgage loan availability and mortgage interest rates.

Our main result is that mortgage lenders responded to the Supreme Court decision to abolish mortgage strip-down in Chapter 13 bankruptcy by increasing approval rates for mortgage applications and reducing interest rates on new mortgages by small amounts. Our favored estimates are that approval rates rose by 0.9 percentage point, or 1.1%, and interest rates fell by 23 basis points, or 3.4%. But when the Supreme Court abolished mortgage strip-down in Chapter 7 bankruptcy, lenders reduced rather than increased mortgage approval rates by 1.5 percentage points, or 1.8%, and they did not significantly change interest rates. Our results for the increase in interest rates from allowing mortgage strip-down under Chapter 13 are only a small fraction of the 30% increase that was predicted by the Mortgage Bankers' Association. Thus, our results suggest that introducing mortgage strip-down under either bankruptcy chapter would not have a strong adverse impact on the terms of mortgage loans and could be a useful new policy tool to reduce foreclosures.

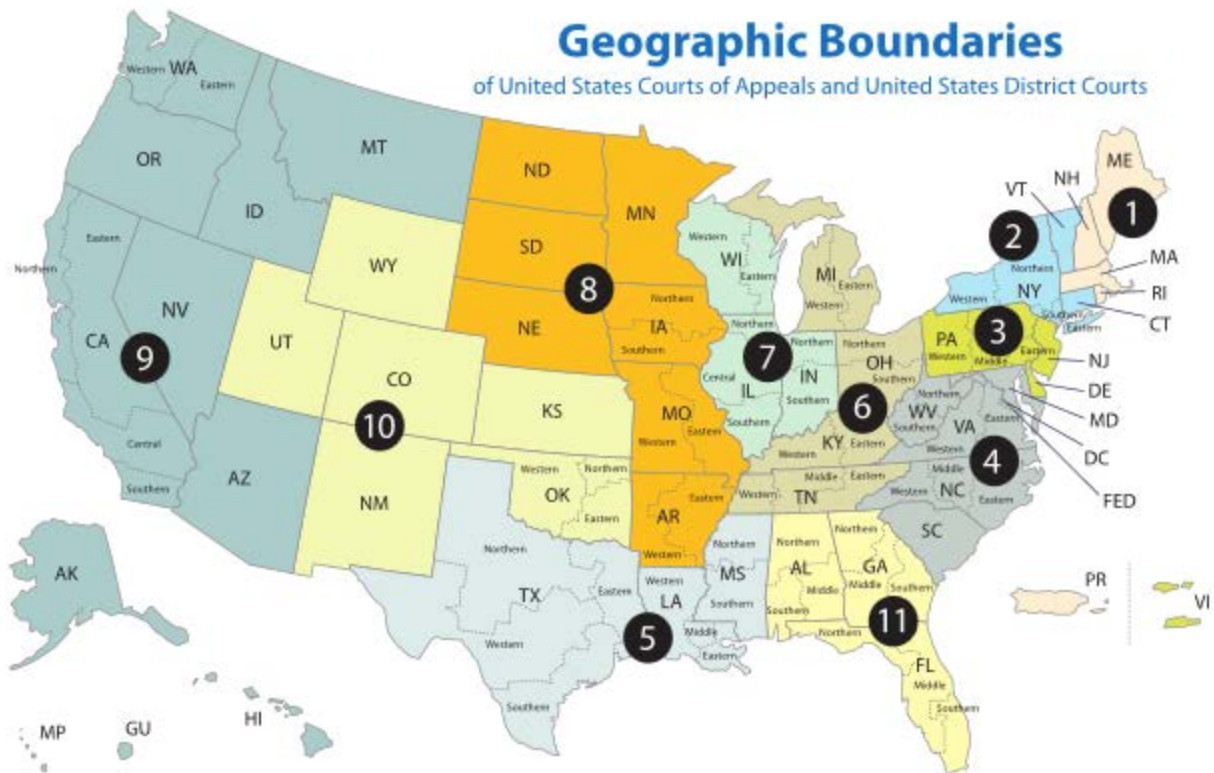
Our results are also relevant to two recent policy initiatives. One is a recent decision by the Eleventh Circuit in 2012 to allow a totally underwater second mortgage to be discharged in Chapter 7 bankruptcy; this is called mortgage “strip-off.” The recent case differs from the earlier Chapter 7 strip-down decisions because the mortgage in question was totally rather than partially underwater, and the court decision therefore discharged it completely rather than partially.²⁵ Although our results are for mortgages generally rather than second mortgages in particular, they suggest that allowing strip-off of totally underwater second mortgages would not substantially harm future mortgage applicants.

²⁵ The Eleventh Circuit Court decision to allow mortgage strip-off followed decisions by the Fourth, Sixth, and Ninth Circuit Courts not to allow it. The decision in the Eleventh Circuit was *McNeal v. GMAC Mortgage* (in re McNeal), 735 F.3d 1263 (11th Cir. 2012). The Supreme Court has not (yet) accepted an appeal on this question.

A second policy initiative consists of recent proposals by local governments to take underwater mortgages by eminent domain, compensate lenders according to the current value of the mortgage, and issue new, smaller mortgages to homeowners. Several large lenders have threatened that if local officials proceed with this proposal, they will cease making mortgage loans at all in the affected jurisdictions, which would substantially harm future borrowers in these areas.²⁶ We think that there is a key difference between mortgage strip-down in bankruptcy versus the eminent domain proposals, which is that the eminent domain approach would simultaneously strip down all of the underwater mortgages within the local government's territory, regardless of whether homeowners would have filed for bankruptcy and sought strip-down on their own. Such concerted action would harm lenders much more than allowing strip-down in bankruptcy under Chapter 7 or Chapter 13 so that their reaction is likely to be much stronger than it would be to the reintroduction of mortgage strip-down in bankruptcy.

²⁶ See Hockett (2013) and Dewan (2013) for discussion.

Figure 1: Geographic Boundaries of United States Courts of Appeals and United States District Courts

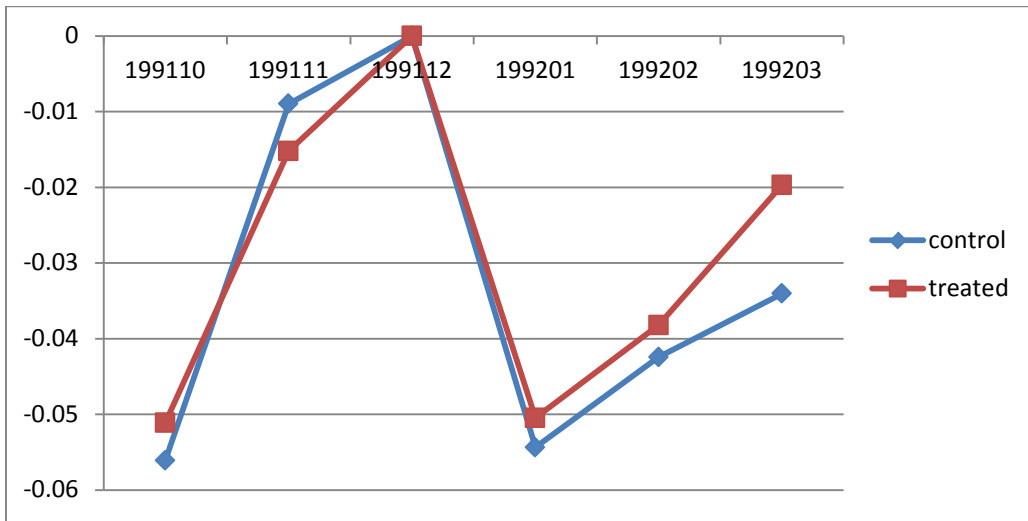


Source: United States Courts at www.uscourts.gov

Figure 2: Approval Rates and Interest Rates Before and After the Supreme Court Decisions to Abolish Mortgage Strip-Down in Chapters 7 and 13

Panel A: Chapter 7

Approval Rates (deviation from 12/1991)



Interest Rates (deviation from 12/1991)

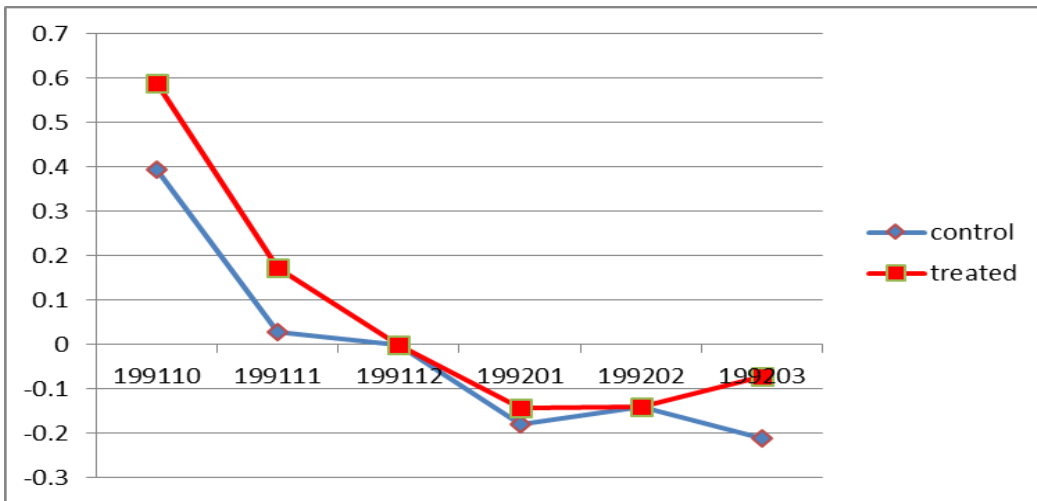
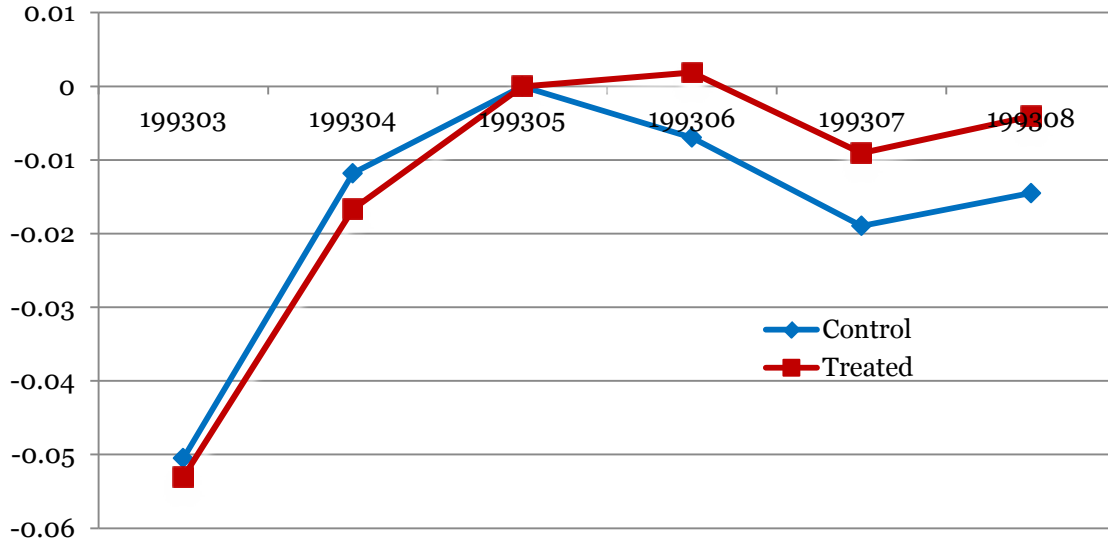
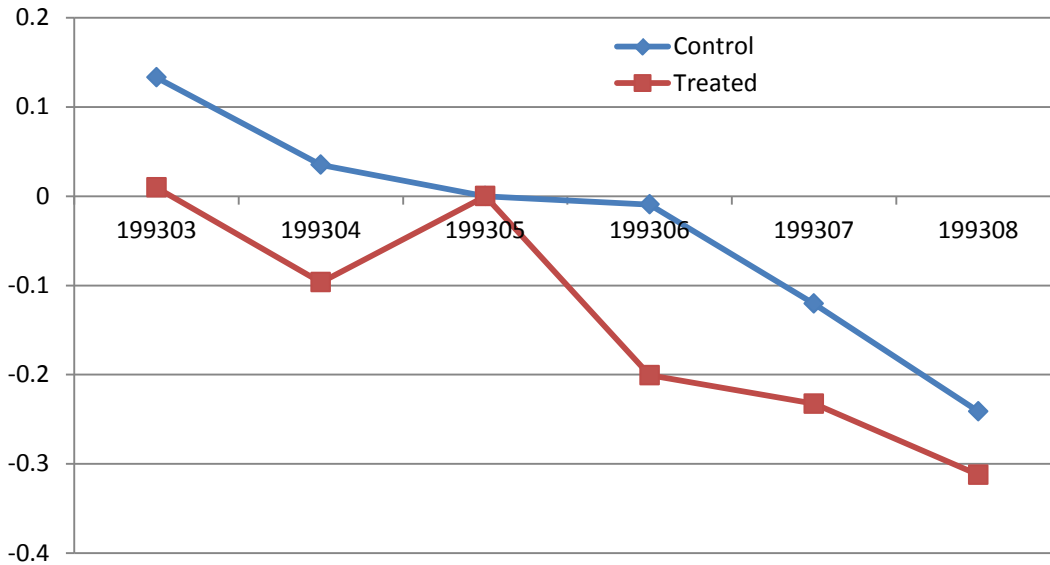


Figure 2 (cont'd) Panel B: Chapter 13

Approval Rates (deviation from 05/1993)



Interest Rates (deviation from 05/1993)



Notes: The data are average monthly approval rates (from HMDA) and interest rates (from MIRS) three months before to three months after the Supreme Court decision abolishing mortgage strip-down in Chapter 13. For both the treated and control groups, the figures for May 1993 are set equal to zero, and the figures for other months are differences relative to May 1993.

Table 1: Court Decisions Concerning Strip-Down of Residential Mortgages

Panel A: District and Bankruptcy Court Decisions Allowing Strip-Down in Chapter 7

District	Circuit	Date
Pennsylvania, W District	3	1981
Illinois, N District	7	1981
Pennsylvania, E District	3	1982
Ohio, S District	6	1982
Alabama, N District	11	1983
Minnesota	8	1984
Iowa, N District	8	1985
West Virginia, W District	4	1985
Illinois, Central District	7	1986
Oregon	9	1987
Virginia, W District	4	August 1987
Kentucky, W District	6	1988
Alabama, S District	11	June 1989
Kentucky, W District	6	March 1989
Kansas	10	1990
Oklahoma, N District	10	1990
Tennessee, W District	6	1990

Panel B: District and Bankruptcy Court Decisions Allowing Strip-Down in Chapter 13

District	Circuit	Date
Massachusetts	1	April 1991
Rhode Island	1	Feb 1990
Maine	1	Jan 1993
Connecticut	2	July 1991
Pennsylvania, E District	3	May 1988
New Jersey	3	Jan 1989
Virginia, W District	4	July 1994
Virginia, E District	4	Feb 1990
North Carolina, E District	4	May 1991
West Virginia, S District	4	May 1991
Indiana, N District	5	Dec 1989
Ohio, S District	6	Feb 1989
Michigan, W District	6	June 1992
Michigan, E District	6	Feb 1993
Tennessee, W District	6	Jan 1992
Illinois, N District	7	April 1990
Oregon	9	Dec 1988
New Mexico	10	Oct 1990
Kansas	10	Sept 1987
Oklahoma, W District	10	Nov 1989
Georgia, Middle District	11	Nov 1992
Alabama, N District	11	April 1992

Note: The date is for the earliest decision in each district.

Table 1 (cont'd) Panel C: Circuit and Supreme Court Decisions Concerning Mortgage Strip-Down in Chapter 7

Court	Type of decision	Date
Circuit 7	Allowed strip-down in Ch. 7	July 6, 1987
Circuit 11	Allowed strip-down in Ch. 7	January 12, 1989
Circuit 3	Allowed strip-down in Ch. 7	November 29, 1989
Circuit 10	Did not allow strip-down in Ch. 7	July 11, 1990
Supreme Court	Abolished strip-down in Ch. 7 (<i>Dewsnup v. Timm</i>)	Argument: October 15, 1991 Decision: January 15, 1992

Panel D: Circuit and Supreme Court Decisions Concerning Mortgage Strip-Down in Chapter 13

Court	Type of decision	Date
Circuit 9	Allowed strip-down in Ch. 13	October 4, 1989
Circuit 3	Allowed strip-down in Ch. 13	February 9, 1990
Circuit 10	Allowed strip-down in Ch. 13	January 17, 1991
Circuit 2	Allowed strip-down in Ch. 13	April 21, 1992
Circuit 5	Did not allow strip-down in Ch. 13	August 13, 1992
Supreme Court	Abolished strip-down in Ch. 13 (<i>Nobelman v. American Savings Bank</i>)	Argument: April 19, 1993 Decision: June 1, 1993

Table 2: Summary Statistics: Supreme Court Samples**Panel A: Chapter 7 Decision**

	HMDA	MIRS
If loan approved (percent)	77.324 (41.87)	--
Interest rate (percent)	--	8.57 (.96)
Circuits 3, 7, and 11	0.271 (0.445)	0.254 (.44)
Districts	0.140 (0.347)	0.108 (.31)
Income (\$000)	68.190 (52.038)	--
If African American applicant	0.029 (0.169)	--
If other nonwhite applicant	0.090 (0.287)	--
If female applicant	0.142 (0.349)	--
If married applicant	0.773 (0.419)	--
If refinance (versus purchase)	0.676 (0.468)	--
Lagged unemployment rate (% MSA)	7.442 (1.829)	6.87 (2.45)
Income (\$000) (MSA)	30.052 (5.283)	--
Lagged house price growth rate (%) (MSA)	0.0117 (0.874)	0.0073 (0.009)
Chapter 7 monthly filing rate (district)	0.0297 (0.0127)	0.01 (.0001)
If minority percent > 30 (census tract)	0.141(0.380)	--
Number of observations	468,000	44,000

Table 2 (cont'd) B: Chapter 13 Decision

	HMDA	MIRS
If loan approved (percent)	81.3 (39.0)	--
Interest rate (percent)	--	7.11 (1.05)
Circuits 2, 3, 9 and 10	0.445	0.464
Districts	0.211	0.164
Income (\$000)	65.7 (48.4)	--
If African American applicant	0.0326 (0.178)	--
If other nonwhite applicant	0.0881 (0.283)	--
If female applicant	0.160 (0.367)	--
If married applicant	0.764 (0.424)	--
If refinance (versus purchase)	0.659 (0.474)	--
Lagged unemployment rate (% MSA)	7.22 (2.09)	6.52 (2.36)
Income (\$000) (MSA)	43.7 (7.90)	42.9 (7.26)
Lagged house price growth rate (%) (MSA)	0.373 (0.678)	0.429 (0.752)
Chapter 13 monthly filing rate (district)	0.00011 (0.00009)	0.00010 (0.00008)
If minority percent > 30 (census tract)	0.174 (0.380)	--
Number of observations	774,000	82,500

Notes: The sample in panel A covers March through August 1993, which is three months prior to and three months after the Supreme Court strip-down decision on June 1, 1993. For panel B, the sample is between October 1991 and March 1992. Dollar figures are in current dollars. Standard errors are in parentheses.

Table 3: Effects of the Supreme Court Decisions to Abolish Strip-Down in Chapters 7 and 13: Benchmark Results

Panel A: The Supreme Court Chapter 7 Strip-Down Decision

	Approval rate Percentage points (HMDA)	Interest rate Percentage points (MIRS)
<i>Circuits*Post</i>	-1.5** (0.042)	-0.46 (0.23)
<i>Districts*Post</i>	-1.1 (0.31)	-0.78 (0.13)
If Chapter 7 filing rate is highest decile	0.18 (0.83)	0.033 (0.76)
If African American	-15*** (0.00)	--
If other nonwhite	-5.6*** (0.00)	--
If female	0.70*** (0.007)	--
If married	5.5*** (0.00)	--
Income (\$000)	0.014 (0.15)	--
If refinance (versus purchase)	2.7*** (0.000)	--
If minority percent > 30	-3.8*** (0.000)	--
Unemployment rate (lagged)	-0.055 (0.46)	0.0146 (0.237)
MSA income (\$000)	0.38*** (0.00)	--
Monthly house price growth rate	-4.08 (0.63)	1.55 (0.749)
Constant	--	6.078 (0.000)
District dummies	Y	Y
District-level time trends	Y	Y
Month dummies	Y	Y
Sample size	468,000	30,638
R-squared/pseudo R-squared	0.038	0.121

Table 3 (cont'd) Panel B: The Supreme Court Chapter 13 Strip-Down Decision

	Approval rate Percentage points (HMDA)	Interest rate Percentage points (MIRS)
<i>Circuits*Post</i>	0.885** (0.023)	-0.229*** (0.01)
<i>Districts*Post</i>	-0.061 (0.897)	0.0417 (0.63)
If Chapter 13 filing rate is highest decile	-4.756 (0.325)	-0.0296 (0.48)
If African American	-11.650*** (0.000)	--
If other nonwhite	-4.471*** (0.000)	--
If female	0.121 (0.650)	--
If married	4.165*** (0.000)	--
Income	0.040*** (0.000)	--
If refinance (versus purchase)	5.154*** (0.000)	--
If minority percent > 30	-3.776*** (0.000)	0.0143 (0.79)
Unemployment rate (lagged)	0.000 (0.986)	0.0129 (0.11)
MSA income (\$)	0.470*** (0.000)	-9.48e-06** (0.02)
Monthly house price growth rate	-8.937 (0.338)	-1.18 (0.50)
Constant	--	8.66** (0.00)
District dummies	Y	Y
District-level time trends	Y	Y
Month dummies	Y	Y
Sample size	774,000	63,700
R-squared	0.050	0.12

Notes: Results are given as marginal effects, with *p*-values in parentheses. The sample period is October 1991 through March 1992 for panel A and March through August 1993 for panel B. HMDA regressions include unreported dummies for missing race and for lender type. MIRS regressions use sample weights. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the district level.

Table 4: Effect of the Two Supreme Court Decisions to Abolish Strip-Down in Chapter 7 and Chapter 13: By Circuit

	Approval rate (HMDA)	Interest rate (MIRS)
Supreme Court Chapter 7 Decision:		
7th Circuit	-1.0 (0.44)	-0.60 (0.16)
11th Circuit	-1.1 (0.28)	-0.12 (0.78)
3rd Circuit	-2.6*** (0.000)	-1.1** (0.019)
Supreme Court Chapter 13 Decision:		
9th Circuit	1.1*** (0.004)	-0.32*** (0.000)
3rd Circuit	1.5** (0.046)	-0.27 (0.18)
10th Circuit	-0.9 (0.39)	-0.22 (0.41)
2nd Circuit	1.2* (0.091)	0.25 (0.25)

Notes: The specification and sample periods remain the same as in Table 3, except that the *Post* dummy is now interacted with separate dummies for each of the treated circuits. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the district level.

Table 5: Effects of the Supreme Court Decision to Abolish Strip-Down in Chapters 7 and 13: Argument Dates

	Approval rate (HMDA)	Interest rate (MIRS)
Chapter 7 Argument Date	-0.99 (0.22)	0.14 (0.29)
Chapter 13 Argument Date	-0.67 (0.24)	0.13* (0.09)

Notes: Each figure is the coefficient of *Circuits*Post* in a separate regression. The sample periods are three months before through three months after October 1991 for the Supreme Court Chapter 7 decision and three months before through three months after April 1993 for the Supreme Court Chapter 13 decision; *p*-values are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Other notes under Table 3 also apply here.

Table 6: Effects of the Supreme Court Decision to Abolish Strip-Down: Specification Checks, Subsample Results, and Fake Date Analysis

	Approval rate (HMDA)	Interest rate (MIRS)
Benchmark results for Chapter 13 strip-down	0.88** (0.023)	-0.24*** (0.01)
Chapter 13 strip-down: High-risk subsamples		
Chapter 13 filing rate > median	1.6** (0.040)	-0.18*** (0.01)
Lender is independent mortgage bank	1.4** (0.048)	-0.084* (0.08)
Income to loan ratio < median	1.0*** (0.019)	n/a
Chapter 13 strip-down: Alternative specifications		
Six months before/after sample period	1.0*** (0.008)	-0.091 (0.24)
Fake date (June 1994)	0.47 (0.35)	-0.11 (0.12)

Notes: Each figure is the coefficient of *Circuits*Post* in a separate regression. The high Chapter 13 subsample consists of mortgages on properties located in districts with Chapter 13 filing rates above the national median level. The independent mortgage bank subsample consists of mortgages originated by independent mortgage banks, which specialize in riskier loans. The six months before/after sample period runs from January to December 1993. The fake date analysis shifts the sample period to one year after the Supreme Court Chapter 13 decision. *p*-values are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the federal district court level. Other notes to Table 3 apply here.

Table 7: Effects of Circuit Court Decisions to Allow Strip-Down in Chapters 7 and 13

	Approval rate (Percentage points) (HMDA)	Interest rate (Percentage points) (MIRS)
Results of Decisions to Allow Strip-Down in Chapter 7		
7th Circuit	--	-0.24 (0.11)
11th Circuit	--	-0.13 (0.73)
3rd Circuit	--	0.066 (0.63)
Results of Decisions to Allow Strip-Down in Chapter 13		
9th Circuit	--	0.090* (0.10)
3rd Circuit	--	0.015 (0.23)
10th Circuit	-1.3 (0.45)	0.028 (0.89)
2nd Circuit	0.26 (0.87)	0.083 (0.49)
Placebo Tests: Results of Decisions Not to Allow Strip-Down		
10th Circuit (did not allow strip-down in Ch. 7)	-0.0087 (0.25)	0.33 (0.45)
5th Circuit (did not allow strip-down in Ch. 13)	-0.77 (0.32)	-0.042 (0.71)

Notes: Each figure is the coefficient of *Circuit*Post* in a separate regression. Sample periods for each regression are three months prior to and three months after each court decision. Each regression drops observations in circuits that previously allowed strip-down under the same Chapter — thus, for example, the regression for the Circuit 11 decision to allow strip-down under Chapter 7 excludes observations in the Circuit 7. Some results for approval rates are missing because the decision occurred before HMDA data are available. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the district level. All regressions contain available covariates, district fixed effects, month fixed effects, and district linear time trends: *p*-values are in parentheses.

Table 8: Results of Long-Period Regressions Explaining the Effect of Circuit Court and Supreme Court Decisions to Allow and Abolish Mortgage Strip-Down

	Interest rate regressions			Approval rate regression	
	Both Supreme Court and circuit court decisions (1)	Only Supreme Court decisions (2)	Only circuit court decisions (3)	Both Supreme Court and circuit court decisions (4)	Only Supreme Court decisions (5)
Strip-down allowed in Chapter 13	0.16*** (0.008)	0.30*** (0.000)	0.17*** (0.007)	0.011 (0.35)	-0.006 (0.181)
Strip-down allowed in Chapter 7	-0.098 (0.26)	omitted	-0.042 (0.56)	-0.0031 (0.47)	omitted

Notes: Except for the sample period and the dummies for observations when strip-down was allowed, the details of the specification are the same as in the MIRS regressions in Table 3. The regression in column (1) uses January 1987 through December 1996 as the sample period. The regression in column (2) drops observations before January 1992, and the regression in column (3) drops observations after April 1992. The regressions explaining approval rates in columns (4) and (5) use the same sample periods as in columns (1) and (2), except that the sample periods start in January 1990 because HMDA data are not available prior to 1990.

Appendix

The legal issue in the Chapter 7 strip-down cases concerns a section of the U.S. Bankruptcy Code, 11 U.S.C. §506. §506(a) “bifurcates” secured loans that are underwater into two parts: a secured claim equal to the current market value of the collateral and an unsecured claim for the remainder. Section 506(d) voids the creditor’s lien on the unsecured portion of the claim, meaning that it will receive little or no payment in bankruptcy. The “plain language” of these provisions implies that secured claims can be stripped down in bankruptcy. However, other aspects of bankruptcy law suggest the opposite. One is the fact that bankruptcy trustees typically abandon property that is subject to an underwater mortgage because the trustee represents unsecured creditors and these properties have no value for unsecured creditors. But if the property has been abandoned by the trustee, then the mortgage lender has the right to foreclose and §506 therefore may not apply.²⁷

The legal issue in the Chapter 13 strip-down cases concerns the relationship between two sections of the Bankruptcy Code, 11 U.S.C. §506 and 11 U.S.C. §1322(b)(2). As discussed, section 506 implies that underwater secured loans can be bifurcated and the underwater portion stripped down in bankruptcy. But §1322(b)(2), which applies only in Chapter 13 bankruptcy, forbids strip-down of mortgages if they are collateralized only by a single-family home that is the owner’s principal residence. Thus, the legal issue is whether the general provision of bankruptcy law that allows strip-down of mortgages or the specific provision of bankruptcy law that prohibits strip-down of residential mortgages is more important.²⁸

²⁷ See the opinion of the Tenth Circuit Court in *Dewsnup v. Timm*, 908 F.2d 588 (10th Circuit, 1990) for a discussion.

²⁸ See Elias (2011), Levitin (2009), and Scarberry and Reddie (2010) for discussion.

References

- Adelino, Manuel, Kristopher Gerardi, and Paul S. Willen, “Why Don’t Lenders Renegotiate More Home Mortgages? Redefaults, Self-Cures, and Securitization,” Public Policy Discussion Paper 09-4 (2009), Federal Reserve Bank of Boston.
- Avery, Robert B., Patricia E. Beeson, and Mark S. Sniderman, “Accounting for Racial Differences in Housing Credit Markets,” Working Paper 9310 (1993), Federal Reserve Bank of Cleveland.
- Bae, Kee-Hong, and Vidhan K. Goyal, “Creditor Rights, Enforcement, and Bank Loans,” *Journal of Finance*, 64(2) (2009), 823–860.
- Bajaj, Vikas, “U.S. Vows More Help for Homeowners,” *New York Times*, October 23, 2008.
- Balasubramnian, Bhanu, and Ken Cyree, “Has Market Discipline on Banks Improved After the Dodd-Frank Act?” *Journal of Banking & Finance*, 41 (2014), 155–166.
- Berkowitz, Jeremy, and Richard Hynes, “Bankruptcy Exemptions and the Market for Mortgage Loans,” *Journal of Law & Economics*, 42(2) (1999), 809–830.
- Berkowitz, Jeremy, and Michelle J. White, “Bankruptcy and Small Firms’ Access to Credit,” *RAND Journal of Economics* 35(1), 69–84 (Spring 2004).
- Bernard, Tara S., “Slow Start to U.S. Plan for Modifying Mortgages,” *New York Times*, May 13, 2009.
- Campbell, John, Stefano Giglio, and Parag Pathak, “Forced Sales and House Prices,” *American Economic Review*, 101(5) (2011), 2108–2131.
- Canner, Glenn B., and Wayne Passmore, “Residential Lending to Low-Income and Minority Families: Evidence from the 1992 HMDA Data,” *Federal Reserve Bulletin*, 80(2) (1994), 79–108.
- Cooper, David, and Jonathan Tomlin, “Expert Testimony, *Daubert*, and the Determination of Damages,” *Review of Law & Economics*, 4(1) (2008), 213–231.
- Craig, Susanne, “A New Effort in Albany to Put Lenders in Charge of Abandoned Properties,” *New York Times*, February 9, 2014.
- Dewan, Shaila, “More Cities Consider Using Eminent Domain to Halt Foreclosures,” *New York Times*, November 15, 2013.

- Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer, "Private credit in 129 Countries," *Journal of Financial Economics*, 84(2) (2007), 299–329.
- Eggum, John, Katherine Porter, and Tara Twomey, "Saving Homes in Bankruptcy: Housing Affordability and Loan Modification," *Utah Law Review*, 3 (2008), 1123–1168.
- Elias, Stephen, *The New Bankruptcy: Will It Work for You? 4th Edition*. Berkeley, CA: Nolo Press, 2011.
- Fay, Scott, Erik Hurst, and Michelle J. White, "The Household Bankruptcy Decision," *American Economic Review*, 92(3) (2002), 708–718.
- Flynn, Ed, and Gordon Bermant, "Bankruptcy by the Numbers: A Tale of Two Chapters: Financial Data," *American Bankruptcy Institute Journal*, 21(8) (2002), 20–38.
- Goodman, Joshua, and Adam Levitin, "Bankruptcy Law and the Cost of Credit: The Impact of Cramdown on Mortgage Interest Rates," *Journal of Law & Economics*, 57 (2014), 139–158.
- Gropp, Reint, J. Karl Scholz, and Michelle J. White, "Personal Bankruptcy and Credit Supply and Demand," *Quarterly Journal of Economics*, 112 (1997), 217–251.
- Hockett, Robert, "Paying Paul and Robbing No One: An Eminent Domain Solution for Underwater Mortgage Debt," Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, 19(5) (2013).
- Jappelli, Tullio, Marco Pagano, and Magda Bianco, "Courts and Banks: Effects of Judicial Enforcement on Credit Markets," *Journal of Money, Credit and Banking*, 37(2) (2005), 223–44.
- Kittle, David, "Statement before the Subcommittee on Commercial and Administrative Law of the House Committee on the Judiciary," Congress 110 (2007).
- Kuchler, Theresa, and Johannes Stroebel, "Foreclosure and Bankruptcy: Policy Conclusions from the Current Crisis," manuscript, Stanford University (2009).
- Laeven, Luc, and Giovanni Majnoni, "Does Judicial Efficiency Lower the Cost of Credit?" *Journal of Banking & Finance*, 29(7) (2005), 1791–1812.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, "Legal Determinants of External Finance," *Journal of Finance*, 52(3) (1997), 1131–1150.
- Levitin, Adam, "Resolving the Foreclosure Crisis: Modification of Mortgages in Bankruptcy," *Wisconsin Law Review* 1 (2009), 565–656.
- Li, Wenli, Michelle J. White, and Ning Zhu, "Did Bankruptcy Reform Cause Mortgage Defaults to Rise?" *American Economic Journal: Economic Policy*, 3 (2011), 123–147.

- Lin, Emily Y., and Michelle J. White, "Bankruptcy and the Market for Mortgage and Home Improvement Loans," *Journal of Urban Economics*, 50(1) (2001), 138–162.
- Mian, Atif, and Amir Sufi, *House of Debt: How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again*. University of Chicago Press, 2014.
- Neumark, David, and William Wascher, "Minimum Wages and Employment: A Review of Evidence from the New Minimum Wage Research," NBER Working Paper 12663 (November 2006).
- Pence, Karen, "Foreclosing on Opportunity: State Laws and Mortgage Credit," *Review of Economics and Statistics*, 88(1) (2006), 177–182.
- Scarberry, Mark S., and Scott M. Reddie, "Home Mortgage Strip Down in Chapter 13 Bankruptcy: A Contextual Approach to Sections 1322(b)(2) and (b)(5)," *37 Pepperdine Law Review*, 635 (2010).
- Stolberg, Sheryl G., and Edmund L. Andrews, "\$275 Billion Plan Seeks to Address Crisis in Housing," *New York Times*, February 18, 2009.
- Summers, Lawrence, "Lawrence Summers on 'House of Debt,'" *Financial Times*, June 6, 2014.
- Visaria, Sujata. "Legal Reform and Loan Repayment: The Microeconomic Impact of Debt Recovery Tribunals in India," *American Economic Journal: Applied Microeconomics*, 3(1) (2009), 59–81.
- White, Michelle J., "Bankruptcy Law," in *Handbook of Law and Economics*, vol. 2. A. Mitchell Polinsky and Steven Shavell, editors. Elsevier, North-Holland Press (2005).
- White, Michelle J., and Ning Zhu, "Saving Your Home in Chapter 13 Bankruptcy," *Journal of Legal Studies*, 39(1) (2010), 33–61.
- Winn, Jane Kauffman, "Lien-Stripping After Nobelman," *Loyola of Los Angeles Law Review*, 27 (1993–1994), 541.