

# Online Appendix for 'To Securitize or to Price Credit Risk?'

## A: Mortgage Default and Lenders' Costs of Default

To formally inspect whether JR law raises credit risk by increasing the probability and cost of mortgage default to lenders, we use loan-level information provided by the Fannie Mae Single Family Loan database between 2000 and 2017 to estimate the equation

$$(1) \quad y_{ilst} = \alpha + \beta JR_s + \gamma X_{ilst} + \delta_l + \delta_t + \varepsilon_{ilst},$$

where  $y_{ilst}$  is either the FORECLOSURE\_COST (in logarithms) incurred by lender  $l$  on mortgage loan  $i$  in state  $s$  at time  $t$ , or DEFAULT (a binary dummy variable);  $JR_s$  is a dummy equal to 1 if state  $s$  uses JR law, 0 otherwise;  $X_{ilst}$  is a vector of controls;  $\delta_l$  and  $\delta_t$  denote lender and year fixed effects, respectively;  $\varepsilon_{ilst}$  is the error term.

Table A1 presents the estimates. The unconditional specification in column 1 shows JR law imposes 65% higher costs on lenders, relative to PS law. Column 2 shows that this result remains economically and statistically significant when we control for the DTI ratio, term to maturity, local house prices and per capita income. Next, we test whether the rate of mortgage default is related to foreclosure law. Consistent with previous evidence (Gerardi et al. (2013), Demiroglu et al. (2014), and Mian et al. (2015)), columns 3 and 4 of Table A1 show that the probability of default is significantly higher in JR states. Economically, the size of this effect is substantial. Column 4 shows the probability of default is 0.28 percentage points higher in JR relative to PS states. Considering the mean default rate in the sample is 0.78%, this equates to a 35% increase.

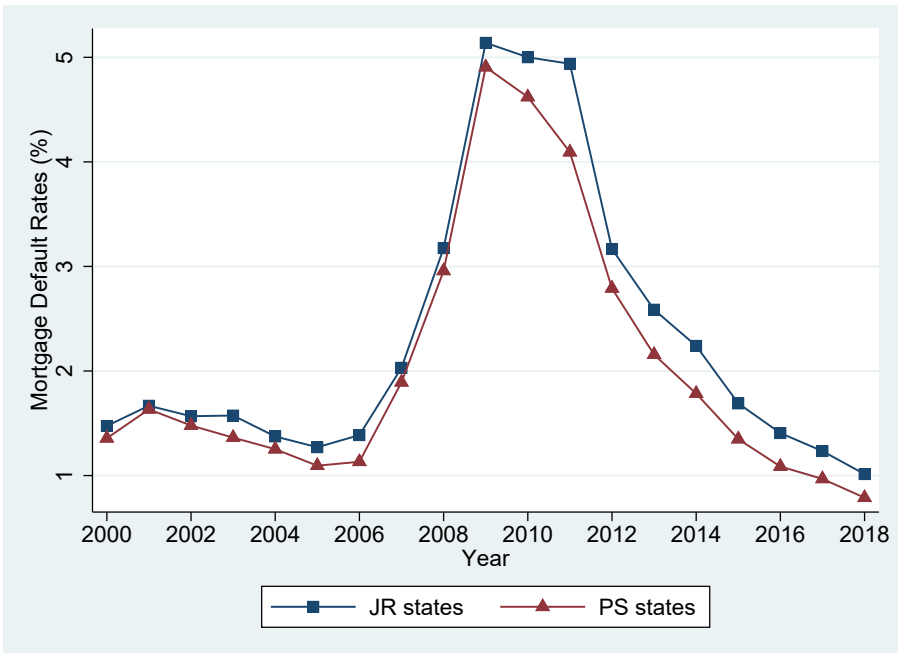
Table A1: Probability of Default and Foreclosure Costs

Notes: This table presents estimates of equation (1). The sample in columns 1 and 2 use only observations where default has occurred. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*\* and \*\*\* indicate statistical significance at the 5% and 1% levels, respectively.

Dependent variable	1	2	3	4
	FORECLOSURE_COST	FORECLOSURE_COST	DEFAULT	DEFAULT
JR	0.5033*** (14.85)	0.5223*** (13.54)	0.0021*** (15.91)	0.0028*** (21.87)
PER_CAPITA_INCOME		0.0031 (0.04)		-0.0065*** (-44.68)
DTI		0.0187 (0.86)		0.0014*** (10.79)
TERM_TO_MATURITY		-0.0127 (-0.76)		0.0002*** (8.63)
HOUSE_PRICES		0.3258** (2.42)		0.0113*** (43.79)
Lender FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	17,091	17,091	2,182,591	2,182,591
$R^2$	0.05	0.05	0.01	0.01

Figure A1: Mortgage Default Rates

Notes: This figure shows the mean rate of mortgage default, defined as the share of mortgages that are at least 90 days late, in JR and PS states between 2000 and 2018. Source: data for 2000 to 2002 is taken from the NY Fed, data for 2003 to 2018 is from the Consumer Financial Protection Bureau.



*T*-test on Mortgage Default Rates

Notes: JR (PS) indicates the mean default rate (in %) in JR (PS) states between 2000 and 2018. Difference is the difference between JR and PS. *t*-statistic is the *t*-statistic from a two-sided test of equality between JR and PS. \*\*\* indicates statistical significance at the 1% level.

JR	PS	Difference	<i>t</i> -statistic
2.6814	2.2134	0.4680***	4.5464

Figure A1 illustrates the mean mortgage default rate in JR and PS states between 2000 and 2018. A *t*-test shows the annual default rate is approximately 0.4680 percentage points higher in JR compared to PS states. Compared to the mean of mortgage default rates in PS states, this estimate implies that the mean default rate is approximately 21% higher in JR states during the sample period. This difference is statistically significant at the 1% level (*t*-statistic = 4.5464).

## B: Geographical Spread of the Data and Variable Description

### B.1: Geographical Spread of the Data

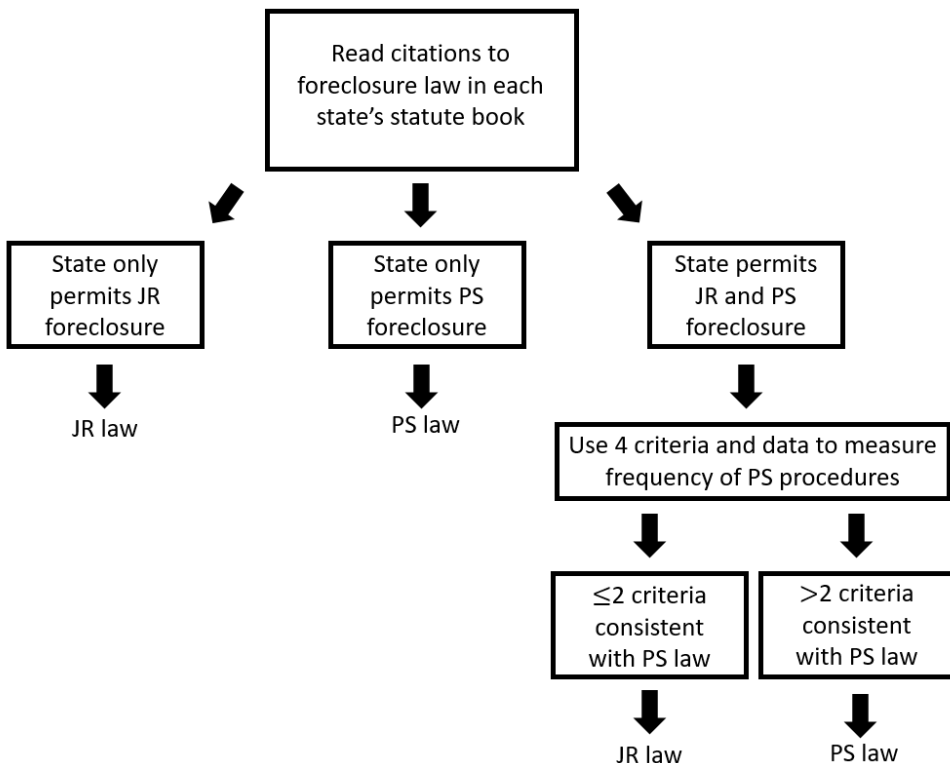
Table A2: Observations in Each Border Pair

Notes: This table reports the number of observations in each border pair in our sample. Pair denotes the bordering states. Obs denotes number of observations.

Pair	Obs	Pair	Obs	Pair	Obs	Pair	Obs
FL-AL	10,570	MS-LA	11,659	OK-MO	524	VA-KY	961
GA-FL	18,448	ND-MN	3,136	RI-CT	7,037	VA-MD	47,318
KS-CO	48	ND-MT	312	RI-NY	174	VT-MA	918
LA-AR	1,515	NE-IA	10,706	SC-GA	16,571	VT-NH	3,955
MA-CT	15,973	NE-KS	340	SC-NC	54,926	WI-MI	4,570
MD-DC	14,394	NH-ME	9,215	SD-MN	804	WI-MN	47,833
MI-IN	14,424	NM-AZ	90	SD-MT	10	WV-KY	965
MN-IA	2,194	NM-CO	378	SD-NE	774	WV-MD	3,632
MO-IA	846	NY-MA	5,245	TN-KY	16,274	WV-OH	7,174
MO-IL	26,593	OH-MI	43,644	TX-LA	5,024	WV-PA	13,653
MO-KS	24,765	OK-AR	5,811	TX-NM	3,493	WY-SD	964
MO-KY	221	OK-CO	3	TX-OK	4,673		

## C: Legal Appendix

We develop a system to classify each state as a JR or PS jurisdiction. The flowchart below illustrates the essence of this classification system. We first read the citations to foreclosure law in each state's statute book. This indicates whether a state permits foreclosure through JR, PS, or both procedures. Where only one procedure is available we designate a state as either a JR or PS state (although we also verify this using data). To identify the most common method in states where the law permits both procedures, we use four additional criteria and data collected from state statutes, foreclosure attorneys, foreclosure auctions, and evidence from the legal literature to verify whether JR or PS law is used. We report the criteria and this data on a state-by-state basis below.



**Criteria 1:** The text of the law codified in each state’s statute book.

We first locate the citations to state foreclosure law in each state’s statute book. For example, for California these are in the California Civil Code Sections 2924 through 2924I and California Code of Civil Procedure Sections 580a through 580d. For Massachusetts the legal process regulating foreclosure is in Massachusetts General Laws Chapter 244. We then screen the text to ascertain whether the state permits foreclosure using Judicial Review, Power of Sale or both procedures. Where only one type of procedure is permitted, we assign a state to that type of law. Although, we also verify this classification using data we describe below. Where both procedures are available, we use Criteria 2 to 5 to identify the most common foreclosure method.

**Criteria 2:** Does the state mandate that lenders initiate the foreclosure process by providing notice of foreclosure in court?

Each state’s legal rules stipulate how lenders provide Notice of Foreclosure to borrowers. In Judicial Review states lenders must provide Notice of Foreclosure by filing a lawsuit in court and serving the borrower with a summons and complaint. In Power of Sale states the lender or trustee typically records a three month notice of default in the County Recorder’s office and sends a copy to the borrower after the recording (a Notice of Trustee Sale). Power of Sale law does not require that the process is initiated by filing a lawsuit in court. Judicial Review is more common where a Notice of Foreclosure must be filed in court.

Florida provides an illustrative example of the Notice of Foreclosure process in Judicial Review states. The lender must file a lawsuit in court by serving the borrower with a summons and complaint. The borrower then has 20 days to file an answer to the complaint with the court. If the court determines that the borrower has defaulted on the mortgage, the judge enters a final judgment of foreclosure and mails a copy to the borrower. A date is then set for a court hearing when a judgment is declared (the judgment date). The foreclosure sale must take place between 20 to 35 days after the judgment date, unless the court order

states otherwise (Florida Statutes Section 45.031). The foreclosing lender must then publish a notice of the foreclosure sale in a newspaper once a week for two consecutive weeks, with the second publication at least five days before the sale (Florida Statutes Section 45.031).

The Notice of Trustee Sale process in California is representative of Power of Sale states. To begin the foreclosure process the lender or trustee records a three month notice of default in the county recorder's office and mails a copy to the borrower after recording it (California Civil Code Section 2924, 2924b).

**Criteria 3:** Data collected from foreclosure attorneys on the frequency of Judicial Review and Power of Sale procedures in the cases they are involved.

We interviewed foreclosure attorneys from each state and asked what in their experience was the most common foreclosure procedure used in the state they operate in. In almost all instances attorneys are unequivocal. Where state law permits both Judicial Review and Power of Sale foreclosure, Power of Sale is invariably used. Where state law permits only one form of foreclosure, that method is used in all cases attorneys have been involved.

**Criteria 4:** Lis Pendens notices / data on foreclosed properties listed for foreclosure auctions on Realtytrac.com.

We randomly sampled 100 foreclosed properties from each state listed for foreclosure auction on Realtytrac.com.<sup>1</sup> Each listing reports whether the borrower was issued with a Lis Pendens notice ahead of the auction. This is a notice of foreclosure that is issued pending Judicial Review foreclosure actions.

We calculate the share of the 100 foreclosed properties that were issued Lis Pendens notices in each state. The higher the share, the more common is Judicial Review. The evidence below shows that the Lis Pendens share is either 100% or close to 100% in states that permit foreclosure exclusively through Judicial Review. In states that permit both

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<sup>1</sup>Owing to their smaller populations, there are fewer properties listed for foreclosure auction in South Dakota and Montana. We therefore rely upon 27 observations for South Dakota and 58 for Montana.

Judicial Review and Power of Sale, there are exceptionally few instances of Lis Pendens notices. This is consistent with the evidence from foreclosure attorneys that where Power of Sale is available, lenders overwhelmingly use it.

Figure A2: Lis Pendens Notices

Notes: This figure shows two foreclosed properties listed for auction on Realtytrac.com. Panel A shows a listing for a house in California, a Power of Sale state. Panel B shows a listing for a house in Kentucky, a Judicial Review state. Source: Realtytrac.com.

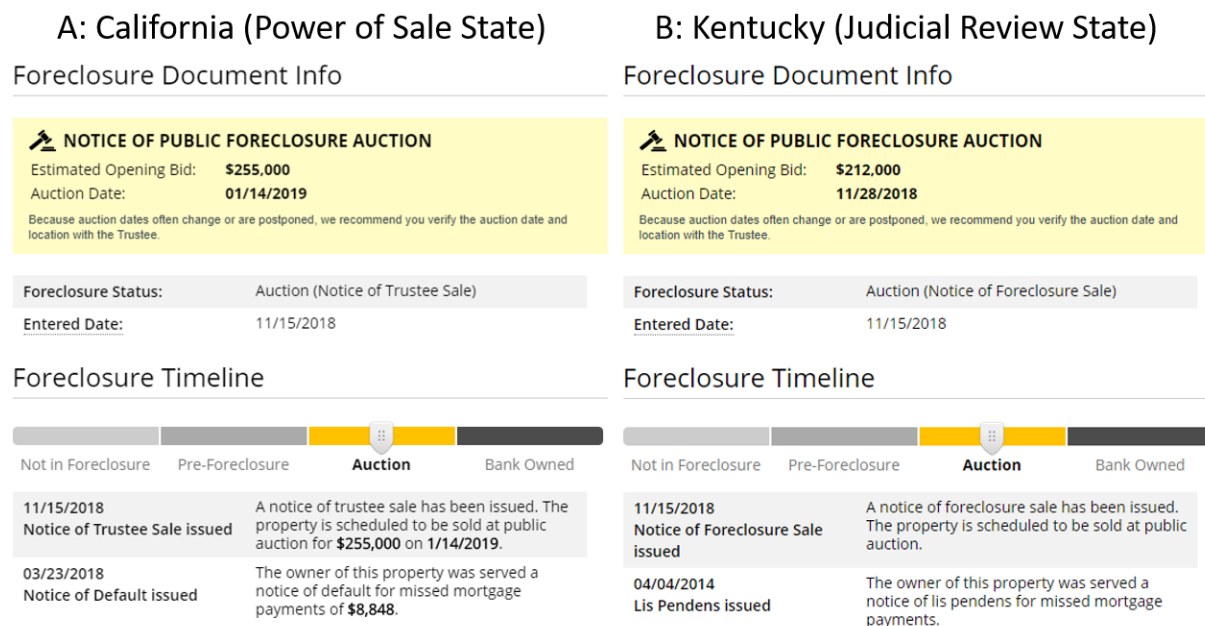


Figure A2 provides details of two foreclosed auction properties listed on Realtytrac.com. In Panel A there is no mention of a Lis Pendens notice. Rather a Notice of Trustee Sale is issued. These data are consistent with California using Power of Sale law. In Panel B a Lis Pendens notice is recorded, consistent with Kentucky using Judicial Review law. In addition, a Notice of Foreclosure sale is issued (Criteria 2).

**Criteria 5:** Contributions to the legal literature.

We retrieve data reported by Ghent (2014), published in the *Journal of Law and Economics*, on the frequency that Power of Sale is used to foreclose in each state.



## Legal Classification System

Using the 5 criteria, and the data reported below, we designate each state as either Judicial Review or Power of Sale. To preview the results, there is no ambiguity in states' foreclosure law.

Following Criteria 1 we designate the 17 states that exclusively mandate Judicial Review foreclosure as JR states (Connecticut, Delaware, Florida, Illinois, Indiana, Kansas, Kentucky, Louisiana, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, Vermont, Wisconsin). Owing to some idiosyncrasies we discuss Delaware and Pennsylvania separately below. We designate the District of Columbia a PS jurisdiction because it allows only Power of Sale foreclosure.

The remaining states permit both types of foreclosure. We therefore use Criteria 2-5 to assign them to JR or PS status. We calculate a PS index that ranges between 0 and 4. We award 1 point if a Notice of Foreclosure in court is not required, 1 point if Power of Sale is the most common type of procedure reported by attorneys, 1 point if the Lis Pendens incidence is less than 10%, and 1 point if Ghent (2014) reports Power of Sale frequency as 'Usual'.<sup>2</sup>

23 states have a PS index of 4. We therefore assign them to PS status (Alabama, Alaska, Arizona, Arkansas, California, Georgia, Idaho, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, Oregon, Rhode Island, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wyoming).

3 states have a PS index of 3 (Colorado, Maryland, Massachusetts, and Nebraska). We assign them to PS status on the grounds that they meet the majority of our PS criteria. The reasons for these designations are:

Colorado only uses a Judicial Review process when the borrower is protected under the Service Members Civil Relief Act (known as a "Rule 120 hearing"). This applies exclusively to veterans and is seldom used. Power of Sale is thus the default option. All

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<sup>2</sup>We choose a 10% Lis Pendens threshold to remain consistent with Type-I errors.

other indicators are consistent with PS law.

Massachusetts state law mandates Lis Pendens notices are filed before a foreclosure auction, despite Power of Sale being the default method of foreclosure. See Massachusetts General Laws Chapter 184 Section 15(a)-(b). All other indicators are consistent with PS law.

Nebraska: Ghent (2014) reports Power of Sale as being 'Available' rather than 'Usual'. All other indicators are consistent with PS law.

6 states permit foreclosure using Judicial Review or Power of Sale and have PS index values between 0 and 2. Iowa, Maine, and New York have a PS index of 0. Oklahoma has a PS index of 1. South Dakota has a PS index of 2. We assign all five states to JR status because while Power of Sale is available, idiosyncrasies of state law effectively rule out Power of Sale.

Iowa (PS index = 0): we classify Iowa as a JR state. Although Iowa permits Power of Sale, this procedure can only be used where borrowers voluntarily give up possession of their home and the lender agrees to waive any deficiency. This type of procedure is rarely used. All other criteria are consistent with Judicial Review. For example, lenders file a Notice of Foreclosure in court, the Lis Pendens incidence is 100%, attorneys report Judicial Review as the default option, and Ghent (2014) reports Power of Sale as being 'Unavailable'.

Maine (PS index = 0): lenders must initiate a foreclosure by providing a Notice of Foreclosure in court, attorneys report JR as the most common procedure, the Lis Pendens incidence is 100%, and Ghent (2014) reports Power of Sale as 'Rare'. Maine has used Judicial Review historically such that it is the default option.

New York (PS index = 0) has used Judicial Review law since at least the 1800s (Fox, 2015). Lenders must initiate a foreclosure by providing a Notice of Foreclosure in court, attorneys report Judicial Review as the most common procedure, the Lis Pendens incidence is 100%,

and Ghent (2014) reports Power of Sale as 'Rare'. In essence, despite both foreclosure procedures being available in New York, historical precedent means that only Judicial Review is used. The classification is consistent with the huge number of foreclosure cases and court backlogs in New York.

Maryland (PS index = 1): from criteria 2-5 all indicators are consistent with Judicial Review, except that Ghent (2014) reports the Power of Sale frequency as usual. However, lenders must start the foreclosure process by filing a Notice of Foreclosure in the County Circuit court where the property is located, attorneys report Judicial Review as the default procedure and a court must ratify the foreclosure sale, and the Lis Pendens incidence is 100%. Furthermore, Pence (2006), Demiroglu et al. (2014) and Ghent and Kudlyak (2011) classify Maryland as a Judicial Review state.

Oklahoma (PS index = 1): lenders do not have to file a Notice of Foreclosure in court. However, while Power of Sale is permitted, borrowers can force a lender to use Judicial Review by sending a certified letter electing for judicial foreclosure to the lender and the county clerk's office (Oklahoma Statute title 46, Section 43). Delinquent borrowers have often chosen this route such that lenders invariably use Judicial Review. All other criteria are consistent with Judicial Review law.

South Dakota (PS index = 2): we classify South Dakota as a Judicial Review state because borrowers can easily challenge Power of Sale foreclosure and demand the process is overseen by a judge (South Dakota Codified Laws Section 21-48-9). Hence, while only 4% of foreclosed borrowers are issued with Lis Pendens notices, Power of Sale is rarely used. Ghent (2014) also reports Power of Sale to be 'Rare'. Conversations with foreclosure attorneys confirm this.

Hawaii is the only state that effectively changes the type of foreclosure law it uses during recent years. Hawaii permits foreclosure using both Judicial Review and Power of Sale.

Before 2011 Power of Sale was the default option. However, Hawaii effectively became a Judicial Review state in 2011 following the introduction of a Mortgage Foreclosure Dispute Resolution program that applies exclusively to Power of Sale foreclosures. This program brings borrowers and lenders together with the goal of resolving mortgage default. This can result in a longer foreclosure timeline as the borrower is granted time to find ways to avoid foreclosure. To avoid the burdens this imposes, lenders now mainly foreclose using Judicial Review. This classification is supported by the fact that lenders file a Notice of Foreclosure in court, evidence from attorneys supports Judicial Review is primarily used, and the Lis Pendens incidence is 64%.

Table A3: Foreclosure Cost and Timeline across Legal Frameworks

Notes: Legal framework is the type of legal process used to regulate foreclosure. FORECLOSURE\_COST is the mean cost incurred by lenders foreclosing mortgages in each legal framework. Data on FORECLOSURE\_COST and TIMELINE are taken from the SFLD database.

Legal framework	1 FORECLOSURE_COST (\$)	2 TIMELINE (Days)
Power of sale	4,035	101
Judicial review	6,428	252
<i>Scire facias</i>	8,304	275

Finally, we discuss Delaware and Pennsylvania separately. Both states' law allows only Judicial Review foreclosure. However, they rely upon *scire facias* law which is designed to be somewhat more creditor friendly than Judicial Review law by placing the onus on borrowers to provide evidence why a lender should not be allowed to foreclose. Despite this feature, Table A3 emphatically shows that *scire facias* is neither expedient nor cheap for lenders. Data show the mean cost to a lender of foreclosing a property is \$8,304 in *scire facias* states compared to \$4,035 and \$6,428 in Power of Sale and Judicial Review states, respectively. In addition, the foreclosure timeline is 275 days in *scire facias* states compared to 101 and 252 days in Power of Sale and Judicial Review states, respectively. We therefore classify Delaware and Pennsylvania as Judicial Review states because 1) the law mandates foreclosure is overseen by a judge, and 2) the foreclosure process is, on average, longer and more costly to lenders relative to even Judicial Review states.

## Legal Appendix Data

This section reports the state-by-state data we use to evaluate the five criteria and classify each state's foreclosure law. For each state we report the citations to foreclosure in state law, whether the state permits foreclosure through Judicial Review, Power of Sale, or both procedures, if a lender must provide Notice of Foreclosure in court, the most common type of foreclosure procedure reported by foreclosure attorneys operating in the state, the share of foreclosed properties listed for auction on Realtytrac.com with Lis Pendens notices, and the frequency of Power of Sale reported by Ghent (2014).

### Alabama

*Citations to state foreclosure law:* Alabama Code Sections 35-10-1 to 35-10-30, and Sections 6-5-247 to 6-5-257.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### Alaska

*Citations to state foreclosure law:* Alaska Statutes Sections 34.20.070 to 34.20.100.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### Arizona

*Citations to state foreclosure law:* Arizona Revised Statutes Sections 33-721 to 33-730 (judicial), and Sections 33-801 to 33-821 (nonjudicial).

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### Arkansas

*Citations to state foreclosure law:* Arkansas Code Annotated Sections 18-49-101 through 18-49-106, and Sections 18-50-101 through 18-50-116.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **California**

*Citations to state foreclosure law:* California Civil Code Sections 2924 through 2924l, and California Code of Civil Procedure Sections 580a through 580d.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **Colorado**

*Citations to state foreclosure law:* Colorado Revised Statutes Sections 38-38-100.3 through 38-38-114.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale. There is some minimal court involvement when the attorney representing the foreclosing party files a motion under Rule 120 of the Colorado Rules of Civil Procedure asking a court for an order authorizing the foreclosure sale by the public trustee. The court sets a hearing (called a “Rule 120 hearing”), which is limited to an inquiry of whether the borrower is in default and in the military and subject to protections under the Service Members Civil Relief Act. Neither of these issues is typically in dispute, such that Rule 120 hearings do not need to take place and the court enters the requested order.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **Connecticut**

*Citations to state foreclosure law:* Connecticut General Statutes Title 49, Sections 49-1 through 49-31v, and Connecticut Superior Court Rules 23-16 through 23-19.

*Law available:* Judicial Review.

*Notice of Foreclosure in court:* Yes. The foreclosing party starts the foreclosure by filing a complaint with the court and serving it to the borrower along with a summons.

*Most common type of procedure (attorneys):* Judicial Review. Foreclosures are either by sale (where the court orders the home sold and the proceeds paid to the foreclosing party to satisfy the outstanding debt) or strict foreclosure (where the court transfers title to the home directly to the foreclosing party without a foreclosure sale). Connecticut General Statutes Section 49-24.

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Unavailable.

## **Delaware**

*Citations to state foreclosure law:* Delaware Code Annotated Title 10, Chapter 49, Sections 5061 through 5067.

*Law available:* Judicial Review.

*Notice of Foreclosure in court:* Yes. To officially start the foreclosure, the foreclosing party files a lawsuit in court and provides notice of the suit to the borrower by serving him or her with a summons and complaint.

*Most common type of procedure (attorneys):* Judicial Review. The lender must sue the borrower in court in order to foreclose.

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Unavailable.

## **District of Columbia**

*Citations to state foreclosure law:* District of Columbia Code Sections 42-815 through 42-816.

*Law available:* Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **Florida**

*Citations to state foreclosure law:* Florida Statutes Sections 702.01 through 702.11, and Sections 45.031 through 45.0315.

*Law available:* Judicial Review.

*Notice of Foreclosure in court:* Yes. The foreclosing party files a lawsuit in court to start the foreclosure and gives notice of the lawsuit by serving the borrower with a summons and complaint.

*Most common type of procedure (attorneys):* Judicial Review.

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Unavailable.

## **Georgia**

*Citations to state foreclosure law:* Georgia Code Annotated Sections 44-14-160 through 44-14-191.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **Hawaii**

*Citations to state foreclosure law:* Hawaii Revised Statutes Sections 667-1.5 through 667-20.1 (judicial), and Sections 667-21 through 667-41 (nonjudicial).

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* Required if a lender opts for foreclosure using Judicial Review.

*Most common type of procedure (attorneys):* Power of Sale (until 2011), Judicial Review (post 2011). The state implemented a Mortgage Foreclosure Dispute Resolution Program in 2011 which applies to Power of Sale foreclosures. To bypass the mediation program, most lenders now use Judicial Review.

*Lis Pendens incidence:* 64%.

*PS frequency (Ghent, 2014):* Available.

## **Idaho**

*Citations to state foreclosure law:* Idaho Code Sections 45-1505 through 45-1515.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **Illinois**

*Citations to state foreclosure law:* Illinois Compiled Statutes Chapter 735, Sections 5/15-1501 through 5/15-1605.

*Law available:* Judicial Review.

*Notice of Foreclosure in court:* Yes. To begin the foreclosure, the foreclosing party files a lawsuit and gives notice of the suit by serving the borrower with a complaint and summons, along with a notice that advises the homeowner of his or her rights during the foreclosure process.

*Most common type of procedure (attorneys):* Judicial Review.

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Unavailable.

## **Indiana**

*Citations to state foreclosure law:* Indiana Code Sections 32-30-10-1 through 32-30-10-14, Sections 32-29-1-1 through 32-29-1-11, and Sections 32-29-7-1 through 32-29-7-14.

*Law available:* Judicial Review.

*Notice of Foreclosure in court:* Yes. The foreclosing party gives the lender notice of the lawsuit by serving a court summons and complaint.

*Most common type of procedure (attorneys):* Judicial Review.

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Unavailable.

## **Iowa**

*Citations to state foreclosure law:* Iowa Code Sections 654.1 through 654.26, and Sections 655A.1 through 655A.9.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* To officially start the foreclosure, the lender files a lawsuit in court.

*Most common type of procedure (attorneys):* Judicial Review. Iowa law also allows an



alternative non-judicial voluntary foreclosures (where the borrower voluntarily gives up possession of the home and the lender agrees to waive any deficiency). However, these non-judicial procedures rarely occur.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Unavailable.

## **Kansas**

*Citations to state foreclosure law*: Kansas Statutes Annotated Sections 60-2410, 60-2414, and 60-2415.

*Law available*: Judicial Review.

*Notice of Foreclosure in court*: The lender starts the foreclosure process by filing a lawsuit in court.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Unavailable.

## **Kentucky**

*Citations to state foreclosure law*: Chapter 426 of the Kentucky Revised Statutes.

*Law available*: Judicial Review.

*Notice of Foreclosure in court*: Yes. The foreclosing party gives the borrower notice of the lawsuit by serving him or her with a summons and complaint.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Unavailable.

## **Louisiana**

*Citations to state foreclosure law*: Louisiana Code of Civil Procedure Articles 3721 through 3753, Articles 2631 through 2772, and Louisiana Revised Statutes Section 13:3852.

*Law available*: Judicial Review.

*Notice of Foreclosure in court*: Upon a default, the foreclosing party files a foreclosure petition in court with the mortgage attached and the court orders the property seized and sold. The homeowner can fight the foreclosure only by appealing or bringing a lawsuit.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Unavailable.

## **Maine**

*Citations to state foreclosure law*: Maine Revised Statutes Title 14 Sections 6101 through 6325.

*Law available*: Judicial Review & Power of Sale.

*Notice of Foreclosure in court*: Yes. To officially start the foreclosure, the foreclosing party files a lawsuit in court and gives notice of the suit by serving the borrower a summons and complaint.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence:* 100%.  
*PS frequency (Ghent, 2014):* Rare.

### **Maryland**

*Citations to state foreclosure law:* Code of Maryland (Real Property) Sections 7-105 through 7-105.8, Maryland Rules 14-201 through 14-209, and Rules 14-305 through 14-306.  
*Law available:* Judicial Review & Power of Sale.  
*Notice of Foreclosure in court:* Yes. The lender initiates a foreclosure case with the Circuit Court in the county in which the property is located.  
*Most common type of procedure (attorneys):* Judicial Review.  
*Lis Pendens incidence:* 100%.  
*PS frequency (Ghent, 2014):* Usual.

### **Massachusetts**

*Citations to state foreclosure law:* Massachusetts General Laws Chapter 244.  
*Law available:* Judicial Review & Power of Sale.  
*Notice of Foreclosure in court:* No.  
*Most common type of procedure (attorneys):* Power of Sale.  
*Lis Pendens incidence:* 99%.  
*PS frequency (Ghent, 2014):* Usual.

### **Michigan**

*Citations to state foreclosure law:* Michigan Compiled Laws Sections 600.3101 through 600.3185, and Sections 600.3201 through 600.3285.  
*Law available:* Judicial Review & Power of Sale.  
*Notice of Foreclosure in court:* No.  
*Most common type of procedure (attorneys):* Power of Sale.  
*Lis Pendens incidence:* 0%.  
*PS frequency (Ghent, 2014):* Usual.

### **Minnesota**

*Citations to state foreclosure law:* Minnesota Statutes Sections 580.01 through 580.30 (foreclosure by advertisement), Sections 581.01 through 581.12 (foreclosure by action), and Sections 582.01 through 582.32 (general foreclosure provisions).  
*Law available:* Judicial Review & Power of Sale.  
*Notice of Foreclosure in court:* No.  
*Most common type of procedure (attorneys):* Power of Sale.  
*Lis Pendens incidence:* 0%.  
*PS frequency (Ghent, 2014):* Usual

### **Mississippi**

*Citations to state foreclosure law:* Mississippi Code Annotated Sections 89-1-55 through 89-1-59.  
*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.  
*Most common type of procedure (attorneys):* Power of Sale.  
*Lis Pendens incidence:* 0%.  
*PS frequency (Ghent, 2014):* Usual.

### **Missouri**

*Citations to state foreclosure law:* Missouri Revised Statutes Sections 443.290 through 443.440 (nonjudicial foreclosures), and Missouri Revised Statutes Section 443.190 and 443.280 (judicial foreclosures).

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### **Montana**

*Citations to state foreclosure law:* Montana Code Annotated Sections 71-1-221 through 71-1-235, and Sections 71-1-301 through 71-1-321.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of sale. Home mortgages in Montana are trust indentures (also known as deeds of trust) under the state's Small Tract Financing Act, which is for properties that do not exceed 40 acres. This type of mortgage can be foreclosed nonjudicially (without a lawsuit) or judicially (with a lawsuit). However, non-judicial foreclosure is the default option.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### **Nebraska**

*Citations to state foreclosure law:* Nebraska Revised Statutes Sections 76-1005 through 76-1018 (nonjudicial), and Sections 25-2137 through 25-2155 (judicial).

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Available.

### **Nevada**

*Citations to state foreclosure law:* Nevada Revised Statutes Sections 107.0795 through 107.130, Sections 40.430 through 40.450, and Sections 40.451 through 40.463.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014)*: Usual.

### **New Hampshire**

*Citations to state foreclosure law*: Title XLVIII, Chapter 479 of the New Hampshire Revised Statutes.

*Law available*: Judicial Review & Power of Sale.

*Notice of Foreclosure in court*: No.

*Most common type of procedure (attorneys)*: Power of Sale.

*Lis Pendens incidence*: 0%.

*PS frequency (Ghent, 2014)*: Usual.

### **New Jersey**

*Citations to state foreclosure law*: New Jersey Statutes Annotated Sections 2A:50-1 through 2A:50-21 and Sections 2A:50-53 through 2A:50-63.

*Law available*: Judicial Review.

*Notice of Foreclosure in court*: Yes. The foreclosing party starts the foreclosure process by filing a lawsuit in court and giving notice of the suit by serving the borrower with a summons and complaint.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Unavailable.

### **New Mexico**

*Citations to state foreclosure law*: New Mexico Statutes Sections 48-7-1 through 48-7-24, Sections 39-5-1 through 39-5-23, and Sections 48-10-1 through 48-10-21.

*Law available*: Judicial Review

*Notice of Foreclosure in court*: Yes. The foreclosing party officially starts a judicial foreclosure by filing a lawsuit (a complaint) in court.

*Most common type of procedure (attorneys)*: Judicial review. Nonjudicial foreclosures are also possible, but uncommon.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Available only for deeds of trust.

### **New York**

*Citations to state foreclosure law*: New York Real Property Actions & Proceedings Sections 1301 through 1391.

*Law available*: Judicial Review & Power of Sale.

*Notice of Foreclosure in court*: Yes. The foreclosing party officially starts the foreclosure process by filing a lawsuit (a complaint) in court. It gives notice of the lawsuit to the borrower by serving him or her with a summons and complaint, along with notices advising the borrower about the foreclosure process.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014):* Rare.

### **North Carolina**

*Citations to state foreclosure law:* North Carolina General Statutes Sections 45-21.1 through 45-21.38C, and Sections 45-100 through 107.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No. However, to officially start the foreclosure, the foreclosing party files a notice of hearing with the court clerk.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### **North Dakota**

*Citations to state foreclosure law:* North Dakota Century Code Sections 32-19-01 through 32-19-41, and Sections 28-23-04 to 28-23-14.

*Law available:* Judicial Review

*Notice of Foreclosure in court:* Yes. The foreclosing party officially starts the foreclosure by filing a lawsuit (a complaint) in court. It gives notice of the lawsuit to the borrower by serving him or her with a summons and complaint.

*Most common type of procedure (attorneys):* Judicial Review.

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Unavailable.

### **Ohio**

*Citations to state foreclosure law:* Title 23, Chapter 2323 (Section 2323.07) and Chapter 2329 of the Ohio Revised Code.

*Law available:* Judicial Review.

*Notice of Foreclosure in court:* Yes. The foreclosing party files a lawsuit to begin the process and gives the borrower notice of the suit by serving him or her with a summons and complaint.

*Most common type of procedure (attorneys):* Judicial Review.

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Unavailable.

### **Oklahoma**

*Citations to state foreclosure law:* Oklahoma Statutes Title 12 Sections 686, 764 through 765, 773, and Sections 41 through 49.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Judicial Review. Foreclosure can take place using Power of Sale if the mortgage contract includes a power of sale clause. However, borrowers can force the lender to foreclose using Judicial Review by taking the following steps at least ten days before the date of the foreclosure sale: 1) notify the foreclosing party (the lender or servicer) by certified mail that the property to be sold is their homestead

(primary residence) and that they elect for judicial foreclosure, and 2) record a copy of the notice in the county clerk's office (Oklahoma Statute title 46, Section 43). Judicial review is the most common foreclosure procedure.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Rare.

## **Oregon**

*Citations to state foreclosure law*: Oregon Revised Statutes Sections 86.726 through 86.815 (nonjudicial foreclosures), and Sections 88.010 through 88.106 (judicial foreclosures).

*Law available*: Judicial Review & Power of Sale.

*Notice of Foreclosure in court*: No.

*Most common type of procedure (attorneys)*: Power of Sale.

*Lis Pendens incidence*: 0%.

*PS frequency (Ghent, 2014)*: Usual.

## **Pennsylvania**

*Citations to state foreclosure law*: Pennsylvania Statutes Annotated Title 35, Sections 1680.402c to 1680.409c, Section 41, Sections 403 to 404, and Pennsylvania Rules of Civil Procedure, Rules 1141-1150.

*Law available*: Judicial Review.

*Notice of Foreclosure in court*: Yes. The foreclosing party officially starts the foreclosure process by filing a lawsuit (a complaint) in court. It gives notice of the lawsuit to the borrower by serving him or her with a summons and complaint.

*Most common type of procedure (attorneys)*: Judicial Review (*scire facias*).

*Lis Pendens incidence*: 100%,

*PS frequency (Ghent, 2014)*: Unavailable.

## **Rhode Island**

*Citations to state foreclosure law*: Rhode Island General Laws Sections 34-27-1 through 34-27-5, and Sections 34-25.2-1 through 34-25.2-15.

*Law available*: Judicial Review & Power of Sale.

*Notice of Foreclosure in court*: No.

*Most common type of procedure (attorneys)*: Power of Sale.

*Lis Pendens incidence*: 0%.

*PS frequency (Ghent, 2014)*: Usual.

## **South Carolina**

*Citations to state foreclosure law*: South Carolina Code Sections 15-39-650 through 15-39-660, and Sections 29-3-630 through 29-3-790.

*Law available*: Judicial Review.

*Notice of Foreclosure in court*: Yes. The lender must give the borrower notice of the lawsuit by serving a summons and complaint.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014):* Unavailable.

### **South Dakota**

*Citations to state foreclosure law:* South Dakota Codified Laws Sections 21-47-1 through 21-47-25 (judicial foreclosures), and Sections 21-48-1 through 21-48-26 (nonjudicial foreclosures).

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Judicial Review. Foreclosures in South Dakota can be through Power of Sale. However, even if the lender starts a Power of Sale foreclosure, the borrower can require the lender to foreclose using Judicial Review by making an application in the appropriate court (South Dakota Codified Laws Section 21-48-9).

*Lis Pendens incidence:* 4%.

*PS frequency (Ghent, 2014):* Rare.

### **Tennessee**

*Citations to state foreclosure law:* Tennessee Code Annotated Sections 35-5-101 to 35-5-111, and Sections 66-8-101 through 66-8-103.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### **Texas**

*Citations to state foreclosure law:* Texas Property Code Section 51.002 through 51.003.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### **Utah**

*Citations to state foreclosure law:* Utah Code Annotated Sections 57-1-19 through 57-1-34, and Sections 78B-6-901 through 78B-6-906.

*Law available:* Judicial Review & Power of Sale

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

### **Vermont**

*Citations to state foreclosure law:* Vermont Statutes Title 12, Sections 4941 through 4954,

and Vermont Rules of Civil Procedure 80.1.

*Law available:* Judicial Review.

*Notice of Foreclosure in court:* Yes. The lender begins the foreclosure by filing a complaint with the court and serving it to the borrower along with a summons and notice of foreclosure.

*Most common type of procedure (attorneys):* Judicial Review. Foreclosures are either by judicial sale or strict foreclosure. With both types of foreclosure, the lender files a lawsuit in a state court. In a foreclosure by judicial sale, the court issues a judgment and orders the home to be sold to satisfy the debt. In a strict foreclosure, the court gives the home directly to the foreclosing lender without a foreclosure sale. Strict foreclosure is allowed if the court finds that the value of the property is less than the amount of the mortgage debt (Vermont Statute title 12, Section 4941).

*Lis Pendens incidence:* 100%.

*PS frequency (Ghent, 2014):* Very rare.

## **Virginia**

*Citations to state foreclosure law:* Virginia Code Annotated Sections 55-59 to 55-66.6.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **Washington**

*Citations to state foreclosure law:* Washington Revised Code Sections 61.24.020 through 61.24.140 (nonjudicial foreclosures), and Sections 61.12.040 to 61.12.170 (judicial foreclosures).

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **West Virginia**

*Citations to state foreclosure law:* West Virginia Code Sections 38-1-3 through 38-1-15.

*Law available:* Judicial Review & Power of Sale.

*Notice of Foreclosure in court:* No.

*Most common type of procedure (attorneys):* Power of Sale.

*Lis Pendens incidence:* 0%.

*PS frequency (Ghent, 2014):* Usual.

## **Wisconsin**

*Citations to state foreclosure law:* Wisconsin Statutes Sections 846.01 through 846.25.

*Law available:* Judicial Review.



*Notice of Foreclosure in court*: Yes. The lender files a lawsuit in court in order to foreclose. The lender gives notice of the lawsuit by serving a summons and complaint.

*Most common type of procedure (attorneys)*: Judicial Review.

*Lis Pendens incidence*: 100%.

*PS frequency (Ghent, 2014)*: Unavailable.

## **Wyoming**

*Citations to state foreclosure law*: Wyoming Statutes Sections 34-4-101 to 34-4-113, and Sections 1-18-101 to 1-18-115.

*Law available*: Judicial Review & Power of Sale.

*Notice of Foreclosure in court*: No.

*Most common type of procedure (attorneys)*: Power of Sale.

*Lis Pendens incidence*: 0%.

*PS frequency (Ghent, 2014)*: Usual.

Table A4 presents our classification of foreclosure law in each state and the District of Columbia.

Table A4: State Foreclosure Law Classification

Notes: JR indicates that a state uses Judicial Review law. PS indicates that a state uses Power of Sale law. \* indicates that a state uses a *scire facias* form of Judicial Review law.

State	Foreclosure Law	State	Foreclosure Law
Alabama	PS	Montana	PS
Alaska	PS	Nebraska	PS
Arizona	PS	Nevada	PS
Arkansas	PS	New Hampshire	PS
California	PS	New Jersey	JR
Colorado	PS	New Mexico	JR
Connecticut	JR	New York	JR
District of Columbia	PS	North Carolina	PS
Delaware	JR*	North Dakota	JR
Florida	JR	Ohio	JR
Georgia	PS	Oklahoma	JR
Hawaii	JR	Oregon	PS
Idaho	PS	Pennsylvania	JR*
Illinois	JR	Rhode Island	PS
Indiana	JR	South Carolina	JR
Iowa	JR	South Dakota	JR
Kansas	JR	Tennessee	PS
Kentucky	JR	Texas	PS
Louisiana	JR	Utah	PS
Maine	JR	Vermont	JR
Maryland	JR	Virginia	PS
Massachusetts	PS	Washington	PS
Michigan	PS	West Virginia	PS
Minnesota	PS	Wisconsin	JR
Mississippi	PS	Wyoming	PS
Missouri	PS		

## D: Ginnie Mae Tests

Table A5: Ginnie Mae Sample Estimates

Notes: This table reports parametric estimates of equation (1). In column 1 the dependent variable is equal to 1 if a loan is securitized through sale to Ginnie Mae, 0 otherwise. In column 2 the dependent variable is IR, measured in percent (%). The sample contains observations of loans eligible for sale to Ginnie Mae. That is, loans insured by the Federal Housing Administration. The unreported control variables ASSIGNMENT, JR\*ASSIGNMENT, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. The sample is restricted to loans within 10 miles of the threshold. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*\*\* indicates statistical significance at the 1% level.

	1	2
Dependent variable:	SEC	IR (%)
JR	0.0227*** (2.91)	0.0243 (1.35)
Control Variables	Yes	Yes
Region FE	Yes	Yes
Lender FE	Yes	Yes
Observations	101,361	100,707
$R^2$	0.66	0.35

## E: Sensitivity Checks

### E.1: DTI Splits

Table A6: Estimates using a 36% DTI Limit

Notes: This table presents parametric estimates of equation (1). In columns 1 and 3 the dependent variable is GSE\_SEC. In columns 2 and 4 the dependent variable is IR, measured in percent (%). In columns 1 and 2, the sample includes only GSE-eligible loans with a maximum DTI ratio of 36% within 10 miles of the threshold. In columns 3 and 4 the sample includes only GSE-eligible loans with a DTI ratio greater than 36% and less than or equal to 50% within 10 miles of the threshold. This includes manually underwritten loans that have a maximum DTI ratio of 45% and non-manually underwritten loans that have a maximum DTI ratio of 50%. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Sample	1	2	3	4
	DTI $\leq$ 36%		36 < DTI $\leq$ 50%	
Dependent variable	GSE_SEC	IR (%)	GSE_SEC	IR (%)
JR	0.0183*** (3.09)	0.0134 (1.24)	0.0315*** (4.60)	0.0138 (1.01)
ASSIGNMENT	0.0011* (1.74)	0.0005 (0.31)	0.0006 (0.95)	0.0023* (1.79)
JR * ASSIGNMENT	0.0015 (1.44)	-0.0020 (-0.98)	0.0003 (0.20)	-0.0028 (-1.29)
APPLICANT_INCOME	-0.0313*** (-6.11)	-0.0829*** (-8.17)	-0.0125* (-1.92)	-0.0509*** (-5.35)
LTV	0.0009*** (4.55)	0.0042*** (16.21)	0.0007*** (2.85)	0.0042*** (8.85)
LENDERS_PER_CAPITA	0.0010*** (5.02)	-0.0008** (-2.51)	0.0004** (2.43)	-0.0011*** (-2.88)
MINORITY	-0.0119*** (-3.41)	-0.0231*** (-5.04)	-0.0121** (-2.30)	0.0067 (0.70)
MALE	0.0006 (0.26)	-0.0026 (-0.77)	0.0028 (0.75)	-0.0076* (-2.01)
Region FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
Observations	227,422	227,422	100,127	100,127
$R^2$	0.50	0.30	0.50	0.29

## E.2: Tests using 2000 to 2017 data

A question is whether our findings are specific to the year 2018. Our choice to focus on this year is due to a lack of information on interest rates on GSE-eligible loans and jumbo loans and other loan characteristics in previous HMDA vintages. During the years 2000 to 2017, we rely on HMDA for data on securitization of GSE-eligible loans and securitization of non-GSE-eligible loans (subprime and jumbos). To inspect the pricing effects of JR law in the non-GSE-eligible market, we rely exclusively on the information about rate spreads of subprime loans (that account for the majority of non-GSE-eligible loans). We collect information on the interest rate at the point of origination on GSE-eligible loans from the Fannie Mae Single Family Loan database (SFLD).<sup>3</sup>

Pooling annual HMDA and SFLD data results in a data set that is computationally too large. In addition to the sample screens we apply to the 2018 data, we take a 10% random sample of the data sets. To mirror the previous econometric set-up, we include region-year and lender-year fixed effects in equation (??). The JR coefficients (LATEs) are therefore computed through cross-sectional comparisons of the treatment and control groups at the same point in time within the same region.

The results in Table A7 are qualitatively and quantitatively similar to the estimates from the 2018 data set and show the findings exist before and after the financial crisis.

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<sup>3</sup>Non-GSE-eligible interest rates are calculated using the HMDA rate spread variable. The rate spread measures the difference between the annual percentage rate (APR) on a loan and the average interest rate on prime loans. We therefore calculate IR for non-GSE-eligible loans in year  $t$  as the sum of the rate spread and average prime offer rate provided by the Federal Financial Institutions Examination Council during year  $t$ .

Table A7: Estimates using data from 2000 to 2017

Notes: This table presents parametric estimates of the equation  $y_{ilrst} = \alpha + \beta JR_s + \gamma f(X_{ilrst}) + \varphi W_{ilrst} + \delta_{rt} + \delta_{it} + \varepsilon_{ilrst}$  where all variables are defined as in equation (??) but with  $t$  subscripts that denote year.  $\delta_{rt}$  and  $\delta_{it}$  represent region-year and lender-year fixed effects, respectively. GSE (Non-GSE) indicates the sample includes GSE-eligible (non-GSE-eligible) loans. In columns 1 and 2 the dependent variable is GSE\_SEC. In columns 3, 4, 7, and 8 the dependent variable is IR, measured in percent (%). In columns 5 and 6 the dependent variable is NSEC. The Pre (Post) sample includes observations from 2000 to 2006 (2010 to 2017). The sample includes all loans within 10 miles of the threshold. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Sample	1		2		3		4		5		6		7		8		
	GSE_SEC		GSE		IR (%)		IR (%)		NSEC		NSEC		IR (%)		IR (%)		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
JR	0.0155*** (3.30)	0.0172*** (3.85)	0.0081 (0.93)	0.0125 (0.98)	0.0051 (0.52)	0.0035 (0.50)	0.0707* (1.78)	0.0958*** (2.76)									
ASSIGNMENT	0.0000 (0.06)	-0.0001 (-0.20)	0.0003 (0.86)	0.0007** (2.26)	0.0013 (0.91)	-0.0006 (-0.21)	0.0001 (0.18)	0.0003 (0.06)									
JR * ASSIGNMENT	-0.0011 (-0.01)	0.0010 (1.05)	-0.0011 (-1.56)	0.0013 (1.62)	-0.0007 (-0.29)	-0.0084* (-1.94)	0.0006 (0.45)	-0.0001 (-0.21)									
APPLICANT_INCOME	-0.0038 (-1.00)	0.0104** (2.22)	0.0280 (0.78)	0.0545 (1.19)	-0.0496*** (-10.57)	-0.0168 (-1.24)	0.0008 (0.13)	-0.0047 (-1.28)									
MALE	0.0093*** (5.70)	0.0076*** (4.82)	0.0010 (0.01)	-0.0157 (-0.11)	0.0130** (2.39)	0.0114 (1.21)	0.0072* (1.75)	0.0012 (1.02)									
MINORITY	-0.0252*** (-4.61)	-0.0347*** (-5.70)	-0.0128 (-1.50)	-0.1569* (-1.70)	0.0470*** (7.23)	-0.0211 (-1.22)	-0.0226** (-2.24)	0.0031 (1.40)									
LTV	0.0003 (0.28)	0.0011 (0.80)	0.0054** (31.84)	0.0530*** (23.67)	-0.0002 (-0.26)	-0.0105** (-2.49)	0.0031* (2.01)	0.0379*** (5.94)									
HOUSE_PRICES	0.0021* (1.70)	-0.0150** (-2.46)	0.0112 (1.24)	-0.0006 (-0.05)	-0.0006 (-0.20)	-0.1256*** (-6.14)	-0.0012 (-0.40)	0.0039 (1.39)									
LENDERS_PER_CAPITA	0.0250 (1.31)	0.0668** (2.47)	-0.6312*** (-4.61)	-0.7792*** (-4.95)	-0.0795* (-1.87)	0.4095*** (4.01)	0.0579* (1.79)	-0.1097 (-1.30)									
Region * Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
Lender * Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
Observations	244,916	190,884	240,145	189,561	34,036	26,160	29,226	26,018									
R <sup>2</sup>	0.51	0.58	0.74	0.79	0.83	0.73	0.61	0.80									

### E.3: RMBS Pricing Tests

To study market-based pricing reactions to JR law, we collect data from Bloomberg on residential mortgage backed securities (RMBS) issued between 2000 and 2016. For each deal we observe the coupon and yield, the ratio of the value of properties in JR states to the total deal value, the share of properties in the deal that are owner occupied, investment properties, fixed rate mortgages, and the mean LTV and FICO score at the point of issue. This provides 43,943 observations.

Table A8: Residential MBS Pricing Results

Notes: This table presents estimates of the equation  $i_{dt} = \alpha + \beta JR\_SHARE_{dt} + \gamma X_{dt} + \varphi_t + \varepsilon_{dt}$ , where  $i_{dt}$  is the yield on RMBS deal  $d$  at the point of origination in year  $t$ ;  $JR\_SHARE_{dt}$  is the ratio of the value of loans in JR states to the total value of all loans in deal  $d$  in year  $t$ ;  $X_{dt}$  is a vector containing the share of the deal by value that are owner occupied, for investment purposes, fixed rate mortgages, the mean LTV ratio in the deal, and the mean credit score;  $\varphi_t$  denote issue year fixed effects;  $\varepsilon_{dt}$  is the error term. Data are taken from Bloomberg. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*\*\* indicates statistical significance at the 1% level.

Dependent variable: $i_{dt}$	1	2
JR_SHARE	0.0797*** (6.60)	0.0808*** (7.01)
OWNER_OCCUPIED		0.1010*** (4.92)
INVESTMENT_PURPOSE		0.1126*** (9.46)
FIXED_RATE		0.1166*** (11.09)
LTV		0.0194*** (39.06)
FICO		-0.0062*** (-50.81)
Issue year FE	Yes	Yes
Observations	43,943	43,943
$R^2$	0.04	0.12

## F: Methodological Robustness Checks

Table A9: Higher Order Polynomial and Non-Parametric Regressions

Notes: This table presents parametric estimates of equation (1) with second, third, and fourth order polynomials and interactions as additional covariates. PAR and NPAR indicate equation (??) is estimated parametrically and nonparametrically, respectively. In Panel A (B) the sample contains GSE-eligible (non-GSE-eligible) loans. In columns 1 to 4 of Panel A the dependent variable is GSE\_SEC. In columns 5 to 8 of Panel A the dependent variable is IR, measured in percent (%). In columns 1 to 4 of Panel B the dependent variable is NSEC. In columns 5 to 8 of Panel B the dependent variable is IR. The sample includes loans within 10 miles of the threshold. The unreported control variables are ASSIGNMENT, JR\*ASSIGNMENT, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Dependent variable	1		2		3		4		5		6		7		8		
	Securitization		PAR		PAR		NPAR		NPAR		PAR		PAR		NPAR		
Panel A: GSE-eligible																	
JR	0.0218*** (2.83)	0.0239** (2.69)	0.0197** (2.22)	0.0175*** (5.78)	0.0225 (1.02)	0.0177 (1.28)	0.0131 (1.28)	0.0123 (1.08)									
ASSIGNMENT	0.0014 (0.82)	0.0016 (0.49)	0.0100** (2.18)		0.0010 (0.50)	0.0007 (0.15)	0.0010 (0.15)										
JR * ASSIGNMENT	-0.0055** (-2.58)	-0.0097** (-2.07)	-0.0140* (-1.70)		-0.0060** (-2.10)	0.0032 (0.49)	0.0172* (1.72)										
ASSIGNMENT <sup>2</sup>	-0.0000 (-0.15)	-0.0001 (-0.08)	-0.0043** (-2.18)		-0.0000 (-0.05)	0.0001 (0.06)	-0.0001 (-0.03)										
JR * ASSIGNMENT <sup>2</sup>	0.0004* (1.90)	0.0016 (1.32)	0.0037 (0.85)		0.0005* (1.80)	-0.0021 (-1.14)	-0.0091* (-1.93)										
ASSIGNMENT <sup>3</sup>		0.0001 (0.05)	0.0007** (2.36)			-0.0001 (-0.07)	0.0001 (0.05)										
JR * ASSIGNMENT <sup>3</sup>		-0.0001 (-1.03)	-0.0004 (-0.58)			0.0002 (1.41)	0.0013* (1.70)										
ASSIGNMENT <sup>4</sup>			-0.0001** (-2.47)				-0.0001 (-0.06)										
JR * ASSIGNMENT <sup>4</sup>			0.0001 (0.47)				-0.0001 (-1.41)										
Control variables	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549	327,549
R <sup>2</sup>	0.52	0.52	0.52	-	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	-



Table A9 Cont'd: Higher Order Polynomial Regressions

Dependent variable	1		2		3		4		5		6		7		8		
	Securitization		PAR		PAR		NPAR		NPAR		PAR		PAR		NPAR		
Panel B: Non-GSE eligible																	
JR	-0.0003 (-0.06)	0.0017 (0.29)	0.0032 (0.51)	0.0078 (1.08)	0.0690*** (3.53)	0.0598** (2.55)	0.0538** (2.25)	0.1597*** (2.65)									
ASSIGNMENT	-0.0052*** (-4.26)	-0.0055 (-1.10)	-0.0063 (-0.77)		-0.0015 (-0.33)	-0.0022 (-0.17)	-0.0069 (-0.35)										
JR * ASSIGNMENT	0.0044** (2.07)	0.0017 (0.26)	-0.0014 (-0.15)		-0.0028 (-0.45)	0.0145 (0.76)	0.0431 (1.43)										
ASSIGNMENT <sup>2</sup>	0.0005*** (3.04)	0.0006 (0.41)	0.0010 (0.28)		0.0001 (0.25)	0.0003 (0.09)	0.0027 (0.30)										
JR * ASSIGNMENT <sup>2</sup>	-0.0003 (-1.33)	0.0004 (0.24)	0.0020 (0.48)		0.0002 (0.25)	-0.0046 (-0.93)	-0.0189 (-1.37)										
ASSIGNMENT <sup>3</sup>		-0.0000 (-0.08)	-0.0001 (-0.14)				-0.0001 (-0.16)										
JR * ASSIGNMENT <sup>3</sup>		-0.0001 (-0.42)	-0.0003 (-0.46)				0.0003 (1.05)										
ASSIGNMENT <sup>4</sup>			0.0000 (0.13)				0.0000 (0.27)										
JR * ASSIGNMENT <sup>4</sup>			0.0000 (0.37)				-0.0001 (-1.03)										
Control variables	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181	135,181
R <sup>2</sup>	0.57	0.57	0.57	-	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	-

Table A10: Narrower Bandwidths

Notes: This table presents parametric estimates of equation (1). A bandwidth of 5 (2.5) miles indicates the sample includes loans within 5 (2.5) miles of the threshold. GSE (Non-GSE) indicates the sample includes GSE-eligible (non-GSE-eligible) loans. In columns 1 and 5 the dependent variable is GSE\_SEC. In columns 3 and 7 the dependent variable is NSEC. In all other columns the dependent variable is IR, measured in percent (%). Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Sample	Bandwidth															
	1		2		3		4		5		6		7		8	
	5 miles		5 miles		5 miles		5 miles		2.5 miles		2.5 miles		2.5 miles		2.5 miles	
Dependent variable	GSE				Non-GSE				GSE				Non-GSE			
	GSE_SEC	IR (%)	NSEC	IR (%)	GSE_SEC	IR (%)	NSEC	IR (%)	GSE_SEC	IR (%)	NSEC	IR (%)	GSE_SEC	IR (%)	NSEC	IR (%)
JR	0.0160** (2.30)	0.0191 (1.40)	-0.0030 (-0.60)	0.0484*** (3.49)	0.0139* (1.78)	0.0127 (1.56)	-0.0042 (-0.63)	0.0396** (2.10)								
ASSIGNMENT	0.0001 (0.17)	0.0015 (1.00)	-0.0041*** (-4.32)	-0.0006 (-0.25)	0.0012 (0.68)	-0.0006 (-0.24)	-0.0010 (-0.32)	0.0022 (0.31)								
JR * ASSIGNMENT	-0.0027* (-1.70)	-0.0050** (-2.15)	0.0052*** (3.32)	-0.0003 (-0.06)	-0.0071** (-2.64)	0.0062 (1.04)	-0.0004 (-0.10)	0.0183 (1.37)								
APPLICANT_INCOME	-0.0172** (-2.48)	-0.0589*** (-7.29)	0.0221*** (4.84)	-0.1390*** (-29.31)	-0.0181** (-2.70)	-0.0588*** (-9.79)	0.0215*** (4.22)	-0.1442*** (-22.18)								
LTV	-0.0009*** (-7.07)	0.0051*** (14.05)	-0.0006*** (-2.88)	0.0052*** (23.61)	-0.0008*** (-5.95)	0.0054*** (13.80)	-0.0005** (-2.52)	0.0052*** (16.91)								
LENDERS_PER_CAPITA	0.0004 (1.20)	-0.0006* (-1.74)	-0.0003 (-1.38)	-0.0016*** (-2.82)	0.0003 (0.70)	-0.0000 (-0.04)	-0.0003 (-0.82)	-0.0005 (-0.60)								
MINORITY	-0.0189*** (-7.23)	-0.0066 (-1.02)	-0.0265*** (-5.49)	0.0178** (2.55)	-0.0155*** (-4.29)	-0.0056 (-0.99)	-0.0232*** (-3.88)	0.0165* (1.72)								
MALE	0.0015 (0.75)	-0.0126*** (-4.87)	-0.0092*** (-3.50)	0.0214*** (3.33)	0.0006 (0.32)	-0.0117*** (-3.65)	-0.0071** (-2.23)	0.0149* (1.67)								
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								
Observations	199,672	199,672	80,259	80,259	105,261	105,261	105,261	44,877								
$R^2$	0.52	0.25	0.58	0.57	0.52	0.25	0.59	0.60								

## G: Private Sales of GSE-Eligible Loans

Table A11: Private Securitization of GSE-eligible Loans

Notes: Panel A presents parametric estimates of equation (1). In column 1 the dependent variable is SEC. In columns 2 and 3 the dependent variable is PRIVATE\_SEC. Panel B reports multinomial logit estimates of equation (??) using GSE-eligible loans. In column 1 the potential outcome is UNSOLD (the lender does not securitize the loan). In column 2 (3) the potential outcome is GSE\_SEC (PRIVATE\_SEC). Panel C provides estimates of equation (??) where the dependent variable is IR, measured in percent (%). The sample contains unsold loans, loans sold to a GSE, and loans sold to a private buyer in column 1, 2, and 3, respectively. The control variables are ASSIGNMENT, JR\*ASSIGNMENT, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3
Panel A: Private securitization of GSE-eligible loans			
Purchaser:	All	Private	Private
JR	0.0091* (1.81)	-0.0116** (-2.22)	-0.0100** (-2.01)
ASSIGNMENT	0.0004 (0.91)	-0.0009** (-2.06)	-0.0005 (-1.32)
JR * ASSIGNMENT	-0.0002 (-0.24)	0.0016** (2.39)	0.0011 (1.57)
APPLICANT_INCOME	-0.0179*** (-5.82)	-0.0013 (-0.34)	-0.0006 (-0.16)
LTV	0.0001 (1.10)	0.0012 (0.89)	0.0012 (0.70)
LENDERS_PER_CAPITA	0.0002 (1.38)	-0.0003 (-1.59)	-0.0004** (-2.10)
MINORITY	-0.0147*** (-7.53)	0.0065** (2.16)	0.0060* (1.89)
MALE	-0.0018 (-1.16)	-0.0019 (-1.34)	-0.0025* (-1.78)
RENEGOTIATION_RATE			0.0251 (0.45)
Region FE	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes
Observations	327,549	327,549	327,549
$R^2$	0.48	0.62	0.63
Panel B: Multinomial logit estimates			
Outcome:	Unsold	GSE	Private
JR	-0.0161 (-1.05)	0.0556** (4.39)	-0.0394** (-2.52)
Control variables	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes
Observations	327,549	327,549	327,549
$R^2$	0.13	0.13	0.13
Panel C: Interest rates (%)			
Sample:	Unsold	GSE	Private
JR	0.0095 (0.57)	0.0210 (1.65)	0.0142 (1.44)
Control variables	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes
Observations	97,186	142,533	90,291
$R^2$	0.51	0.26	0.20

## H: Probability of Mortgage Default

Table A12: Splitting sample by Probability of Default

Notes: This table presents parametric estimates of equation (1). GSE-eligible (Non-GSE-eligible) indicates the sample includes GSE-eligible (non-GSE-eligible) loans. In columns 1 and 2 the dependent variable is GSE\_SEC. In columns 3, 4, 7, and 8 the dependent variable is IR, measured in percent (%). In columns 5 and 6 the dependent variable is NSEC. Low (High) PD indicates the sample includes loans with a probability of default less than or equal to (above) the mean probability of default. The probability of default is estimated using the approach outlined by Agarwal et al. (2012). The control variables are ASSIGNMENT, JR\*ASSIGNMENT, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*\* and \*\*\* indicate statistical significance at the 5% and 1% levels, respectively.

Sample	1		2		3		4		5		6		7		8	
	GSE-eligible				Non-GSE-eligible				NSEC				IR (%)			
Dependent variable	Low PD	High PD	Low PD	High PD	Low PD	High PD	Low PD	High PD	Low PD	High PD	Low PD	High PD	Low PD	High PD	Low PD	High PD
Sample	0.0189***	0.0201**	0.0012	0.0314	-0.0097	-0.0041	0.0620***	0.0665***	(2.76)	(2.37)	(0.12)	(1.26)	(-1.41)	(-0.76)	(3.08)	(3.35)
LATE (%)	4.03	4.80	-	-	-	-	1.33	1.40								
Chow F-stat	4.90														15.65	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	178,113	149,436	178,113	149,436	32,387	102,794	32,387	102,794	32,387	102,794	32,387	102,794	32,387	102,794	32,387	102,794
$R^2$	0.52	0.53	0.24	0.28	0.63	0.57	0.63	0.57	0.63	0.57	0.53	0.57	0.53	0.57	0.53	0.57

# I: Supplementary Robustness Tests

Table A13: Legal Factors

Notes: This table presents parametric estimates of equation (1). In Panel A (B) the sample contains GSE-eligible (non-GSE-eligible) loans. The dependent variable in columns 1 to 4 of Panel A (B) is GSE\_SEC (NSEC). The dependent variable in columns 5 to 8 of both panels is IR, measured in percent (%). In columns 1 and 5 the sample excludes observations from Delaware and Pennsylvania. In columns 2 and 6 the sample excludes observations from Texas. In columns 3 and 7 the sample excludes observations from Louisiana. In columns 4 and 8 the sample excludes observations from Massachusetts. The sample includes all loans within 10 miles of the threshold. The control variables are the ASSIGNMENT variable, the JR\*ASSIGNMENT interaction variable, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*\* and \*\*\* indicate statistical significance at the 5% and 1% levels, respectively.

Dependent variable	1		2		3		4		5		6		7		8	
	DE & PA	TX	TX	LA	LA	MA	MA	DE & PA	DE & PA	TX	TX	TX	LA	LA	MA	MA
Panel A: GSE-eligible																
JR	0.0177***	0.0164**	0.0169**	0.0157**	0.0164	0.0152	0.0151	0.0189	0.0152	0.0152	0.0152	0.0152	0.0151	0.0151	0.0189	0.0189
	(2.82)	(2.55)	(2.61)	(2.35)	(1.59)	(1.43)	(1.41)	(1.60)	(1.43)	(1.43)	(1.43)	(1.43)	(1.41)	(1.41)	(1.60)	(1.60)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	309,645	314,876	314,197	316,001	309,645	314,876	314,197	316,001	309,645	314,876	314,197	316,001	314,197	314,197	316,001	316,001
$R^2$	0.52	0.52	0.52	0.52	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.24
Panel B: Non-GSE-eligible																
JR	-0.0070	-0.0064	-0.0083	-0.0100	0.0671***	0.0567***	0.0668***	0.0609***	0.0671***	0.0567***	0.0567***	0.0668***	0.0668***	0.0668***	0.0609***	0.0609***
	(-1.39)	(-1.25)	(-1.66)	(-1.20)	(3.68)	(3.12)	(3.57)	(3.18)	(3.68)	(3.12)	(3.12)	(3.57)	(3.57)	(3.57)	(3.18)	(3.18)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	131,822	131,865	131,866	133,125	131,822	131,865	131,866	133,125	131,822	131,865	131,865	131,866	131,866	131,866	133,125	133,125
$R^2$	0.57	0.57	0.58	0.57	0.54	0.53	0.53	0.54	0.54	0.53	0.53	0.53	0.53	0.53	0.54	0.54

Table A14: Additional Lending Industry Robustness Tests

Notes: This table presents parametric estimates of equation (1). In Panel A (B) the sample contains GSE-eligible (non-GSE-eligible) loans. In columns 1 to 6 of Panel A (B) the dependent variable is GSE\_SEC (NSEC). In columns 7 to 12 of both panels the dependent variable is IR, measured in percent (%). In columns 1 to 3 and 7 to 9 the sample contains observations of banks. In columns 4 and 10 the sample contains state chartered (SC) banks. In columns 5 and 11 the sample contains national chartered (NC) banks. In columns 6 and 12 the sample contains banks that securitize less than 50% of the loans they originate. The sample includes all loans within 10 miles of the threshold. The control variables are ASSIGNMENT, JR\*ASSIGNMENT, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. Standard errors are clustered at the state level and the corresponding *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	1	2	3	4	5	6	7	8	9	10	11	12
	Banks			Securitization			Banks			IR (%)		
Sample	Banks			SC Banks			NC Banks			Low OTD		
Panel A: GSE-eligible loans												
JR	0.0447** (2.41)	0.0449** (2.42)	0.0456** (2.41)	0.0131** (2.24)	0.0114** (2.47)	0.0119** (2.24)	0.0205 (1.09)	0.0212 (1.12)	0.0218 (1.19)	0.0061 (0.46)	0.0048 (0.30)	0.0108 (0.97)
BANK_SIZE	0.0595*** (22.47)	0.0594*** (21.84)	0.0529*** (11.97)				-0.0122*** (-2.85)	-0.0150*** (-3.82)	-0.0227*** (-4.47)			
NIL_RATIO	0.0110 (0.17)	0.0126 (0.18)	0.0132 (0.19)				-0.0402 (-1.10)	-0.0406 (-0.99)	-0.0407 (-0.93)			
ZSCORE	-0.0534 (-0.72)	-0.0545 (-0.74)	-0.0591 (-0.79)				-0.1151*** (-3.31)	-0.1170*** (-3.43)	-0.1217*** (-3.85)			
CAPITAL_RATIO	-0.0022 (-0.73)	-0.0021 (-0.71)	-0.0028 (-0.87)				0.0001 (0.05)	0.0056** (2.12)	0.0047* (1.91)			
COST_OF_DEPOSITS		-0.0139 (-0.45)	-0.0206 (-0.62)					-0.0098 (-1.19)	-0.0098 (-1.05)			
OUT_OF_STATE			0.0708* (1.82)						0.0855*** (3.31)			
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Observations	185,289	185,289	185,289	146,413	38,876	117,370	185,289	185,289	185,289	146,413	38,876	117,370
R <sup>2</sup>	0.16	0.16	0.17	0.44	0.56	0.45	0.07	0.09	0.10	0.24	0.33	0.27
Panel B: non-GSE-eligible loans												
JR	-0.0174 (-1.30)	-0.0219 (-1.16)	-0.0217 (-1.17)	-0.0030 (-0.44)	-0.0013 (-0.07)	-0.0040 (-0.88)	0.0421** (2.30)	0.0436** (2.43)	0.0456** (2.56)	0.0382** (2.31)	0.0798* (1.69)	0.0735*** (4.07)
BANK_SIZE	-0.0337*** (-12.34)	-0.0468*** (-11.18)	-0.0497*** (-11.39)				-0.0527*** (-32.18)	-0.0502*** (-32.36)	-0.0692*** (-37.85)			
NIL_RATIO	-0.0935*** (-2.73)	-0.0534** (-2.26)	-0.0564** (-2.34)				-0.1122*** (-5.68)	-0.2106*** (-11.29)	-0.2291*** (-12.23)			
ZSCORE	0.0155 (0.25)	0.0105 (0.18)	0.0130 (0.23)				-0.3393*** (-11.45)	-0.3056** (-10.60)	-0.2977*** (-10.43)			
CAPITAL_RATIO	0.0140*** (3.62)	0.0079** (2.08)	0.0078* (2.02)				-0.0078*** (-4.70)	-0.0079*** (-4.59)	-0.0103*** (-6.03)			
COST_OF_DEPOSITS		0.0157 (0.64)	0.0119 (0.48)				0.0800*** (6.28)	0.0800*** (6.28)	0.0593*** (4.72)			
OUT_OF_STATE			0.0351* (1.69)						0.2163*** (21.01)			
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Observations	86,037	86,037	86,037	74,575	11,462	62,468	886,037	86,037	86,037	74,575	11,462	62,468
R <sup>2</sup>	0.16	0.22	0.22	0.48	0.49	0.23	0.20	0.23	0.24	0.51	0.54	0.54

Table A15: Miscellaneous Sensitivity Checks

Notes: This table reports parametric estimates of equation (1). In Panel A the sample contains GSE-eligible loans and the dependent variable is GSE\_SEC. In Panel B the sample contains GSE-eligible loans and the dependent variable is IR, measured in percent (%). In Panel C the sample contains non-GSE-eligible loans and the dependent variable is NSEC. In Panel D the sample contains non-GSE-eligible loans and the dependent variable is IR. The control variables are ASSIGNMENT, JR\*ASSIGNMENT, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. Standard errors are clustered at the state level and the corresponding  $t$ -statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6	7
Panel A: GSE-eligible securitization							
JR	0.0200*** (3.23)	0.0201*** (3.34)	0.0162** (2.50)	0.0202*** (3.24)	0.0201*** (3.68)	0.0200*** (3.26)	0.0192*** (3.01)
AUTO_DELINQUENCY_RATE	-0.0019 (-0.46)						
CREDIT_CARD_DELINQUENCY_RATE		0.0073 (0.82)					
RENEGOTIATION_RATE			-0.0579 (-0.69)				
REFINANCING_RATE				0.0129 (1.13)			
ADJUSTABLE_RATE_LOAN					-0.3781*** (-14.54)		
STATE_CORPORATE_TAX						-0.0024 (-0.75)	
STATE_PERSONAL_TAX							0.0061*** (3.41)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	327,549	327,549	327,549	327,549	327,549	327,549	327,549
$R^2$	0.51	0.51	0.51	0.51	0.54	0.51	0.51

Table A15 Cont'd: Miscellaneous Sensitivity Checks

	1	2	3	4	5	6	7
Panel B: GSE-eligible interest rates (%)							
JR	0.0159 (1.39)	0.0151 (1.60)	0.0163 (1.37)	0.0158 (1.39)	0.0158 (1.41)	0.0319 (1.12)	0.0140 (1.27)
AUTO_DELINQUENCY_RATE	-0.0003 (-0.08)						
CREDIT_CARD_DELINQUENCY_RATE		0.0279*** (3.70)					
RENEGOTIATION_RATE			0.0069 (0.08)				
REFINANCING_RATE				0.0392** (2.02)			
ADJUSTABLE_RATE_LOAN					-0.2512*** (-6.33)		
STATE_CORPORATE_TAX						0.0127** (2.52)	
STATE_PERSONAL_TAX							0.0033 (1.53)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	327,549	327,549	327,549	327,549	327,549	327,549	327,549
R <sup>2</sup>	0.23	0.23	0.23	0.23	0.24	0.23	0.23



Table A15 Cont'd: Miscellaneous Sensitivity Checks

	1	2	3	4	5	6	7
Panel C: Non-GSE-eligible securitization							
JR	-0.0069 (-1.34)	-0.0070 (-1.46)	-0.0097** (-2.24)	-0.0067 (-1.34)	-0.0069 (-1.32)	-0.0123 (-1.01)	-0.0062 (-1.28)
AUTO_DELINQUENCY_RATE	-0.0005 (-0.24)						
CREDIT_CARD_DELINQUENCY_RATE		0.0008 (0.17)					
RENEGOTIATION_RATE			-0.0387 (-0.90)				
REFINANCING_RATE				-0.0100 (-1.22)			
ADJUSTABLE_RATE_LOAN					-0.0968*** (-6.43)		
STATE_CORPORATE_TAX						-0.0012 (-0.52)	
STATE_PERSONAL_TAX							-0.0006 (-0.42)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135,181	135,181	135,181	135,181	135,181	135,181	135,181
R <sup>2</sup>	0.57	0.57	0.57	0.57	0.58	0.57	0.57

Table A15 Cont'd: Miscellaneous Sensitivity Checks

	1	2	3	4	5	6	7
Panel D: Non-GSE-eligible interest rates (%)							
JR	0.0611*** (2.77)	0.0542*** (2.76)	0.0542** (2.34)	0.0624*** (2.82)	0.0623*** (3.00)	0.0591** (2.10)	0.0491** (2.51)
AUTO_DELINQUENCY_RATE	-0.0054 (-0.79)						
CREDIT_CARD_DELINQUENCY_RATE		0.0380** (2.08)					
RENEGOTIATION_RATE			0.0126 (0.07)				
REFINANCING_RATE				0.0421 (1.33)			
ADJUSTABLE_RATE_LOAN					-0.3074*** (-10.63)		
STATE_CORPORATE_TAX						0.0027 (0.26)	
STATE_PERSONAL_TAX							0.0121** (2.54)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135,181	135,181	135,181	135,181	135,181	135,181	135,181
R <sup>2</sup>	0.53	0.53	0.53	0.53	0.54	0.51	0.53

Table A16: Estimates by Population and Region

Notes: This table presents estimates of equation (1). GSE (Non-GSE) indicates the sample includes GSE-eligible (non-GSE-eligible) loans. In column 1 the dependent variable is GSE\_SEC. In columns 2 and 4, the dependent variable is IR, measured in percent (%). In column 3 the dependent variable is NSEC. The sample includes loans within 10 miles of the threshold. Panel A includes observations from regions with above the mean population. Panel B includes observations from regions with below the mean population. In Panel C the sample includes observations from CT, MA, ME, NH, NY, RI, and VT. In Panel D the sample includes observations from IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, and WI. In Panel E the sample includes observations from AZ, CO, and NM. In Panel F the sample includes observations from AR, KY, LA, MS, OK, TN, TX, VA, and WV. In Panel G the sample includes observations from regions that border the accepted regions in the US (for example, between Northeastern and Southern states) AL, AR, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, and WV. The control variables are ASSIGNMENT, JR\*ASSIGNMENT, APPLICANT\_INCOME, LTV, LENDERS\_PER\_CAPITA, MINORITY, and MALE. Standard errors are clustered at the state level and the corresponding *t*-statistics are reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Sample	1	2	3	4
	GSE		Non-GSE	
Dependent variable	GSE_SEC	IR (%)	NSEC	IR (%)
Panel A: Most populous border regions				
JR	0.0174** (2.18)	0.0145 (1.18)	-0.0051 (-0.89)	0.0461** (2.21)
Control variables, Region FE, Year FE	Yes	Yes	Yes	Yes
Observations	127,836	127,836	50,303	50,303
$R^2$	0.52	0.25	0.58	0.56
Panel B: Least populous borders regions				
JR	0.0231*** (3.66)	0.0239 (1.25)	-0.0121 (-0.98)	0.0790*** (3.82)
Control variables, Region FE, Year FE	Yes	Yes	Yes	Yes
Observations	199,713	199,713	84,878	55,203
$R^2$	0.51	0.24	0.58	0.55
Panel C: Northeast				
JR	0.0308** (2.89)	0.0177 (1.11)	0.0125 (0.47)	0.1423*** (4.51)
Control variables, Region FE, Year FE	Yes	Yes	Yes	Yes
Observations	31,582	31,582	12,091	12,091
$R^2$	0.49	0.27	0.54	0.48
Panel D: Midwest				
JR	0.0198* (1.84)	-0.0032 (-0.20)	-0.0033 (-0.49)	0.0159* (1.79)
Control variables, Region FE, Year FE	Yes	Yes	Yes	Yes
Observations	127,187	127,187	43,878	43,878
$R^2$	0.51	0.20	0.58	0.48
Panel E: West				
JR	0.1229 (0.98)	0.2792 (1.46)	-0.0079 (-0.05)	0.4032 (0.98)
Control variables, Region FE, Year FE	Yes	Yes	Yes	Yes
Observations	458	458	309	309
$R^2$	0.77	0.54	0.69	0.93

Table A16 Cont'd: Estimates by Population and Region

Sample	1	2	3	4
	GSE		Non-GSE	
Dependent variable	GSE_SEC	IR (%)	NSEC	IR (%)
Panel F: South				
JR	0.0186** (2.12)	-0.0023 (-0.15)	-0.0318** (-2.01)	0.2360*** (4.96)
Control variables, Region FE, Year FE	Yes	Yes	Yes	Yes
Observations	58,904	58,904	28,202	28,202
$R^2$	0.53	0.27	0.59	0.66
Panel G: Borders between regions				
JR	0.0179** (2.18)	0.0306 (1.28)	-0.0106 (-0.90)	0.0767*** (3.28)
Control variables, Region FE, Year FE	Yes	Yes	Yes	Yes
Observations	156,864	156,864	74,076	74,076
$R^2$	0.52	0.26	0.58	0.59

## Online Appendix References

Fox, J. (2015) 'The Future of Foreclosure Law in the Wake of the Great Housing Crisis of 2007-2014', *Washburn Law Journal*, 54: 489-526.