State Deficiency Laws, Borrower Price Protection, and Auction Sale Outcomes

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December 24, 2022

Abstract

The auction sale price plays a critical role in deficiency judgment, which is an important means to balance lender right and borrower protection. Empirical research on auction sales, however, has been rare. This study investigates the impact of state deficiency laws on auction sale prices. Using a cross-border discontinuity design and contrasting an auction sale price to its own benchmark valuation, we document that foreclosed properties are sold on average at a 10% higher auction price (relative to its benchmark valuation) in recourse states than non-recourse states. More importantly, the effect exists only when deficiency judgments are likely to be pursued by lenders. The results indicate that the fair valuation rule regulating deficiency judgments, despite its vagueness, helps motivate lenders to avoid very low valuations of auctioned properties. The finding has implications on borrower protection, recovery of distressed housing markets, foreclosure law reform, and the perceived housing market conditions.

1 Introduction

Foreclosure implementations balance the rights of lenders and borrowers through various means. One important mechanism is the deficiency judgment, which arises when proceeds from foreclosure sales fall short of borrowers' mortgage obligations.[1] A deficiency judgment is a personal debt and determined as the difference between borrower's outstanding debt obligations and the valuation of the foreclosed property. Deficiency laws governing deficiency judgments have impact on not only defaulted borrowers but also non-defaulted borrowers through mortgage credit supply (Kahn and Yavas, 1994; Dagher and Sun, 2016).

A number of studies (e.g., Pence (2006); Ghent and Kudlyak (2011); Zhu and Pace (2021); Dagher and Sun (2016); Kahn and Yavas (1994)) have investigated the impact of foreclosure laws on various issues such as borrower defaults, foreclosure starts, mortgage terminations, and credit supply, etc. However, not much attention has been given to how foreclosure practices affect the auction sale price or the price at which the property ownership was transferred away from borrowers.[2] The auction sale price, if not contested by a court or borrower, is used to determine deficiency judgment. Statistics on housing markets including these foreclosure prices may also affect the perception of the housing market, especially in periods of distress. Whether state deficiency laws have any influence on auction sale price remains an unexplored question.

This paper examines the potential impact of state deficiency laws on the auction sale price. Consider a situation where there is no third-party bidder,[3] so that a lender's

[1] Other mechanisms include judicial procedures, statutory right of redemption, short-term financing at auction sales (a deposit or immediate payment), minimum bid rules, etc.

[2] Foreclosed properties are sold through auction. At a foreclosure auction, either the lender or any third-parties can bid for a property. The auction sale price could be either the cash purchase price of the auctioned property if a third-party wins the auction or the REO acquisition price if a lender takes back the property. Throughout the paper, we use auction sale price, successful bid, and property transfer price interchangeably. The bidder with the highest bid wins the auction and takes ownership of the property from the borrower.

[3] Historically, it is relatively rare to have third-party acquisitions of foreclosed properties at auctions.

reservation price (which is the starting bid) becomes the auction sale price. At first glance, to maximize deficiency judgments which are allowed in recourse states, lenders are motivated to obtain a property at a lower value. As lenders in non-recourse states where no deficiency judgment is allowed do not have this incentive, it would seem that the auction prices in recourse states should be lower than in non-recourse states, all else equal. However, low values of an auctioned property increase the chance of legal challenges from borrowers/courts seeking fair valuation of the foreclosed property as recourse states typically refers to the fair market valuation in determining deficiency judgments. A borrower or a court challenging whether a low auction price meets the standard of a "fair market value" will incur additional costs to lenders such as legal fees, appraisal costs, and uncertainty of property valuation in determining the deficiency judgment (as the court will set the judgment amount) (Burkhart, 2017). Lenders also bear additional costs and uncertainty associated with longer property holding times during the legal process. In addition, deficiency judgments might incentivize borrowers to avoid purposely damaging the property (Fraley, 2019), which could leads to a higher valuation (thus a lower deficiency judgment). These concerns may motivate lenders to avoid very low valuations to reduce potential borrower/court challenges. In practice, however, the meaning of fair valuation is often vague and hard to quantify, and there is often lack of meaningful guidance (Institute, 2017). This could weaken lenders' incentive to avoid the potential legal issues. Given the potential offsetting influences, the impact of deficiency laws on auction sale prices and the direction of the potential effect remain empirical questions.

To investigate the above questions, ideally, we need (1) an otherwise homogeneous setting with distinct changes in state foreclosure laws for identification, and (2) a valuation of the auctioned property at the auction date to help control for housing quality and compare to the auction sale price. Empirically, we conduct a quasi experiment by identifying 27 cross-border MSAs and exploring the discontinuity in foreclosure laws across state borders. We limit the sample to be within those cross-border MSAs

as social/economic and housing market conditions are similar and smooth throughout the same MSA. The cross-border discontinuity design has often been used in the empirical literature studying the effect of state foreclosure laws.

To estimate the a benchmark valuation of the auctioned property at the auction date as a control of housing quality, we follow the literature and use the repeat sales approach (Agarwal et al., 2015). We first obtain the market valuation of the same property at loan origination, then adjust the property valuation from origination to the auction date by using zip code-level house price index (HPI). We then form a valuation ratio, auction sale price divided by the HPI-adjusted original property valuation, and use it to investigate whether the auction sale price (relative to its own benchmark valuation) is different in recourse versus non-recourse states. Since an individual property's appreciation might deviate from what the local HPI indicates due to maintenance, we partially control for this with detailed individual mortgage-level information and local macro-level variables in the analyses.

Our overall sample includes $12,596$ auctions ranging from year 2006 to 2016 in the 27 cross-border MSAs. Comparing the ratio of a property's auction sale price to its own market valuation between recourse states and non-recourse states, the results show that, within the same MSA, same loan origination quarter and the same auction sale quarter, recourse states have about 10% higher auction sale price (relative to its market value) than non-recourse states. The effect is significant both statistically and economically. Moreover, the effect exists only for auction sales where lenders are likely to pursue deficiency judgments. In absence of potential deficiency (thus no deficiency judgment), there is no significant difference in auction sale price between recourse states and non-recourse states. This indicates that fair value limitation on deficiency judgments in recourse states helps avoid very low auction prices.[4] The results sustain various robustness checks such as using HPI-adjusted REO sale price as an alternative measure of fair market valuation for a subset of sample.

[4]It is important to point out that the results do not imply that the auction prices for underwater properties in recourse states equal the fair market valuations.

The finding that recourse states have higher auction sale prices than non-recourse states has important implications for borrower price protection, distressed housing market recovery, and foreclosure law reform, etc. It shows that the fair valuation limit on deficiency judgments and the likely close scrutiny of foreclosed property valuation by borrowers/courts in recourse states reduces extremely low auction prices, and thus reduces borrower deficiency judgments. The higher auction price might also affect mortgage insurance payouts from mortgage insurers. The higher auction price due to lenders' deficiency judgment considerations, however, could reduce the number of third-party bidders participating in the auction and the chance of a third-party purchase of the auctioned property in recourse states versus non-recourse states. The resulting excess inventory of REO properties could pose negative impact to lenders' balance sheets because of the associated carrying and liquidation costs of the REO properties (Chinloy et al., 2017), and slow down neighborhood housing market recovery, especially in distressed markets. As for foreclosure law reform, if states allowing deficiency judgments can avoid low auction prices through means such as fair valuation rules, this raises the question whether the post-foreclosure redemption (usually unpopular with lenders), is redundant in those situations.[5]

This paper is organized as follows: Section 2 discusses the potential effect of state deficiency laws on auction sale price, Section 3 describes data and sample, Section 4 presents the empirical evidence, and Section 5 summarizes the key findings.

2 State Deficiency Laws, Deficiency Judgments, and Auction Sale Price

Foreclosed properties are sold through auction sales. If an auction sale price falls short of the outstanding mortgage debt (plus interests and fees), a lender may pursue

[5]Historically, the post-foreclosure right of redemption was established to encourage fair bidding price in auctions.

deficiency judgments. Deficiency judgment is a personal debt and generally determined as the difference between the outstanding debt obligations and the valuation of the property. Deficiency judgments are valuable assets to lenders, especially when borrowers default strategically or have other assets. For foreclosed borrowers with few assets, the deficiency judgment typically has little immediate value at the time that it is first created. However, since deficiency judgments can have a term of 20 years or more, these initially deep-out-of-money options still have value.[6]

The foreclosure law governing the creation of deficiency judgments is the recourse/non-recourse statute. In a recourse state, a lender could pursue the borrower's other assets or incomes such as wages, bank accounts, and other real or personal properties to recover the deficiency. In a non-recourse state, a lender can only obtain the property via foreclosure, even if the sale proceeds are not enough to repay the loan. Historically, the amount of deficiency judgment was determined as the difference between the outstanding debt and the auction sale price. A lower auction price can thus lead to a higher deficiency judgment as was the case before the Great Depression (Osborne et al., 1979). This can lead to double recovery for lenders when they acquire the foreclosed property at nominal price, pursue the borrower for the deficiency judgment and resell the property later at a profit, and can thus result in large borrower losses (Institute, 2017). In the wake of the Great Depression and in an effort to regulate this abusing lending practice, states enacted Fair Valuation legislation to protect borrowers, by limiting deficiency judgments calculation using the standard of fair market value (e.g., Weinberger (2015); Washburn (1979)). In practice, however, the meaning of fair valuation is often vague and hard to quantify, and there is often lack of meaningful guidance (Institute, 2017).

Though lender and third-party bidders could both play a role in the auction outcome, in reality, the lender plays a more critical role in determining the auction outcome since (1) the lender sets the starting bid (which is lender's reservation price)

[6]See, for example, Kimbriell (2013).

and (2) the lender is often the only bidder in a foreclosure auction.[7] Lenders also have information advantage of the property during the mortgage underwriting and financing advantage at auction through credit bid.[8] Even if a property is sold to a third party, lender has an impact on the auction outcome by placing the starting bid. A high auction price could either be that a lender places a high bid and wins the auction, or the lender's high bid increases the bidding price of a third party who wins the auction. The consideration of deficiency judgment may impact lender's reservation price (starting bid) but should not have a direct impact on a third-party's bid, other than through the effect of the lender's bid. Often times, the lender is the only bidder in an auction and the lender's bid becomes the auction sale price.

The state deficiency laws may have an impact on auction sale price only when lenders intend to pursue deficiency judgments. When placing a bid, lenders consider to maximize the utility from pursuing deficiency judgments. At first glance, to maximize deficiency judgments, lenders may be motivated to bid at a lower price than in a situation with no deficiency judgments. However, borrowers/courts in these recourse states have the right to contest the fairness of the property valuation. If borrowers contest the auction sales price, lenders bear the burden to establish that the sale price represents the fair market valuation at the auction date by means such as appraisals or comparable listings. Often times, there are discrepancies between lenders' and borrowers' appraisals or other valuations. The court ultimately determines the fair market value and the corresponding deficiency judgment. In case of borrower objections, the legal procedure will incur additional costs to lenders such as legal fees and appraisal costs. There are also additional costs and uncertainty associated with longer property holding times. The lower the auction price, the higher the chance of a borrower's objection and of a modification in the deficiency judgment by the court. To lower the chance of a borrower objection and court inquiry for justification

[7] In the empirical setting, we control local-level macro variables that could have an impact on the number of bidders and competitiveness of the auction.

[8] Third-party purchasers need to pay cash for the purchase instead.

of auction fairness, lenders might be motivated to raise their bids.[9] In addition, there is a possibility that deficiency judgments might incentivize borrowers to avoid purposely damaging the property, which could lead to a higher valuation (thus a lower deficiency judgment). Though auctioned properties are not subject to inspection, lenders might factor this into consideration when placing their bid.[10] The vagueness and difficulty in determining the fair market valuation and the lack of guidance in the fair valuation legislation, however, can weaken lenders' incentive to raise the reservation price. Overall, whether deficiency laws result in higher auction prices in recourse versus non-recourse states remains an empirical question. The effect, if exists, should center on those situations where deficiency judgments are plausible. If there is no deficiency from a foreclosure, there should be no difference in the auction sale price between a recourse state versus a similar sale in a non-recourse state.

Another foreclosure law, statutory right of redemption might also have an impact on auction sale price. A statutory right of redemption grants borrowers certain time to repurchase the property *after* foreclosure auction at either the auction sale price or the outstanding debt, depending on different jurisdictions. The intention of redemption rights is to encourage those who bid at the sale to bid at a fair price, because a bid below market value is more likely to result in redemption. However, redemption rights might lead to a lower, rather than a higher bidding price for a foreclosed property for some reasons (Nelson and Whitman, 2003). First, since a purchaser must wait for the statutory redemption time to expire before officially owning the property, the purchaser bears additional risks during the redemption time, such as property deterioration, market fluctuation, and potential borrower redemption. The higher risk associated with redemption rights reduces the valuation of the property and likely the price that a purchaser is willing to pay at an auction. Second, the higher risk/uncertainty associated with redemption rights might reduce the number

[9] A lender faces an optimization problem by factoring in the expected utilities from deficiency judgments, and the expected costs from borrower contest such as legal and holding costs, and the resulting uncertainty in deficiency judgment.

[10] The magnitude of effect may be rather small though.

of third party bidders participating in the auction. A lack of bidders might lead to a lower auction sale price. Third, borrowers in foreclosure are typically financially constrained and their ability to raise enough cash to redeem the property is limited. If a bidder views the probability of redeeming a property unlikely, her motivation to increase the bidding price to deter redemption will be weakened. Those opposing impacts make the actual effects of redemption rights on foreclosure auction price an empirical question.

3 Data, Sample and Summary Statistics

3.1 Data and Sample

The main data source of this study comes from Black Knight Financial Services, Inc (BKFS). BKFS provides us the McDash Core Data and the McDash Resolution Module. We also utilize the county-level income and unemployment rate data from the Bureau of Labor Statistics. The zipcode-level house price index (HPI) comes from the Federal Housing Finance Agency (FHFA).

The McDash Core data contains information on US residential mortgages that is collected from mortgage servicers.[11] This data set has detailed mortgage/borrower information at origination, such as borrowers' credit scores, loan-to-value ratios and documentation status, etc. It also reports subsequent loan performances such as defaults and payments. The Resolution Module was created by BKFS utilizing its proprietary methodologies matching McDash Core data with the nationwide county-level Recorder's data (also called real estate deed data). The Resolution Module includes the resolution information of foreclosed properties such as foreclosure auction dates and auction outcomes, etc.

Our sample includes foreclosure auctions from year 2006 to 2016. The McDash

[11] McDash Core data was previously called LPS data. This data set has been widely used in the literature such as Piskorski et al. (2015).

Resolution Module starts from year 2006. Our data of the McDash Resolution Module ends in year 2016. The McDash Module contains foreclosure auctions that involve a transfer of property ownership.[12] We require the foreclosure auctions to have valid transaction prices (property transfer prices) and valid auction dates recorded in the Resolution Module. The transaction price represents the property sale price at the auction if a third party purchaser acquires the property, or the REO acquisition price if a lender takes back the property from the borrower.

Our analyses need to control for loan and borrower characteristics, so we match the McDash Core data with the Resolution Module, using a common identifier from both data sets, to obtain the first lien mortgage information associated with the foreclosure auctions. We restrict loan origination year from 2005, since McDash data has few coverage before year 2005 and key credit risk characteristics such as documentation status and debt-to-income ratio were not available until year 2005. We require the mortgages to be held on banks' own books (also called portfolio loans) at the time of foreclosure auction. The focus of portfolio loans helps eliminate any potential complications from servicing treatments due to securization status on auction outcomes, and thus obtain a cleaner setting to investigate the effect of state foreclosure laws on auction outcomes.

Real estate markets follow strong spatial patterns and are localized markets (LeSage and Pace, 2009). To reduce heterogeneity to better identify the effect of state deficiency laws on foreclosure auction outcomes, we identify cross-border MSAs and limit the sample to be within those cross-border MSAs. The housing markets are similar and the economic/social ties are close throughout the same MSAs. The discontinuity of deficiency laws across state borders thus provides an opportunity to better identify its effects on auction outcomes. MSAs are required to have more than 30 observations to be included in the analyses. Table 2 reports the number of observations by MSA in the sample.

[12]If an auction fails to result in a transfer of property ownership, the outcome of the auction is not recorded in a real estate deed and not observable in the data.

3.2 Variables and Summary Statistics

This paper studies whether state deficiency laws have an impact on auction sale price. Auction sale price is defined as the property sale price if a third-party purchaser acquired the property at an auction, or the REO acquisition price if a lender repossessed the foreclosed property from the borrower at an auction. The auction sale price, if not contested by court or borrower because of deviation from fair market price, will be used to determine potential deficiency judgments in either case, which equals the difference between outstanding loan balance plus fees and interests and the auction sale price.

To investigate whether deficiency laws have an impact on auction outcome, the auction sale price (PriceA) needs to be compared with the fair market valuation at the same auction date for the same property. The valuation of a property at loan origination represents the property's market valuation at that time. We adjust the original valuation using zipcode-level house price index (HPI) to capture the local housing market changes from origination to auction sale, and utilize the HPI-updated valuation of the same property (PriceO) as a proxy for its market valuation at auction time. The dependent variable is created as a valuation ratio, PriceA/PriceO, auction sale price divided by the zipcode-level HPI-updated valuation of the same property at loan origination. Given everything else remains the same, the higher the valuation ratio, the higher the auction price, relative to its fair market valuation. This approach uses repeat sales valuation method (e.g., Agarwal et al. (2015); Diop et al. (2022)). Section 4.1 discusses our estimation methodologies in detail.

The key explanatory variable of interest is recourse (Recourse). We follow Ghent and Kudlyak (2011) to classify whether a state is a recourse or non-recourse state. If deficiency judgment is either not allowed or highly unlikely to obtain, a state is classified as a non-recourse state and the recourse variable equals 0. Otherwise, a state is classified as a recourse state and the recourse variable equals 1. Recourse states also have limitation on deficiency judgment through the fair valuation rules

which limit deficiency judgment to the difference between debt and the fair valuation of the property.

The statutory right of redemption refers to the *post* foreclosure right of redemption. Our classification of redemption right follows the categorization as in Zhu and Pace (2021) and is similar to Pence (2006). Redemption variable equals 1 if borrowers are likely to have access to the redemption right and the redemption price is based on the auction sale price. This represents a strong redemption right as defined by Zhu and Pace (2021). Otherwise, the redemption variable equals 0. Other than state deficiency laws, we control whether a foreclosure is required to file a lawsuit in court (judicial foreclosure) or not (nonjudicial foreclosure). Following the literature such as Dagher and Sun (2016) and Mian et al. (2015), we use the RealtyTrac classifications to define state judicial status (Judicial). The judicial variable equals one if a state allows only judicial foreclosures where courts always get involved in the foreclosure process. Otherwise, the judicial variable equals zero. Table 1 summarizes state foreclosure laws.

Zipcode-level HPI captures the overall local housing market price movements. Individual properties, however, might appreciate or depreciate at different rates due to different property maintenance. To have a finer control of individual property's potential deviation in appreciation from the overall local housing market, we include explanatory variables that might contribute to the varying property conditions or valuations at the auction time: number of months in foreclosure (MonthInForeclosure) and current loan-to-value ratio (CurrentLTV) at auction. Borrowers in foreclosure are most likely experiencing financial distress and have low motivation or ability to perform property maintenance. Thus, longer time in foreclosure may lead to deteriorating property conditions and lower valuations. Similarly, borrowers with higher current loan-to-value ratio are likely to be severely financially distressed and their motivations of performing property maintenance tend to be even lower. So, higher current LTV may be associated with worse property conditions at auction. In addition, we

include a rich set of mortgage risk characteristics in the analyses as those might be associated borrowers' financial constraints and have an impact on their investments in the property. Loan characteristics included are: borrower's credit score (FICO), full documentation status (FullDoc), fixed rate mortgage dummy (FRM), debt-to-income ratio (DTI), missing DTI dummy(DTIMissing), junior lien dummy (JuniorLien), term refinance dummy (TermRefi), cash out refinance dummy (CashOutRefi), loan age at auction (LoanAgeAuction), and original loan term (LoanTerm). When auction sale proceeds is not sufficient to payoff the outstanding debt (plus interests and fees), lenders may file a claim with the private mortgage insurance company to request payment to cover certain losses from the foreclosed mortgage. Since auction sale could have affect PMI payout, private insurance companies may have an impact on the foreclosure auction. Taking this into consideration, we include private mortgage insurance dummy (PMI) as a control variable in our analyses.

Housing market and other macro economic conditions may affect auction outcomes. To control local economic and housing conditions, we include MSA*Closing Quarter fixed effects and MSA*Auction Quarter fixed effects in our analyses. This enables us to make inference within the same MSA, the same closing quarter and the same auction sale quarter, regarding the impact of deficiency laws on auction sale. In addition, we include county-level median household income (IncomeC) and unemployment rate (UnemploymentC), and zipcode-level default rate (DefaultRate) and the previous year house price change (HPIChange) in the analyses. These variables help to better control economic and housing conditions at finer geographical levels.[13]

Table 2 reports the number of foreclosure auctions by MSA in the sample. Tabel 3 presents the number of foreclosure auctions per year. Most auctions happened from year 2009 to 2014. Table 4 shows the summary statistics of variables. The average valuation ratio, PriceA/PriceO (auction sale price divided by HPI-adjusted valuation

[13]Other financial institutional details such as servicer/lender might have an impact on the auction outcomes. However, we acknowledge that we do not have access to such information as McDash does not have any financial institution details.

at origination), is 0.79. The lower valuation of the foreclosed properties may come from both the less than ideal sale condition in the foreclosure auction and possible depreciation of foreclosed properties from origination to auction time.[14] About 50% mortgages locate in recourse states and 50% mortgages locate in non-recourse states. About 18% mortgage borrowers locate in states with strong redemption right. The remaining 82% mortgage borrowers have no or weak access to redemption right. Next section discusses empirical results.

4 Empirical Studies

This section discusses the estimation strategies first and then presents the empirical results.

4.1 Estimation Methodologies

To estimate the impact of deficiency laws on auction sale price, we explore the discontinuity in foreclosure laws across state borders and within the same cross-boarder MSAs. As social/economic and housing market conditions are similar and smooth throughout an MSA, a discontinuous change in deficiency laws across state boundary helps identify its effects. The cross-border discontinuity design has been used in the empirical literature studying the effect of state foreclosure laws (e.g., Dagher and Sun (2016); Zhu and Pace (2021); Mian et al. (2015); Pence (2006)).

Auction sale price is affected by property quality. To control for property quality, we construct a valuation ratio, the auction sale price of a foreclosed property divided by its own previous valuation at loan origination (HPI-adjusted), and use the ratio to gauge whether the auction sale price deviates from the fair valuation. The assumption is that the valuation at loan origination reflects the market valuation of the property

[14] Previous literature has documented some significant such foreclosure discounts (Campbell et al., 2011).

at that time. Adjusting the valuation from origination to auction time, using zipcode-level HPIs, yields a proxy for property fair valuation at auction.[15] This repeat sales approach has been used in the literature to study valuation issues such as appraisal bias. For example, Agarwal et al. (2015) compare the appraisals of refinance loans to the previous transaction price of the same property to measure appraisal bias.

Individual properties might appreciate at different rates than the overall local market as indicated by the zipcode-level HPI. Adjusting the previous valuation using local HPI might not fully reflect property market valuation at auction. Though as long as the deviation in appreciation from local HPI is not correlate with state deficiency laws, the estimation of the impact from deficiency laws should not biased. This, however, may introduce additional noise in the estimation. To reduce the estimation noise, we include months in foreclosure, current LTV, and other loan risk characteristics to capture some potential contributing factors that might lead to different investments in maintenance and result in varying property conditions at auction time. We also include MSA*OrigQuarter fixed effects and MSA*AuctQuarter fixed effects, as well as other macro-level variables at finer geographical level in the model to control for potential impact from macro economic conditions on auction outcomes. The inference drawn from within the same MSA, same origination quarter and same auction quarter helps further control macro economic related omitted variables.

In sum, our approach of estimating the effect of deficiency laws on auction sales is to compare the auction price to its own HPI-adjusted previous valuation, and contrast the difference of the auction price to its own previous valuation across state borders with discontinuous deficiency laws and within the same MSAs. This resembles a cross-sectional difference-in-difference design.

[15] Contrasting auction sale price with the market valuation of the same property helps minimize the impact from omitted property characteristics.

4.2 Empirical Results - Deficiency Laws and Auction Sale Price

This section empirically investigates whether state deficiency laws have an impact on auction sale price.

4.2.1 Overall Results

We report the whole sample results of OLS regression in Table 5 Model 1. The dependent variable is a valuation ratio, PriceA/PriceO, the auction sale price divided by the HPI-adjusted origination valuation of the same property. Detailed loan-level controls and macro-level variables as discussed in Section 3.2 are included as explanatory variables. We also include MSA*Auction Quarter and MSA*Closing Quarter fixed effects in order to make inference within the same MSA, the same origination quarter and the same auction quarter. The fixed effects help to minimize concerns regarding omitted variables at local level. Foe example, number of auction participants could have an impact on auction outcomes. While the number of auction participants could vary dramatically across MSA and time, the variation in the auction market should be relatively small within the same MSA, at the same quarter of auction and for mortgages originated in the same quarter. We report the coefficient estimates with standard errors in parentheses. Standard errors are clustered at MSA level.

The explanatory variables of interest are state deficiency laws: recourse and redemption. A state falls in one of the four categories regarding deficiency laws: recourse with redemption, recourse with no redemption, non-recourse with redemption, and non-recourse with no redemption. Most redemption states allow recourse. Iowa (IA) and Minnesota (MN) are the only two redemption states not allowing recourse. We thus control for IA and MN dummies in the regressions to facilitate interpretation. After including the IA/MN dummies, the variable of Redemption represents a state allowing both redemption and recourse. The variable of Recourse represents a recourse state not allowing redemption. The omitted baseline case is a non-recourse

state with no redemption. Judicial status is included as an additional control. State foreclosure laws are classified as in Section 3.2.

The full sample analysis in Table 5 Model 1 includes foreclosure auctions on properties securing both refinance and new purchase mortgages. The results show that recourse states have an auction sale price on average 8.78% higher than non-recourse states. The effect is statistically significant at a 5% level. This result indicates that lenders bid higher in a recourse state than in a non-recourse state to lower the chance of borrower's or court's contest which can add potential litigation costs and longer property holding costs. The result does not indicate that lenders in a recourse state bid higher than the fair market valuation, but rather increase the price relative to lenders in non-recourse states or avoid very low bid. Table 4 documents that the average discount of an auction sale is about 21%. A 9% increase in auction price still yields a lower than the benchmark valuation price. Redemption shows no statistically significant impact on auction sale price. The magnitude of the coefficient estimate for redemption is also small.[16] The very small number of states with strong redemption rights could contribute to the lack of statistical power of redemption variable.

4.2.2 Sub Sample Robustness Checks

This section conducts several sub sample robustness checks. The first sub sample includes only properties securing new purchase loans (Purchase Sample). The purchase sample results are presented in Model 2 Table 5. Our estimation strategy takes the property valuation at origination as its fair market valuation at that time, and utilize the original valuation as a benchmark to evaluation the auction price. New purchase loans carry a transaction price, so it is reasonable to treat the transaction

[16] As an alternative specification, we change the omitted baseline case as a recourse state with no redemption, and include non-recourse and non-redemption case in the regression. This specification allows directly inference of the redemption variable. The results remain the same that redemption is not statistically significant in explaining auction sale price.

price as the fair market valuation of the property.[17] On the contrary, refinance loans lack a transaction price and instead an appraised value is used as property valuation at origination. Various studies (Agarwal et al., 2015; Calem et al., 2021) document significant appraisal bias for refinance loans and the bias varies across different mortgages. This incurs measurement error in the valuation ratio. Excluding properties securing refinance loans and focusing on purchase loans help eliminate the measurement error incurred by appraisal bias.

Model 3 and 4 in Table 5 further divide the new purchase sample by auction year. Model 3 includes purchase loans with auction sale before the end of year 2010 (P & Y $\leq$ 2010). Model 4 includes purchase loans with auction sale after year 2010 (P & Y>2010). These two sub sample analyses serve two purposes. The first one is to check the effects of deficiency laws during both an up and down housing market. The second one is to address a potential concern regarding loan modification on property appreciation. Loan modifications could change borrowers' financial status and their motivation in performing property maintenance.[18] These changes could affect property appreciation. Since loan modifications are rare before the end of year 2010 (Adelino et al., 2013), it should be less of a concern in Model 3 than Model 4. The various sub samples consistently show that recourse states have higher auction sale price than non-recourse states. We do not find statistically significant redemption effect on auction price.

Table 6 conducts several more robustness checks using more homogeneous sub samples. Model 1 includes properties securing new purchase loans and limits the sample to fixed rate mortgages. Borrowers choosing adjustable rate mortgage may have short time horizon in house tenure or seek lower initial interest rates. These two groups of borrowers have different financial constraints and motivations in property investments. Focusing on FRM creates a more homogeneous groups of borrowers/loans,

[17]For new purchase loans, property valuation in McDash data is the lower of transaction price or appraisal. As very few appraisals fall below transaction price, the property valuation should be the arm's length transaction price in most cases.

[18]Loan modification may change the foreclosure timeline, which we controlled in the model

which leads to less variation in HPI-adjusted house appreciation. Model 2 includes properties securing new purchase loans and limits the mortgages to those not carrying private mortgage insurance. If an auction sale fails to generate enough proceeds to repay the debt, private mortgage insurance company needs to compensate the lender for certain amount of the loss. Typically, private mortgage insurance companies have their own policy that could affect auction outcomes. This may introduce additional complications of the analyses. Another issue is that McDash reports PMI status at origination without updates, so loans with PMI at origination may actually have no PMI at auction. This creates some measurement error on PMI status for those with PMI at origination. On the contrary, loans without PMI at origination would have the same no PMI status at auction. Model 2 eliminates these potential issues associated with loans with PMI by focusing on mortgages without PMI. Junior liens increase the combined loan-to-value and reflect the full indebtness of a borrower. However, the status of junior liens were not tracked by McDash after loan origination. To reduce this possible measurement error, Model 3 includes properties backing new purchase loans with no junior liens. In sum, the purpose of the various sub sample analyses is to reduce potential impact from some unobservable factors and increase the explaining power of the model. Table 6 again shows consistent results as the previous findings, namely that recourse states have higher auction prices than non-recourse states, and redemption states do not have significant different auction prices than non-redemption states.

4.3 Why Recourse States Have a Higher Auction Price?

The previous section documents that auction sale price is higher in a recourse state than in a non-recourse state. This section intends to investigate the economic reasoning behind it. Our hypothesis is that the fair valuation rules associated with deficiency judgment help motivate lenders to avoid low bid or increase their bid relative to the situation where no deficiency judgment is considered or allowed.

To test this hypothesis, we divide the sample according to the median current loan-to-value ratio (LTV ratio at auction time) of 0.96. The higher the current LTV, the lower the chance the auction proceeds can repay the debt in full. If a borrower has current LTV greater than 0.96, a deficiency judgment is more likely. This high current LTV sample forms our deficiency judgment likely sample. If a borrower has current LTV ratio lower than 0.96, a deficiency is less likely and the chance that a lender pursues after a borrower for deficiency judgments is lower. This forms our deficiency judgment unlikely sample.

Table 7 conducts the analyses and reports the results. Model 1 and 2 include properties securing both refinance and new purchase loans (full sample). Model 3 and 4 include only properties securing new purchase loans. As expected, the results show that recourse states have significantly higher auction sale price than non-recourse states in deficiency judgment likely sample (current LTV $>$ median). The effects are significant at the 1% level. For the deficiency judgment unlikely sample, recourse variable is not statistically significant for the full sample and is marginally significant for the purchase sample. The marginal significance of the deficiency unlikely sample is reasonable. The sales of some properties in this sub sample would not generate enough proceeds to repay the debt as the auction sale price is on average 79% of its HPI-updated origination valuation.

Table 8 conducts robustness checks. To ensure that the effects are not driven by a single state, we take one of the four states with most observations out of the sample each time and repeat the analyses as in Table 7. Properties securing new purchase loans are included in Table 8. Panel A reports the results for deficiency judgment unlikely sample (current LTV $<$ median) and Panel B reports the results for deficiency judgment likely sample (current LTV $>$ median). The results support the previous findings that recourse is consistently associated with higher auction sale price but only for deficiency likely sample. The results for deficiency unlikely sample seem to be driven by Missouri. When Missouri is taken out, the recourse variable is

not statistically significant.

4.4 Additional Robustness Check

The above analyses use the prior valuation of a foreclosed property as a benchmark for its fair market valuation at auction. As discussed above, borrowers play a role in property maintenance and this may cause individual property's appreciation deviating from the overall local HPI. We perform various sub sample analyses to address the concern in the previous sections.

If a property is acquired by the lender at auction, the property becomes a REO property. McDash Resolution Module tracks the real estate deed data and records the date and sale price when a lender sells a REO property in the market. The REO liquidations are arm's length transactions. This subsequent sale price thus can be used to derive an alternative fair market valuation.

This section conducts additional robustness checks by using a property's subsequent REO liquidation price (HPI-adjusted) as a proxy of fair market price. As lenders, instead of borrowers, hold the property from auction until liquidation, the heterogeneity caused by borrower's maintenance should not be a concern. However, we admit that there could be heterogeneity in maintenance or renovation among lenders or servicers.[19]

Table 9 reports the regression results. The dependent variable is the valuation ratio of auction price of a foreclosed property divided by its HPI-adjusted REO liquidation price. Liquidated REO properties are included in the analysis. We require the time lag between the REO liquidation and the auction sale within 6 months to minimize the deviation of individual property's appreciation from the local HPI. Model 1 includes the full sample. The independent variables include state foreclosure laws, IA/MN dummies, MSA*auction quarter fixed effects, and MSA*REO liquidation quarter fixed effects. We also include the time lag and the HPI change from

[19]Our data unfortunately does not provide any institutional information.

auction sale to REO liquidation in all the regressions. We exclude loan-level and macro-level controls in Model 1. Model 2 includes loan-level and macro-level controls as defined in Table 5. Other than that, the specifications are the same as in Model 1. Model 3 and Model 4 divide the full sample into deficiency judgment likely and deficiency judgment unlikely sample. The results are consistent with the previous analyses. Recourse states have higher auction price than non-recourse states. The effect is statistically significant at the 1% level among deficiency likely sample. The magnitude of the recourse effect is larger than the previous analysis. This might be due to the fact that only properties taken back by the lender are included in Table 9. The previous analysis includes both third-party sales and REO acquisitions.

5 Conclusion

In an ideal world, foreclosures would lead to auction sales at prices similar to those comparable sales under normal market conditions ("fair market value"). In the real world, foreclosure auction sales differ from typical real estate sales in many significant ways which result in low auction sale prices. The auction sale price plays an important role in deficiency judgments which affect the balance between borrower protection and lender rights. Empirical studies on auction outcomes, however, have been extremely limited. Among many potential factors that could affect the auction sale price, this study specifically investigates whether state deficiency laws materially affect auction prices.

Recourse statutes protect lenders' rights by allowing them to pursue after borrowers for deficiency judgments when the foreclosed property is not sufficient to pay off the mortgage debt. Limiting the property valuation to "fair market valuation" in calculating deficiency judgment helps protect borrowers, though the meaning and guidance on fair valuation is often vague. On the one hand, these deficiency laws might motivate lenders to bid low to maximize a deficiency judgment relative to a comparable bid in a non-recourse state where a deficiency judgment is not allowed. Alternatively, lenders may wish to avoid low bids to reduce the chance of challenges to the fairness of auction sale price from either borrowers or courts. Which of these influences dominate in determining auction sale prices in recourse states versus non-recourse states is thus an empirical matter.

Examining the actual auction prices in the 27 MSAs that straddle state borders over 2006–2016 and contrasting the auction price with the HPI-adjusted previous transaction price of the same property, the results show that after controlling for loan and macro variables as well as using time and MSA fixed effects, recourse states show about 10% significantly higher auction prices (relative to its benchmark value) than the non-recourse base case. The effect exists only in those observations where deficiency judgments are likely. This indicates that the fair valuation rule and the po-

tential borrower/court scrutiny motivate lenders to avoid very low auction sale prices and help borrowers in reducing deficiency judgments. An implication of the research is that recourse state auction prices might provide a better guide to the valuation of distressed properties than non-recourse states. In addition, if the fair valuation rule in recourse states avoids very low auction prices, this may make redundant the post-foreclosure redemption right (unpopular with mortgage servicers).

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Table 1: State Foreclosure Laws

State	Judicial	Recourse	Redemption
AL	0	1	1
AR	0	1	0
GA	0	1	0
IA	0	0	1
IL	1	1	1
IN	1	1	0
KS	1	1	1
KY	1	1	1
MA	1	1	0
MD	1	1	0
MI	0	1	1
MN	0	0	1
MO	0	0	0
MS	0	1	0
NC	0	0	0
NE	1	1	0
NJ	1	1	1
OH	1	1	0
OK	0	1	0
OR	0	0	0
PA	1	1	0
RI	0	1	0
SC	1	1	0
TN	0	1	0
VA	0	1	0
WA	0	0	0
WI	1	0	0
WV	0	1	0

Notes: This table summarizes state foreclosure laws. Judicial equals 1 if only judicial foreclosures are allowed in a state. Otherwise, it equals 0. Recourse equals 1 if deficiency judgments are allowed and practical. Otherwise, it equals 0. Redemption equals 1 for a state if its redemption right is accessible to borrowers and has the auction price as the redemption price. Otherwise it equals 0.

Table 2: Number of Observations by MSA

MSA	Number of Obs
Allentown-Bethlehem-Easton, PA-NJ	107
Augusta-Richmond County, GA-SC	207
Charlotte-Gastonia-Concord, NC-SC	1456
Chattanooga, TN-GA	299
Cincinnati-Middletown, OH-KY-IN	1324
Clarksville, TN-KY	273
Columbus, GA-AL	115
Davenport-Moline-Rock Island, IA-IL	78
Duluth, MN-WI	97
Evansville, IN-KY	103
Fayetteville-Springdale-Rogers, AR-MO	401
Fort Smith, AR-OK	196
Hagerstown-Martinsburg, MD-WV	89
Huntington-Ashland, WV-KY-OH	36
Kansas City, MO-KS	1280
Kingsport-Bristol-Bristol, TN-VA	81
Louisville-Jefferson County, KY-IN	265
Memphis, TN-MS-AR	680
Minneapolis-St. Paul-Bloomington, MN-WI	1131
Omaha-Council Bluffs, NE-IA	133
Portland-Vancouver-Beaverton, OR-WA	1111
Providence-New Bedford-Fall River, RI-MA	414
Saint Louis, MO-IL	1419
South Bend-Mishawaka, IN-MI	111
Virginia Beach-Norfolk-Newport News, VA-NC	923
Winchester, VA-WV	56
Youngstown-Warren-Boardman, OH-PA	184
Total	12569

Table 3: Number of Observations by Auction Year

Auction Year	Number of Obs
2006	91
2007	489
2008	819
2009	1270
2010	2045
2011	1354
2012	2011
2013	2050
2014	1309
2015	980
2016	151

Table 4: Summary Statistics

Variable	Mean	StdErr	Min	Max
PriceA/PriceO	0.79	0.21	0.40	1.20
Recourse	0.51	0.50	0.00	1.00
Redemption	0.18	0.39	0.00	1.00
Judicial	0.24	0.43	0.00	1.00
MonthinForeclosure	8.85	7.89	1.00	45.00
LoanAgeAuction	51.01	22.80	6.00	133.00
CurrentLTV	0.97	0.10	0.77	1.23
PMI	0.15	0.36	0.00	1.00
JuniorLien	0.22	0.42	0.00	1.00
FICO (in 100)	6.56	0.62	3.00	8.50
FullDoc	0.70	0.46	0.00	1.00
FRM	0.80	0.40	0.00	1.00
DTI	0.38	0.08	0.11	0.62
DTIMissing	0.42	0.49	0.00	1.00
TermRefi	0.11	0.31	0.00	1.00
CashOutRefi	0.14	0.34	0.00	1.00
LoanTerm	364.13	34.29	24.00	600.00
IncomeC	4.25	0.72	2.36	8.29
UnemploymentC	7.61	1.99	2.80	13.90
DefaultRate	0.10	0.03	0.01	0.27
HPIChange	2.08	4.81	24.04	25.21

Notes: This table presents the summary statistics. The valuation ratio, PriceA/PriceO, is calculated as the auction sale price divided by the zipcode-level HPI updated origination price of the same property.

Table 5: Overall Regression Results

	Model 1	Model 2	Model 3	Model 4
Variable	Full	Purchase(P)	P&Y≤2010	P&Y>2010
Recourse	0.0878**	0.1030**	0.1192**	0.1011**
	(0.0436)	(0.0507)	(0.0582)	(0.0494)
Redemption	0.0031	−0.0035	0.0124	−0.0086
	(0.0291)	(0.0299)	(0.0352)	(0.0286)
Judicial	−0.0586*	−0.0556	−0.0555	−0.0684
	(0.0318)	(0.0400)	(0.0373)	(0.0424)
IA & MN	Y	Y	Y	Y
Loan Controls	Y	Y	Y	Y
Macro Controls	Y	Y	Y	Y
MSA*OrigQuarter FE	Y	Y	Y	Y
MSA*AuctQuarter FE	Y	Y	Y	Y
R-Square	0.3603	0.3668	0.3915	0.3730
Adj R-Sq	0.2822	0.2657	0.2758	0.2468
N	12535	9511	4026	5485

Notes: This table presents the overall OLS regression results. We report the coefficient estimates with standard errors in the parentheses. The dependent variable is PriceA/PriceO, the valuation ratio between the auction sale price and the zipcode-level HPI updated origination price of the same property. Loan-level controls include months in foreclosure, loan age at auction, current LTV at auction, private mortgage insurance dummy, junior lien dummy, borrower's credit score, full documentation dummy, fixed rate mortgage dummy, debt-to-income(DTI), DTI missing, loan term, term/rate refinance dummy and cashout refinance dummy. Macro-level controls include county median income and unemployment rate, and zipcode-level default rate and previous year HPI change. Model 1 includes the full sample. Model 2 includes purchase loans. Model 3 includes purchase loans that had auction sales until 2010. Model 4 includes purchase loans that had auction sales after 2010. Standard errors are clustered at MSA level. * p<0.10, ** p<0.05, *** p<0.01.

Table 6: Robustness Checks - Clean Sub Samples

	Model 1	Model 2	Model 3
Variable	FRM=1	PMI=0	JuniorLien=0
Recourse	0.1264**	0.0852**	0.1284***
	(0.0556)	(0.0428)	(0.0488)
Redemption	−0.0068	0.0190	−0.0073
	(0.0338)	(0.0272)	(0.0297)
Judicial	−0.0752*	−0.0573	−0.0743**
	(0.0447)	(0.0378)	(0.0354)
IA & MN	Y	Y	Y
Loan Controls	Y	Y	Y
Macro Controls	Y	Y	Y
MSA*OrigQuarter FE	Y	Y	Y
MSA*AuctQuarter FE	Y	Y	Y
R-Square	0.4023	0.3774	0.3976
Adj R-Sq	0.2825	0.2585	0.2689
N	7522	7782	7144

Notes: This table presents the OLS regression results for three clean sub samples. The sample construction is intended to reduce heterogeneity that might affect the auction sale price. We report the coefficient estimates with standard errors in the parentheses. The dependent variable is PriceA/PriceO, the valuation ratio between the auction sale price and the zipcode-level HPI updated origination price of the same property. Loan-level controls, macro-level controls and other model specifications are the same as in Table 5. Model 1 includes purchase loans with fixed interest rate. Model 2 includes purchase loans with no PMI. Model 3 includes purchase loans with no junior liens. Standard errors are clustered at MSA level. * p<0.10, ** p<0.05, *** p<0.01.

Table 7: Auction Sale Price and Deficiency Judgment (DJ)

	Model 1	Model 2	Model 3	Model 4
	Full Sample		Purchase Sample	
Variable	DJ Unlikely	DJ Likely	DJ Unlikely	DJ Likely
Recourse	0.1033	0.0401***	0.1339*	0.0617***
	(0.0709)	(0.0155)	(0.0734)	(0.0157)
Redemption	−0.0012	0.0210	−0.0039	0.0179
	(0.0374)	(0.0134)	(0.0366)	(0.0136)
Judicial	−0.0666	−0.0360**	−0.0929	−0.0275*
	(0.0616)	(0.0149)	(0.0644)	(0.0161)
IA & MN	Y	Y	Y	Y
Loan Controls	Y	Y	Y	Y
Macro Controls	Y	Y	Y	Y
MSA*OrigQuarter FE	Y	Y	Y	Y
MSA*AuctQuarter FE	Y	Y	Y	Y
R-Square	0.4153	0.4350	0.4612	0.4377
Adj R-Sq	0.2624	0.3284	0.2727	0.3000
N	6082	6453	4542	4969

Notes: This table presents the OLS regression results to investigate the relation between potential deficiency judgments and auction sale price. Model 1 and 2 include both purchase and refinance loans. Model 3 and 4 include purchase loans. Model 1 and 3 have loans with current LTV at auction lower than the median CLTV (current LTV at auction) of 0.96. Model 2 and 4 have loans with current LTV higher than the median CLTV of 0.96. Loans with low CLTV are less likely to have deficiency judgments (DJ Unlikely) and loans with high CLTV are more likely to have deficiency judgments (DJ Likely). We report the coefficient estimates with standard errors in the parentheses. The dependent variable is PriceA/PriceO, the valuation ratio between the auction sale price and the zipcode-level HPI updated origination price of the same property. Loan-level controls, macro-level controls and other model specifications are the same as in Table 5. Standard errors are clustered at MSA level. * p<0.10, ** p<0.05, *** p<0.01.

Table 8: Auction Sale Price and Deficiency Judgment - One State Out Robustness Checks

Panel A	Deficiency Judgments Unlikely			
Variable	MO	NC	OH	MN
Recourse	0.0423	0.2202***	0.1398*	0.1332*
	(0.0572)	(0.0638)	(0.0730)	(0.0732)
Redemption	−0.0481	−0.0461	−0.0385	−0.0045
	(0.0517)	(0.0476)	(0.0609)	(0.0366)
Judicial	−0.0845	−0.0871	−0.0770	−0.0932
	(0.0586)	(0.0581)	(0.0625)	(0.0650)
R-Square	0.5044	0.5069	0.4432	0.4740
Adj R-Sq	0.2986	0.3066	0.2411	0.2791
N	3839	4002	4237	4091
Panel B	Deficiency Judgments Likely			
Variable	MO	NC	OH	MN
Recourse	0.0600***	0.0717***	0.0798***	0.0608***
	(0.0136)	(0.0258)	(0.0257)	(0.0162)
Redemption	0.0168	0.0153	−0.0319	0.0180
	(0.0164)	(0.0162)	(0.0379)	(0.0139)
Judicial	−0.0319*	−0.0306*	−0.0100	−0.0293*
	(0.0167)	(0.0183)	(0.0164)	(0.0170)
R-Square	0.4456	0.4592	0.4096	0.4501
Adj R-Sq	0.2819	0.3073	0.2512	0.3127
N	4041	4352	4364	4600

Notes: This table conducts robustness checks. We report the OLS regression results. Purchase loans are included in the analyses. We take out one of the four states with the most observations from the sample each time. Panel A have loans with current LTV at auction lower than the median CLTV of 0.96. Panel B have loans with current LTV higher than the median CLTV of 0.96. Loans with low CLTV are less likely to have deficiency judgments and loans with high CLTV are more likely to have deficiency judgments. We report the coefficient estimates with standard errors in the parentheses. The dependent variable is PriceA/PriceO, the valuation ratio between the auction sale price and the zipcode-level HPI updated origination price of the same property. IA and MN dummies, loan-level controls, macro-level controls ans other model specifications are the same as Table 5. MSA*OrigQuarter fixed effects and MSA*AuctQuarter fixed effects are included in the analyses. Standard errors are clustered at MSA level. * p<0.10, ** p<0.05, *** p<0.01.

Table 9: Robustness Checks - Comparing Auction Price with Later Sale

	Model 1	Model 2	Model 3	Model 4
Variable	Full Sample	Full Sample	DJ Unlikely	DJ Likely
Recourse	0.2979**	0.2133***	0.2577*	0.2474***
	(0.1314)	(0.0685)	(0.1426)	(0.0944)
Redemption	0.0318	0.0615**	0.1691***	−0.0245
	(0.0542)	(0.0247)	(0.0503)	(0.0214)
Judicial	−0.1845*	−0.1135***	−0.2274***	−0.1639*
	(0.1063)	(0.0396)	(0.0755)	(0.0857)
IA & MN	Y	Y	Y	Y
Loan Controls	N	Y	Y	Y
Macro Controls	N	Y	Y	Y
MSA*AuctQuarter FE	Y	Y	Y	Y
MSA*REOLiqQuarter FE	Y	Y	Y	Y
R-Square	0.0280	0.0719	0.0733	0.0395
Adj R-Sq	0.0273	0.0699	0.0708	0.0373
N	2854	2848	1500	1348

Notes: This table conducts additional robustness checks by comparing the auction sale price with later REO sale price. We require the REO sale within six months after foreclosure auction. Model 1 includes full sample but without loan-level and macro-level controls. Model 2 includes full sample with loan-level and macro-level controls. Model 3 has loans with current LTV at auction lower than the median CLTV of 0.96. Model 4 has loans with current LTV higher than the median CLTV of 0.96. Loans with low CLTV are less likely to have deficiency judgments and loans with high CLTV are more likely to have deficiency judgments. We report the coefficient estimates with standard errors in the parentheses. The dependent variable is PriceA/PriceL, the valuation ratio between the auction sale price and the zipcode-level HPI adjusted REO price of the same property. We include the time lag and the HPI change between auction time and REO sale time in all regressions. IA/MN dummies, loan-level controls, macro-level controls, and other model specifications are the same as in Table 5. Standard errors are clustered at MSA level. * p<0.10, ** p<0.05, *** p<0.01.