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ABSTRACT

Loss mitigation actions (e.g., liquidation or renegotiation) for delinquent mortgages might be hampered by the conflicting goals of claim holders with different levels of seniority. Although similar agency problems arise in corporate bankruptcies, the mortgage market is unique because in a large share of cases junior claimants, in their role as servicers, exercise operational control over loss mitigation actions on mortgages owned by senior claimants. We show that servicers are less likely to act on the first lien mortgage owned by investors when they themselves own the second lien claim secured by the same property. When they do act, such servicers' choices are skewed towards actions that maximize the value of their junior claims, favoring modification over liquidation and short sales and deeds-in-lieu over foreclosures. We also show that such servicers find it more difficult to avoid taking actions on second lien loans when first liens are modified and that they do not modify their second lien loans on more concessionary terms. We show that these actions transfer wealth from first to second liens and moderately increase borrower welfare.

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1 Introduction

Conflicts between debt holders at times of bankruptcy are a central problem in corporate finance. In the simplest form, senior debt holders enjoy the absolute priority rule and are quick to liquidate assets because there is generally little upside for them in renegotiating the debt. In contrast, junior debt and equity holders are interested in restructuring the obligations of a bankrupt firm because they can benefit from the option value of its resurrection (Warner 1977, White 1983).

The recent boom and bust of the housing market, with its wave of delinquencies, led to similar conflicts in the mortgage market. The second lien home equity market rose from less than $200 billion at the beginning of 2000 to a peak of well over $1 trillion in 2008 (Lee, Mayer, and Tracy 2012). Goodman, Ashworth, and Yin (2010) report that more than 50 percent of first lien mortgages that have been securitized in the private-label market have at least one junior lien attached to them. In these cases, the incentives for liquidation and renegotiations are different for first and second lien holders. Compared to corporate finance, the situation in the mortgage market is even more complex, because first lien mortgages are often securitized to a wide array of mortgage backed securities (MBS) investors who delegate loss mitigation decisions to servicers. In many cases, these servicers own a concurrent second lien claim on the same property (Engel and McCoy 2011). This structure of ownership and decision-making alters the power balance and potentially gives substantial leverage to junior lien holders, who decide how to mitigate losses on the senior loan (a variant of the classic "holdup problem").[1] If in corporate finance the issue is that senior claimants are quick to liquidate, in the residential mortgage market, the concern is that second lien claimants have the power to delay resolution or to shift

[1] On one hand, the pooling and servicing agreement (PSA) requires the servicer to act for the benefit of the investors who own the first lien. On the other hand, some actions that are optimal from the first-lien owners' perspective may be suboptimal to the servicer when that servicer is the owner of the second-lien loan.

the burden of loss mitigation onto the senior claimant. Such choices could potentially increase eventual losses and undermine sustainability of renegotiated mortgages. This potential conflict of interest has been raised by Mayer et al. (2009a), Goodman (2011a, 2011b), Cordell et al. (2011), and Bond et al. (2013). It has received considerable media coverage and has led to a legislative proposal—the Mortgage Servicing Conflict of Interest Elimination Act of 2010—that aimed to disallow servicing of first lien mortgages by entities that own second liens secured by the same property.[2]

Addressing the large inventory of delinquent mortgages remains the key component in restoring the health of the U.S. housing market, which has substantial implications for broader macroeconomic performance. Both policymakers and mortgage investors, therefore, would benefit from understanding the potential impact of servicer conflicts of interest on workouts of delinquent loans. Such knowledge is useful when designing near-term policy initiatives as well as forward-looking reforms for the mortgage servicing market. For private investors, assessing these conflicts is helpful in refining the contractual covenants that govern servicer relationships. Despite the importance of such conflicts of interest, few studies have attempted to provide direct empirical evidence of the existence and quantitative impact of servicer conflicts related to junior lien ownership. Our paper aims to fill this gap and to contribute to the existing literature on agency effects in loss mitigation choices for nonperforming assets.

In this paper, we test for the existence of holdup in the loss resolution process. In broad terms, "holdup" is defined as any action that benefits a junior lien holder at the expense of the more senior claimant. Specifically, we evaluate the claim that servicers who own second lien mortgages while servicing the first lien on behalf of outside investors ("holdup servicers") have a

[2] See, for example, Gretchen Morgenson, "In This Play, One Role is Enough," *New York Times*, August 14, 2010, and Alex Ulam, "Why Second-lien Loans Remain a Worry," *American Banker*, May 2, 2011.

conflict of interest and therefore may influence the choice of loss mitigation actions to their advantage. Our unique dataset of matched senior- and junior lien claims and their loss mitigation actions in the event of delinquency allows us to compare these "holdup servicer" mortgages to control groups in which such a conflict of interest is likely to be less intense.

Holdup servicers' incentives could affect the likelihood of both liquidation and modification. In the case of foreclosures, proceeds from auction sales satisfy the claims of senior lien holders before any residual is turned over to junior claimants. Because this residual is often small or nonexistent, servicers that own second liens have no incentive to aggressively pursue foreclosure and extinguish their liens for little in return.[3] In the case of non-foreclosure liquidations—deeds-in-lieu and short sales—the servicer does not automatically have to extinguish the second lien, but they need to resolve it in some fashion for the transaction to proceed. Typically, in approving a pre-foreclosure liquidation, the holdup servicer effectively converts its second lien loan into an unsecured claim, akin to a credit card balance. By doing so, the second lien holder also gives up the value of receiving a payment in return for releasing its lien (Been et al. 2012). This action also provides relatively little incentive for the second lien owner/servicer to trigger the liquidation process (unless the second lien is also seriously delinquent and the owner-servicer has already recognized the second as a loss).

In loan modification cases, second liens present a particularly thorny problem.[4] On the one hand, junior lien holders have a strong incentive to modify the first lien and attain a stronger position for their junior claim. Modification of the first lien without any adjustment to the junior

[3] Eliminating secured interest in the property (the lien) does not necessarily annul the lender's claim for repayment (the promissory note). The ability of a junior-lien lender to pursue collection on the now unsecured debt is governed by state law. For instance, in California, a junior-lien loan that was used to help finance the purchase of the property cannot be collected once the lien is eliminated in foreclosure. However, lenders retain the right to attempt collection on other junior-lien loans.

[4] See Bond et al. (2013) for an extensive analysis of the second-lien holdup problem in the context of mortgage refinancing.

lien would benefit the junior claimants because the borrower's improved financial position frees up additional cash flows to the second lien holders. However, many pooling and servicing agreements (PSA) that govern the relationship between loan servicers and investors make it hard to modify the first lien mortgage unless the second lien holder resubordinates their claim on it (see e.g., McCoy 2012, Cordell et al. 2011, Pinedo and Baumgardner 2009).[5] The first lien holders are generally reluctant to agree to a modification that leaves the junior claim intact, because lien priority dictates that junior claimants bear the loss first. Similarly, junior debt holders are not willing to simply extinguish their claims and allow modification to proceed, because there is always a chance that the borrower will become current on the delinquent loan or that collateral value will rise high enough to yield a positive return in the event of foreclosure. The resulting stalemate might be all the more pronounced when the second lien holder is also the party determining when, whether, and how to proceed with a specific set of loss mitigation actions. Indeed, servicers are not obligated to modify second liens at all.[6]

Thus, second lien owners have an incentive to "hold up" any resolution (modification or liquidation) of the mortgage unless they can recover some price above the true value of their claim. The potential for holdup is especially strong when the first lien is securitized, because the ownership structure of the first claim holders would be dispersed, which significantly hampers negotiations between first- and second lien holders. Mayer et al. (2009a) discuss this possibility and propose an optimal loan modification strategy.[7]

[5] Most legal analysis suggests that modifications of first-lien loans is highly unlikely to trigger loss of seniority (Been at al., 2012). However, because the case law has not been fully settled, first-lien holders generally require second-lien holders to agree to subordinate their claims prior to approving modification (McCoy 2012).

[6] Under the HAMP Second Lien (2MP) program, servicers of second liens are given financial incentives to modify their claims on a *pari passu* basis with first-lien modifications—the second lien is modified in exactly the same fashion as the first-lien loan.

[7] Mayer et al. (2009a) propose a solution to the holdup problem: providing a fee to the second-lien holder to relinquish its control on the modification of the first lien. Beyond the mortgage market, a vast literature has

We identify potential holdups by using a unique dataset from the Office of the Comptroller of the Currency (OCC) that matches the first and second liens by the exact property address. This dataset has several advantages over existing datasets on mortgage performance—McDash, Loan Performance, BlackBox, etc. First, the existing datasets only show whether a second lien exists on the property was issued at the same time as the first lien. In contrast, the OCC dataset allows us to match the first and second liens even if the second lien was issued months or years after the first. Second, the OCC dataset allows us to separately identify whether the same or a different servicer is servicing the first and second liens, in addition to identifying whether the first lien is being held in the servicer's portfolio or is securitized. Finally, we can precisely track outcomes like foreclosures, modifications, and so forth in the OCC data, but the other datasets require some of the outcomes to be imputed.

Our group of interest (treatment) contains pairs of first and second mortgages in which (1) the first lien is securitized and delinquent and (2) the second lien is owned and serviced by the same bank that services the first lien. This group of mortgages is subject to holdup by the second lien holder (and servicer). We compare this group of mortgages to a control group consisting of properties in which (1) the first lien mortgage is securitized and is delinquent but (2) the second lien loan is owned and serviced by a *different* bank than the one that services the first lien. Hence, this group has a similar ownership and servicing structure, but without the holdup problem.[8]

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suggested possible solutions to the holdup problem in more general settings (see Mailath and Postelwaite 1990 and Kominers and Weyl 2011).

[8] We note that it is possible that the second-lien holder in the non-holdup group could hold up the modification or refinancing of the first lien by refusing to resubordinate its claim to the new loan. This holdup problem differs from the one we consider in this paper, which results from having the same servicer servicing the first- and second-lien loans.

Using this identification approach, we find significant evidence that the holdup servicers delay loss mitigation actions on first lien mortgages. Specifically, with holdup, the probability of no action increases by 2 to 4 percentage points (4% to 9% in relative terms) during the first six months following delinquency. This effect remains this strong for a longer 12-month horizon, and it is robust to numerous sample refinements.

Among the mortgages on which servicers took action, we find that holdup leads to a lower probability of liquidation and a higher probability of modification. For the six-month horizon, we find that holdup reduces the likelihood of liquidation by 2 to 4 percentage points (3% to 5% in relative terms). This effect remains strong at the 12-month horizon and is particularly pronounced in a subsample of second liens that continue to perform. We also find somewhat higher modification rates among holdup servicers in cases where the first lien loan was securitized by government-sponsored enterprises (GSEs) like Fannie Mae or Freddie Mac.

Looking *within* each set of actions, we find that when holdup servicers resorted to liquidation, they were more likely to choose a short sale or deed-in-lieu transaction than an outright foreclosure. This choice arguably resulted in greater recovery values for the junior claims. We also find that when holdup servicers chose modification, they were more likely to modify the attendant second liens as well, although the relative leniency of modification terms on the second liens was similar to that offered by the non-holdup servicers.

An important question is whether actions (or inactions) of holdup servicers have a related effect on borrowers. To test this, we evaluate the relation between the incentive to hold up and the performance of first- and second lien loans. First lien loans securitized by the GSEs and serviced by holdup servicers are more likely to become current in the *absence* of any action, which suggests that holdup servicers are more likely to identify borrowers that could self-cure. We also find that in holdup situations second lien loans are more likely to remain performing,

which is consistent with the idea that holdup servicers encourage second lien borrowers to stay current, potentially in exchange for avoiding liquidation of their first lien loan.

Our paper is related to several strands of the literature. First, recent studies have found that securitization could impede renegotiation of delinquent loans (Piskorski et al. 2010, Agarwal et al. 2011a, Zhang 2013): securitized loans exhibit lower rates of renegotiation and higher rates of liquidation.[9] However, these papers cannot identify a specific channel through which the agency frictions resulting from separation of ownership and control in securitization affect loss mitigation actions. Through our unique database, we are able to shed light on whether the frictions are exacerbated if the controlling entity (the servicer) also owns an accompanying second lien note on the delinquent property. Second, our work is related to the growing literature that seeks to explain the recent financial crisis and drivers of mortgage foreclosures (e.g., Keys et al. 2010, Mian and Sufi 2009, Campbell et al. 2011, Mayer et al. 2009b, Elul 2011, Agarwal et al. 2011c, and Agarwal et al. 2011d). Our paper contributes to the literature by documenting the important role of second liens in mortgage foreclosures and renegotiation. Third, our work also contributes to a long line of studies on the role of second liens on mortgage defaults. We add to this literature by looking at the redefault rate of mortgages. Finally, a vast body of work in law and economics on topics of eminent domain and corporate takeovers has been motivated by the holdup problem. Specifically, in public land assembly projects, minority land holders can create a holdup problem. To address this problem, the Fifth Amendment of the U.S. Constitution allows the government to take over private property under the justification of eminent domain (Posner 2005). Similarly, in corporate takeovers of public firms, the law requires the acquiring party to

[9] Several commentators have argued that securitization does not fully explain the lack of modifications, especially since the government introduced the Home Affordable Modification Program (HAMP), which should have made modifications easier (Agarwal et al. 2011b).

bid for all the shares of the firm. To keep minority shareholders from holding up the bid, some jurisdictions allow the acquirer to bid for a super-majority of shares (Armour and Skeel 2007).

The rest of the paper proceeds as follows. In Section 2, we develop a set of testable hypotheses, and Section 3 summarizes the data. Section 4 details the results and examines their robustness. Section 5 discusses the policy implications of our findings.

2 Hypotheses and Identification Strategies

2.1 Hypotheses

Two main sources discuss the effect of second lien holders on loss mitigation approaches to delinquent loans. Mayer et al. (2009a) argue that a holdup problem arises when property values decline and modification of the first lien is acceptable to its owners only when it effectively extinguishes the second lien on the property. The authors suggest that by dragging their feet, second lien holders put pressure on first lien holders to buy them out.

In addition, Goodman (2011a, 2011b) analyzes the conflict of interest between various lien holders that arises when the junior lien holder services and thus makes loss mitigation decisions for both liens. Similar to Mayer et al. (2009a), she concludes that second lien lenders oppose resolutions that deplete the value of their claims. Specifically, liquidations are less likely to be initiated, because the second lien holders bear most of the cost from this action. Moreover, whenever possible, second lien lenders are more likely to approve first-lien loan modifications without making similar concessions on their own liens. This outcome results in less sustainable modifications, because the borrowers' overall debt burden is not reduced by as much as it would be in the absence of such conflicts (Goodman 2011b).

Three primary predictions stem from Mayer et al. (2009a) and Goodman (2011a, 2011b). First, the likelihood of inaction on delinquent first lien mortgages is higher in the presence of

second lien claims, particularly when such claims are owned by the servicers of the first lien mortgages. Second, conditional on undertaking some loss mitigation action, the likelihood of liquidations is lower when second lien lenders service first lien mortgages. Finally, second lien holdup lenders increase the likelihood of loan modification, especially if such renegotiations can be done on terms that shift the cost toward first lien holders. In this study, we empirically test these hypotheses and quantify their relative effects.

2.2 Terminology

Our dataset includes several types of mortgages. To facilitate the discussion, we developed a shorthand notation that captures different ownership and servicing structures. Loans that are collateralized by the same asset receive a four-letter acronym. The first two letters pertain to the first lien, and the second two refer to the second lien. The first and third letters describe the *servicing* status of the first and second liens, respectively. The second and fourth letters describe the *ownership* status of the first and second liens, respectively. The letters "A" and "B" denote banks A or B. The letter "S" means that the loan is securitized; "P" stands for private-label securitization (PLS) and "G" for securitization by government-sponsored enterprises (GSE) like Fannie Mae and Freddie Mac.

For example, if there are two liens and both are owned and serviced by the same bank, then the notation is AAAA. ASAA denotes a first lien that is securitized and a second lien that is owned and serviced by the same bank that services the first. Code APBB indicates that the first lien is securitized through a private-label securitization and serviced by Bank A, and the second is owned and serviced by a different bank, Bank B.

2.3 Holdup and Non-Holdup Groups

Group ASAA contains the loans subject to holdup. For this group, the first lien is securitized, and the second is owned and serviced by the same bank that services the first lien (see, e.g., Mayer et al. 2009a, Goodman 2011a, 2011b, McCoy 2012, Cordell et al. 2011).[10] In such cases, the servicer has a potential conflict of interest but has the fiduciary responsibility to maximize the value of the serviced portfolio for the investors. This responsibility is mandated by pooling and servicing agreements (PSAs) that govern the relationship between investors (principals) and servicers (agents). However, as the second lien *owner*, the servicer might seek to maximize its own benefit within the parameters established by the PSAs.

We use group ASBB as our control (no holdup) group. Because the servicers of the first and second liens are distinct banks (as opposed to the same servicer, as in ASAA), this group does not face the holdup problem in which we are interested. We, therefore, capture the economic effect of holdup by differencing the two groups, ASAA and ASBB:

$$ASAA - ASBB = Holdup\ effect.$$

In a regression framework, we combine the two samples and introduce a *holdup servicer* dummy indicating that the observation is from group ASAA.

$$LossMitigation_{i,j,s,d} = \theta + \gamma I(Holdup\ servicer) + \beta X_{i,d} + \delta_j + \mu_d + \rho_s + \varepsilon_{i,j,s,d}. \quad (1)$$

The vector of observable covariates includes borrower *i*'s FICO score at the time of default as well as a number of characteristics for both the first- and second lien loans associated with this borrower. This list includes unpaid loan balances on each lien, a current estimate of the

[10] Ideally, we would like to compare the AAAA group to ABAA, those cases in which the first lien is owned by another bank. However, in our dataset, most first-lien mortgages that are owned by a third party are in fact securitized, making group ABAA very small.

first-lien loan-to-value ratio and the resulting amount of estimated equity available to cover the second lien claim, indicators for the contract form of each lien type (amortizing or interest-only), and the degree of utilization for second lien lines of credit. Our empirical design also incorporates a number of fixed effects that capture the influence of servicer-specific factors (j), state laws governing loss mitigation actions (s), and time-specific trends prevalent at the time of first lien default (d), such as the extent of backlogs in mortgage foreclosure pipelines. Consequently, our parameter of interest focuses on within-servicer differences in mitigation choices in cases where the servicer owns a concurrent second lien loan, while controlling for borrower, state, and time-specific factors.

We note, however, that holdup problems exist even when the second lien servicer does *not* service the first lien. In particular, it is possible that the owner of the second lien could prevent modification or refinancing of the first lien by refusing to resubordinate its claim to the new loan, as discussed in Bond et al. (2013).

3 Data

3.1 Source and Address Matching for First Lien Mortgages and Home Equity Loans

We use three raw data sources to develop our data sample. The first is OCC Mortgage Metrics (MM), which collects data from 10 large banks that service about 56 million (64%) first lien mortgages in the United States. The MM database records various loan attributes as well as precise loss mitigation and performance outcomes beginning in January 2008. The second is the OCC Home Equity (HE) database, which contains about 23.2 million second lien home equity credits (representing about 65% of all home equity credits outstanding). The HE database coverage starts in May 2008. Similar to MM, the HE database contains data on a broad spectrum

of loan/borrower attributes measured at the time of loan origination, current measures of loan/borrower attributes, delinquency behavior, and loss mitigation/workout resolutions.

Associated with the HE database is the OCC Home Equity Crosswalk (HECW). For each home equity account in the dataset from December 2009 through April 2012, the HECW database allows us to link a second lien home equity loan to a first lien mortgage by matching exact addresses for each loan in a given month. Each record in the HECW database contains a pair of MM and HE loan numbers, the statement month, and the corresponding ID for each property address (e.g., 1234 Main Street, City X, State Y, and Zip Code 56789). If multiple MM loans or HE loans are found for a single property, the HECW database shows multiple records for that address. For example, if a borrower takes out a first lien mortgage (loan A), a home equity loan (loan B), and a home equity line of credit (HELOC, loan C) for his/her home, two records will be shown: loan A matching with loan B, and then loan A matching with loan C under the same property address ID. The match type of both records would be labeled as having one first lien mortgage and many home equity credit lines.

We use the earliest snapshot of HECW data available (December 2009) to construct the crosswalk between first lien and junior lien loans going back to May 2008. By doing so, we obtain a merged MM and HE dataset with a longer history. Through this process, we are able to extract about 2.95 million loan-pairs from May 2008 through April 2012 that have a first lien mortgage matching only one second lien loan. These properties account for about 80% of the HECW properties. For these loan-pairs, there are 126 million first lien loan statements and 94 million second lien loan statements.

To address the issue of left censoring, we focus on loans that became seriously delinquent after they entered the matched database. In constructing our sample of distressed loans, we require first lien loans to be either current or at most 30 days delinquent when the loan-pair first

appears in the data. We then define the loan-pair as being distressed when the first lien (MM) loan becomes seriously delinquent (defined as 60 days past due). At this point, the loan-pair enters our analysis sample. Using this definition, we identify about 0.43 million distressed loan-pairs with 20.4 million first lien statements and 14.4 million second lien statements.

3.2 Summary Statistics

We present the summary statistics in Table 1. Panel A summarizes the frequency of different loss mitigation actions for the holdup and non-holdup groups for the 6- and 12-month horizons following delinquency of the first lien loan. The panel shows that nearly half of all delinquent first lien loans (45.7%) receive no action from their servicers in the first six months. Among those loans that are acted upon by the servicers, the most common outcome is to be placed into a foreclosure process (about 33.7% of delinquent first lien loans). Only a small share (6.5%) of loans get fully liquidated (i.e., run through the entire foreclosure process or have a short sale/deed-in-lieu transaction completed) or modified within the first six months. A similar fraction of delinquent first lien loans gets modified. Over a longer 12-month horizon, the likelihood of inaction is reduced to about 28%, with the difference approximately equally distributed between liquidations (voluntary and otherwise) and modifications. During the first 6 months following delinquency of the first lien loan, about 36% of second lien loans remain current, dropping to about 28% for the 12-month horizon.

Across groups, we see that those subject to holdup (APAA and AGAA) have a somewhat lower incidence of inaction than the non-holdup groups (APBB and AGBB). For privately securitized loans, the holdup group has higher unconditional means for delinquent first lien mortgages being placed into the foreclosure process and a lower incidence of modification. The

opposite is true for loans securitized by the GSEs. We also note that second lien loans in the holdup groups are less likely to continue performing at both time horizons.

Previous studies (Lee et al. 2012, Goodman et al. 2011) have found that a substantial share of second lien loans remain current for extended periods after the associated first lien loans become delinquent. This recent phenomenon has been attributed to households' desire to retain access to a line of credit at times of economic stress. Such credit sources become more important when the first-lien mortgage obligation cannot be sustained, leading to degraded credit scores and subsequent difficulty in initiating new credit lines. Figure 1 corroborates the results of these earlier studies by summarizing the timing of defaults on senior and junior liens backed by the same property.

Only a small fraction of properties in our sample—8.8% of those with GSE-backed first lien mortgages and 7.0% of those with PLS first lien mortgages—record second lien delinquencies more than 3 months *before* the onset of delinquency on the associated first lien loan. Using a symmetric two-month window to define contemporaneous first- and second lien defaults, we find that 47.3% of loans in the GSE sample and 49.4% of loans in the PLS sample default simultaneously on both liens. The striking fact, however, is that about an equal share of borrowers in the GSE (27.5%) and the PLS (25.1%) samples remain current on their second lien loan for more than a year following the default of the associated first lien mortgage. These values mirror the Lee et al. (2012) estimates of 20–30 percent, which are based on credit bureau data.

Panel B of Table 1 presents summary statistics for the key borrower and loan characteristics in the holdup and non-holdup groups at both the 6- and 12-month horizons. We see that borrowers in our sample have mean FICO scores below 600, as would be expected having just gone through a serious delinquency. More importantly for the design of the study, the entire distribution of FICO scores appears broadly alike for holdup and non-holdup groups for

both GSE- and PLS-securitized loans. Figure 2 demonstrates this similarity in a continuous setting of kernel density plots. There is virtually no difference in the distribution of borrower FICO scores across the holdup and non-holdup groups, whether at the time of loan origination or following the delinquency that triggers a massive deterioration in credit scores. The same similarities can be observed in distributions of loan-to-value ratios on first lien loans (lower panels of Figure 2) or of the first- and second lien unpaid principal balances (available upon request).

As expected, a higher fraction of mortgages securitized via PLS are classified as low-documentation loans compared to GSE-backed loans. Interestingly, for both GSE and PLS loans, the fraction of low-documentation first lien mortgages is consistently lower in the holdup groups. Another notable difference between PLS and GSE mortgages is the extent to which the second lien loan is supported by the collateral that would remain after paying off the first lien. PLS loans have much lower cushions, on average, than GSE loans. We stress that this measure likely substantially overstates the amount of collateral that would be available for the second lien holder, because it assumes no-cost liquidation at the appraised value. Among PLS loans, the holdup group shows somewhat lower levels of collateral support for the second lien.

An area of concern in comparing the holdup and non-holdup groups is whether they contain a different mix of second lien loans. As mentioned by several studies (notably, Lee et al. 2012), borrower characteristics and subsequent performance substantially differ between closed-end second lien loans (CES) and the more traditional home equity lines of credit (HELOCs). CES loans are much more likely to have been originated alongside first liens—so-called piggyback loans—and to have performed similarly to subprime mortgages (especially when they were piggybacked). In contrast, the majority of HELOCs are originated after the first lien loan, and their performance generally resembles that of prime mortgages. Our dataset allows us to

identify HELOCs and CES loans, as well as categorize whether a given second lien loan was piggybacked to the first lien loan at origination. Panel B shows that the share of HELOCs in the holdup PLS sample is somewhat higher than in the non-holdup PLS sample, whereas the two GSE samples contain roughly equal shares of HELOCs. However, we find a substantial difference in shares of piggyback loans: both the GSE and PLS samples contain many more such loans in their respective holdup groups. This introduces the possibility of nonrandom selection into the holdup sample on the basis of variables observable to the lender but not the econometrician. We evaluate this possibility in our empirical analysis below.

Because previous research shows that loss mitigation actions are influenced by the type of state law governing foreclosures (Ghent and Kudlyak 2011), we also compare the distribution of loans in the two samples across judicial and non-judicial foreclosure states. We find virtually no difference in the fraction of loans in judicial foreclosure states assigned to the holdup and non-holdup groups for either type of securitization.

4 Empirical Results

We test the effects of holdup on several aspects of loss resolution. First, we test whether the propensity of servicers to take action is lower when holdup is a possibility. Second, conditional on servicers taking an action, we examine the effects of holdup on the likelihood of deciding whether to pursue loan modification or liquidation (forced and voluntary). Third, we evaluate various pathways within each of those choices. For liquidated loans, we assess whether holdup servicers were more likely to engage in voluntary liquidations (short sales and deeds-in-lieu) that maximized the value of their claims. For modified first lien loans, we evaluate actions on their second lien counterparts, both along the extensive and the intensive margins. Finally, we

look for evidence that servicers' behavior affected the long-term performance of first and second loans.

4.1 Holdup and No Action

During the recent financial crisis, a surprisingly high fraction of loans had no loss mitigation action (Agarwal et al. 2011a). In this subsection, we test whether this lack of action is exacerbated by the holdup problem. From the perspective of second-lien holders, delaying an action on the first lien allows the second lien holder to benefit from the borrower's potential recovery. Given that most delinquent borrowers are underwater, an immediate resolution of the first lien has a high likelihood of wiping out the value of the second lien altogether.[11] We, therefore, predict that the possibility of a holdup increases the likelihood of no action.

To test this hypothesis, we regress an indicator of whether there was any loss mitigation action undertaken with respect to the delinquent first lien mortgage on a holdup servicer indicator and a set of controls described in Equation (1). "No action" is defined as having no record of loss mitigation action on file, i.e., the first lien neither entered a modification (trial or permanent), started a foreclosure process, nor was liquidated. We include a large battery of controls.[12] Standard errors in all regressions are clustered by state.

[11] As mentioned in the introduction, resolving a delinquent first-lien loan through liquidation eliminates the second lien but not necessarily the promissory note. Resolving such loans through modifications need not impair the second lien altogether, although PSA agreements often contain clauses that require concurrent action on second-lien loans.

[12] Controls include the following measures captured at the time of first-lien delinquency: an indicator as to whether the second lien has defaulted, indicators for five FICO score buckets, indicators for buckets of the leverage of the first-lien loan, indicators for buckets of the unpaid balance (in dollars) of the first- and second-lien loans, and the fraction of the second-lien loan that could be covered by the current value of the house. They also include indicators for categories of the original terms of the first- and second-lien loans, for whether the first- and second-lien loans had low documentation, for whether the first-lien loan is an ARM, for whether the first- and second-lien loans are interest-only loans, for whether the second-lien loan is a home equity line of credit, for whether the second-lien loan is fully drawn, for whether the second-lien loan is a credit line and is frozen, and for whether the second lien loan is a piggyback loan (i.e., originated within two months of the origination of the first lien loan). The controls also

Table 2 presents several specifications for regression samples consisting of mortgages in both the holdup (ASAA) and the non-holdup group (ASBB). We show results for the 6- and 12-month horizons as well as splits between loans securitized by GSEs and those with PLSs.

The results in all specifications show that the likelihood of no action is higher when holdup is a possibility. The economic magnitude is large. The unconditional probability of no action among PLS loans is 49.8% and 31.2% for 6 and 12 months, respectively. For GSE loans, the probability of no action is 44.1% and 26.5% for 6 and 12 months, respectively. For PLS loans, the coefficient on the holdup servicer dummy for the 6-month horizon is 4.4 percentage points, translating into a relative increase in the likelihood of inaction of 8.9%. Over the 12-month horizon, the coefficient of 3.1 percentage points corresponds to about a 10% increase. The estimates of the holdup effect for the GSEs point to a 4% (1.7/44.1) and 2.9% (0.8/26.5) higher likelihood of no action.

We consider an alternative explanation for our results. A difference in the likelihood of receiving any action can potentially be explained by coordination time. Suppose that the first- and second lien holders negotiate the outcome of a loan. We would expect more delay related to legal negotiations when the negotiating parties are distinct, as in the non-holdup group ASBB. In contrast, the regressions show that this action is less likely when the first and second liens are serviced by the same party, as in ASAA.

Interestingly, the regressions show that mortgages in which only the first lien has defaulted (i.e., the attached second lien is continuing to perform) have a higher likelihood of having no action. This finding is consistent with the idea that when the second lien is current (i.e., non-delinquent), there is little incentive for the second lien holder to cooperate.

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include a set of dummies for the delinquency quarter, the state in which the secured property is located, the identity of the first-lien servicer, and indicators for the origination year of the first-lien loan.

Overall, these results show that the possibility of a holdup reduces the likelihood of any loss mitigation action by 3% to 10%.

4.2 Holdup and No Action: Robustness Checks

Our identification of holdup servicers thus far has been based on comparing identities of the first- and the second-lien servicers at the time the first lien becomes delinquent and the loan-pair enters the sample. However, the time period of our sample is characterized by substantial industry consolidation, with firms severely weakened by the crisis being absorbed by their stronger competitors. If a firm A servicing the first lien mortgage is acquired by a firm B servicing the second lien loan *after* the first lien loan becomes delinquent, firm B would theoretically exercise control over both liens. Yet, our approach will fail to categorize this loan-pair as subject to potential holdup. As an alternative, we could identify holdup situations on the basis of a fixed horizon *following* sample entry or the merger, but this strategy presents its own problems. Even though the acquiring entity becomes the de jure owner of both liens on the date of the merger, the de facto integration of servicing systems and decision-making might take some time, as well as varying considerably from merger to merger. Consequently, we conduct a simple robustness check of our results by removing from our sample all of the loan-pairs in which the servicer of either the first- or the second lien loan was acquired. Acquired servicers account for about 36% of our observations. In the remaining sample, there is no ambiguity about which servicing entity is making loss mitigation decisions and thus no ambiguity in identifying holdup cases.

The results of this exercise are shown in columns (1) and (4) of Table 2B. Although sample sizes are smaller (especially among PLS loans), the holdup loan-pairs continue to be

strongly associated with a higher likelihood of inaction. The magnitudes of the coefficient estimates remain similar to those obtained using the full sample (Table 2).

As mentioned in the previous subsection, cases in which the second lien loan continued to be current were less likely to receive any loss mitigation action on the delinquent first lien mortgage. One might expect this effect to be magnified for holdup servicers, because they might be more aware of the payment status of the second lien and more reluctant to upset the status quo. To evaluate this, we restrict the sample to cases in which the second lien remained current. Once again, we find a strongly positive coefficient on the holdup dummy (columns (2) and (5)). However, the magnitude of this effect is not larger in the restricted sample either in absolute or relative terms.[13]

Our overall identification strategy hinges on the holdup and non-holdup samples being observationally equivalent at the time of sample entry. As discussed in Section 3.2, we observe a much higher prevalence of piggyback second lien loans among holdup servicers. This finding raises the possibility that the holdup sample could be different for a variety of unobservable reasons. For example, holdup servicers who issue piggybacks might be fully aware of the combined LTV of their loans and might thus select a different subset of borrowers than non-holdup servicers of piggyback loans. Put differently, holdup servicers of piggyback loans likely have better information about their borrowers, which could explain the difference in their actions following the default. Moreover, because piggyback loans are more likely to be originated for the purpose of financing the home purchase (or refinancing), the ability of the second lien holder to pursue collection is limited relative to loans used to finance other consumption. This, too, could result in a different set of observed actions undertaken by servicers.

[13] In an alternative specification, we interacted holdup with an indicator of only the first lien being delinquent, and we got similar results.

To guard against this possibility, we repeat our regressions on samples that exclude loan-pairs in which the second lien is a piggyback. The results are presented in columns (3) and (6) of Table 2B. Again, we find a higher likelihood of inaction by holdup servicers. The magnitude of the estimates of the holdup effect in the non-piggyback sample is similar to that of the full sample.

In all subsequent analyses, we repeat the robustness checks described in this subsection. In all cases, the results are qualitatively and quantitatively similar to those obtained in the full sample, and we do not report them for brevity.[14]

4.2 Holdup and Liquidations

The findings in the previous section suggest that holdup servicers are more likely to avoid taking an action on a delinquent loan. Once a decision to take action is made, is there a difference in the behavior of such servicers with respect to the course of loss mitigation? Because a holdup servicer immediately internalizes the loss from sending a property to liquidation, we expect such servicers to be less likely to liquidate a securitized first lien mortgage.[15]

In Table 3, we test this prediction by regressing an indicator for whether a loan is liquidated or is in the foreclosure process within 6 or 12 months post-delinquency on the holdup indicator and the same set of controls used in Table 2. We restrict our sample to loans that went through some loss mitigation action.[16]

[14] All of the tables with robustness checks are available on request.
[15] Even if the servicer were still able to pursue collection efforts or if the second-lien loan remained current, the loss of a lien renders the second-lien loan unsecured and thus subjects the lender to higher capital charges.
[16] Among loans with loss mitigation actions, the three outcome categories are liquidation, modification, and refinancing/loan repayment.

The results in columns (1) and (2) of Table 3, Panel A, show that the six-month likelihood of liquidation or foreclosure of the first lien loan is significantly lower—by 2.3 to 4.0 percentage points—among loans for which holdup is a possibility. This effect is present for both PLS and GSE loans, although it appears to be larger and more persistent for the latter subgroup. (Panel B of Table 3 presents results over a longer 12-month horizon.) In relative terms, the likelihood of liquidation or foreclosure is 3% to 5% lower. This result is consistent with the idea that first lien servicers who have a stake in the second lien loan use their power to hold up liquidations and foreclosures. Columns (3) and (4) show the results of a similar exercise in which the sample is further limited to properties with a delinquent first lien but a still-performing second lien loan. In cases of performing second liens, the effects of potential holdup are somewhat stronger, as expected—holdup servicers are in less of a rush to liquidate properties while the junior lien loan they own continues to perform.

The OCC data allow us to identify the specific type of liquidation action taken by the servicer. We differentiate between involuntary liquidations (foreclosures) and voluntary liquidations (short sales and deeds-in-lieu), which allow borrowers to negotiate in advance the terms upon which they will surrender the collateral. As mentioned earlier, involuntary liquidations result in automatic extinguishment of the junior liens (though not the claims themselves). In contrast, non-foreclosure liquidations require the junior-lien holder to resolve their claim in some fashion in order for the transaction to proceed. This creates an opportunity for the junior claimant to receive a payment in return for releasing its lien (Been et al. 2012). Consequently, we would expect the holdup servicers to prefer this path if liquidation is chosen.

Columns (5) and (6) present the regression results on the subsample of delinquent loans chosen for liquidation. We find that among such loans, holdup servicers indeed prefer the path of voluntarily negotiated liquidations, which allows them to negotiate a payment for releasing their

second lien while retaining the monetary claim. The economic magnitude of this effect is substantial: holdup servicers are 18% to 21% more likely to select voluntary liquidations relative to the unconditional mean.

In summary, our results indicate that liquidation, in general, is less likely when the securitized first lien mortgage has a second lien attached that is being serviced by the holder of the second lien. This finding is consistent with the idea that second lien lenders hold up first lien lenders. However, if liquidation is pursued, holdup servicers are more likely to negotiate a voluntary liquidation arrangement.

4.3 Holdup and Modifications

Whether or not holdup servicers favor modifications of first lien loans is a subject of debate. Legally, the second lien is not automatically extinguished once the first lien is modified. Therefore, modification of the first lien loan could be favorable to the owner of the second lien loan because it improves the borrower's overall cash flows, thereby making repayment of the second lien more likely. In practice, modification of the first lien may lead to a deadlock. In many cases, the PSAs do not allow the first lien to be modified without the second lien being extinguished or modified. Second lien holders, however, may be reluctant to relinquish their claim. In comparison, when the same servicer has control over both first and second liens, it may be able to push a modification through.

In Table 4, Panel A, we test the proposition that holdup servicers will favor modification of the first lien. We regress a modification dummy on the holdup indicator and the usual set of controls and fixed effects. The results are mixed. We find no evidence of holdup effects for PLS loans over the six-month horizon following delinquency, but we do find a positive effect for GSE loans. Over a longer horizon, the estimated effect for GSE loans remains positive and sizable,

suggesting a 16% relative increase in the modification rate of holdup servicers. However, the estimate for the PLS loan sample becomes significantly negative though small in magnitude.

The difference in results for GSE and PLS loans potentially reflects differences in the institutional arrangements governing loan modifications in cases where multiple liens are present. Decisions on GSE loans are well coordinated across investors due to the uniformity of GSE servicing arrangements and their market power. In comparison, in PLS originations, investors are dispersed and the coordination mechanism is poor. The difference may allow holdup servicers to have greater latitude in their decisions about modifying PLS loans compared with GSE loans.

We next turn to the question of whether, conditional on modification of the first lien mortgage, the holdup servicers are less likely to modify their second liens. Although such behavior can maximize value for the holdup servicer, their ability to do so is circumscribed by the servicing arrangements. The empirical results, presented in Panel B of Table 4, suggest that such arrangements might be affecting servicer choice. Indeed, we find that holdup servicers are *more* likely to modify junior liens conditional on modifying the senior claims. This finding is consistent with the fact that holdup servicers are more aware of the presence of the second lien (or it is cheaper and easier for them to verify that a junior lien exists) and are thus bound by servicing agreements to take action on second lien loans. As suggested by point estimates in Panel B, this effect is large, varying between 15 and 30% relative to the unconditional mean. We also note that servicers appear to be able to avoid taking action on a large share of second lien loans following modification of the first lien.

4.4 The Characteristics of Modifications of Loans Subject to Holdup

As shown in the previous subsection, holdup servicers are more likely to jointly modify both loans. It is possible that these actions still maximize the value of holdup servicers' claims, especially if they are able to modify their second lien loans on relatively favorable terms. We look for evidence of preferential holdup among second lien loans owned by the holdup servicers.

We measure the generosity of mortgage modifications as the reduction in the modified loan payment relative to the original amount. This is a well-defined metric for first lien loans that have preset amortizing payments. However, second lien loans present a potential problem, because some only require minimum payments, which are less sensitive to changes in loan terms. To partially mitigate the resulting imprecision, we aggregate modified loans into three categories: those whose required payment increased following modification, did not change, and decreased.

Table 5 presents summary statistics from this exercise for GSE and PLS loans, stratified by whether the servicer making modification decisions was subject to holdup concerns. Among GSE loans (Panel A), we fail to detect any appreciable difference in the distribution of outcomes between holdup and non-holdup servicers. Among PLS loans (Panel B), we find a *lower* incidence of modifying second lien loans on preferential terms among holdup servicers, which is compensated by their higher propensity to modify both liens on similar terms. The *pari passu* treatment of senior and junior liens in the dataset is not necessarily surprising given the existence of the 2MP program introduced by the U.S. Treasury in 2010. Under the program, servicers of second lien loans are given monetary incentives to match the terms of HAMP modifications extended to the first lien loans backed by the same property. It should be noted that modifying second liens on equal or better terms than the first lien mortgages runs counter to the principle of seniority and could thus be regarded as favorable to the second lien. On net, we do not detect any

statistically measurable differences in the propensity of holdup servicers to offer favorable second lien modifications.

4.5 The Effects of Holdup on Borrower Welfare

Our earlier results show that holdup servicers are less likely to act on delinquent first lien mortgages owned by investors and that when they do act, they favor modifications over liquidations, especially when the second lien is still performing. Thus, holdup factors appear to affect the distribution of cash flows between first- and second lien holders. An important question is whether holdup also affects borrowers' welfare or whether it is simply a wealth transfer between first- and second lien holders.

To answer this question, we examine the performance of loans conditional on holdup. If holdup servicers are better able to identify borrowers with better prospects of resuming payments, their delay of loss mitigation and particularly liquidation actions is beneficial. A similar implication is reached if such servicers are better able to identify loans for which modification is more likely to lead to sustainable loan performance. We begin with the first lien.

In Table 6, we regress an indicator of whether the first lien is performing in months 7 through 12 following its delinquency on a holdup indicator and the rest of the controls. We first perform this regression on a subsample of loans in which the first lien saw no action over the first six months following delinquency. The results in columns (1) and (2) suggest that holdup servicers were indeed better able to identify borrowers that could self-cure in the absence of servicer action. The economic magnitude of these effects is non-negligible: 1.5% (or 11% in relative terms) for PLS loans and 0.9% (4% in relative terms) for GSE loans.

In columns (3) and (4), we restrict the sample to loans that were modified within the first six months. The point estimates suggest that holdup servicers were also more likely to extend

modifications to borrowers with ex post better loan performance. Again, the effects are somewhat stronger for PLS loans (8% in relative terms) than for GSE loans (3% in relative terms).

We next test the performance of the second lien over the same horizon. This test is important beyond the welfare question, because it is possible that holdup servicers encourage borrowers to stay current on their second lien loans *in exchange* for avoiding liquidation of the first lien loan. Consequently, in Table 7 we examine performance of second-lien loans among those loan-pairs for which only the first lien was delinquent at the outset. Columns (1) and (2) indicate that in this sample, second lien loans of holdup servicers perform 2.2% better for PLS loans, but that there is no material effect for second lien loans attached to GSE securitizations. We then repeat the exercise conducted for the first lien loans and partition the sample into cases in which the first lien received no action over the first six months and cases in which the first lien was modified. Among GSE-backed loans (columns (3) and (4)), this decomposition fails to identify any holdup effects. For PLS loan-pairs, we find that second lien loans of holdup servicers are more likely to remain current, both when they waited to undertake any first lien action and when they modified the first lien. This finding is consistent with the idea that holdup servicers convince borrowers to stay current on their second liens in exchange for avoiding liquidation of the first lien loan.

5 Conclusion

In this paper, we present novel evidence showing that the seniority structure in mortgage lending affects loss mitigation outcomes. In particular, we find evidence of systematic differences in loss mitigation actions by servicers who own the second lien loan and who service both loans. Our findings suggest that such “holdup” servicers are less likely to take actions that

jeopardize the value of their own claims. Specifically, holdup servicers are more likely to delay any action on delinquent first lien mortgages, lowering the likelihood of foreclosures. When they do take action, their loss mitigation approaches are skewed away from liquidations, especially in instances where the associated second lien loan remains performing. When such servicers do pursue liquidations, they are somewhat more likely than non-holdup servicers to use the short-sale and deeds-in-lieu approaches, which give them greater bargaining power in the foreclosure process. Our results also suggest that holdup increases the likelihood of modifications for GSE-backed loans and that it increases the likelihood of concurrent modification of second lien loans.

The welfare implications of our results are far from straightforward. On the one hand, the actions of holdup servicers appear to maximize the value of their junior claims, possibly at the expense of the senior-lien holders. On the other hand, the holdup servicers appear to be better at identifying first lien loans that self-cure, and their delay in taking loss mitigation actions on such loans improves the value of the first lien loans as well. Our results further show that some second lien loans owned by holdup servicers are more likely to remain performing, consistent with the idea that these servicers encourage second lien holders to remain current on their loans in exchange for avoiding liquidation.

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Table 1. Summary Statistics

The table gives summary statistics for the subsamples used in the paper. Panel A shows statistics about the loss mitigation actions for the different subsamples by investor type. Panel B presents summary statistics for the holdup and non-holdup groups for the 6- and 12-month horizons.

Panel A: Holdup and Non-holdup Samples

	Private-Label Securitizations (PLS)		Government Sponsored Entity Securitizations (GSE)		GSE + PLS Loans
	Holdup	Non-Holdup	Holdup	Non-Holdup	
Group	APAA	APBB	AGAA	AGBB	
1st lien servicer	A	A	A	A	
1st lien owner	P	P	G	G	
2nd lien servicer	A	B	A	B	
2nd lien owner	A	B	A	B	
	Action on 1st lien within 6 months				
N =	35,348	50,784	123,439	96,473	306,044
1st lien					
No action	46.4	52.2	43.7	44.7	45.7
In foreclosure process	33.9	30.3	33.2	36.0	33.7
Liquidated	6.4	4.1	7.3	6.8	6.5
Modified	5.0	8.8	6.6	5.9	6.5
Repayment/Prepaid (incl. voluntary liq)	8.3	4.6	9.2	6.7	7.5
2nd lien performing at the end of horizon	32.3	37.3	34.5	39.0	36.1
	Action on 1st lien within 12 months				
N =	33,087	47,856	115,597	89,791	286,331
1st lien					
No action	28.2	33.3	25.9	27.4	27.9
In foreclosure process	31.8	31.7	28.7	31.4	30.4
Liquidated	18.9	13.8	19.1	18.8	18.1
Modified	10.1	14.9	14.5	13.4	13.7
Repayment/Prepaid (incl. voluntary liq)	11.0	6.4	11.7	9.0	9.9
2nd lien performing at the end of horizon	24.5	26.9	27.2	30.1	27.7

Table 1. Summary Statistics (Cont.)

Panel B: Summary Distribution Statistics

	Private Label Securitizations (PLS)				Government Sponsored Entity Securitizations (GSE)			
Horizon:	6 months		12 months		6 months		12 months	
	Holdup	Non-Holdup	Holdup	Non-Holdup	Holdup	Non-Holdup	Holdup	Non-Holdup
Group	APAA	APBB	APAA	APBB	AGAA	AGBB	AGAA	AGBB
Current borrower and loan characteristics								
FICO group 1 (<300)	3%	4%	3%	4%	5%	6%	5%	6%
FICO group 2 (300-579)	21%	22%	21%	22%	27%	27%	27%	27%
FICO group 3 (580-659)	22%	23%	22%	23%	23%	23%	23%	23%
FICO group 4 (660-719)	24%	25%	24%	25%	21%	21%	22%	22%
FICO group 5 (720-779)	21%	20%	22%	20%	17%	17%	17%	16%
FICO group 6 (>780)	8%	6%	8%	6%	6%	5%	6%	5%
CLTV group 1 (<80)	27%	22%	27%	22%	36%	36%	36%	35%
CLTV group 2 (80-99)	21%	22%	21%	22%	24%	23%	24%	23%
CLTV group 3 (100-119)	18%	19%	18%	19%	15%	14%	15%	14%
CLTV group 4 (>120)	27%	26%	27%	26%	19%	18%	19%	18%
CLTV group 5 (missing)	8%	11%	8%	11%	6%	10%	7%	10%
1st lien unpaid balance group 1 (<$133K)	14%	11%	14%	11%	28%	26%	28%	26%
1st lien unpaid balance group 2 ($133-217K)	15%	18%	15%	18%	30%	31%	30%	31%
1st lien unpaid balance group 3 ($218-341K)	17%	22%	17%	22%	28%	31%	29%	31%
1st lien unpaid balance group 4 (>$341K)	53%	49%	53%	49%	13%	11%	13%	11%
1st lien unpaid balance group 5 (missing)	0%	0%	0%	0%	0%	0%	0%	1%
2nd lien unpaid balance group 1 (<$28K)	15%	13%	15%	13%	29%	25%	29%	25%
2nd lien unpaid balance group 2 ($29-49K)	19%	19%	19%	19%	29%	26%	29%	26%
2nd lien unpaid balance group 3 ($50-83K)	28%	27%	28%	27%	24%	25%	24%	25%
2nd lien unpaid balance group 4 (>$83K)	36%	39%	36%	40%	17%	22%	17%	22%
2nd lien unpaid balance group 5 (missing)	2%	2%	2%	2%	2%	2%	2%	2%
Loan terms at origination								
1st lien term group 1 (<= 15 yrs)	4%	2%	4%	2%	7%	6%	7%	6%
1st lien term group 2 (20-30 yrs)	93%	95%	93%	95%	92%	93%	92%	93%
1st lien term group 3 (>30 yrs)	4%	3%	4%	3%	2%	0%	2%	0%
2nd lien term group 1 (<= 10 yrs)	37%	30%	36%	30%	35%	28%	34%	29%
2nd lien term group 2 (10 - 15 yrs)	11%	17%	12%	17%	14%	16%	14%	16%
2nd lien term group 3 (15 - 25 yrs)	5%	11%	5%	11%	7%	15%	7%	14%
2nd lien term group 4 (> 25 yrs)	33%	31%	33%	31%	37%	30%	37%	30%
2nd lien term group 5 (missing)	14%	11%	15%	12%	7%	11%	8%	11%
1st lien is low doc	62%	73%	63%	73%	43%	56%	43%	57%
2nd lien is low doc	77%	80%	77%	81%	70%	71%	71%	72%
1st lien is ARM	56%	57%	56%	57%	20%	18%	21%	19%
1st lien is interest only (IO)	42%	43%	42%	44%	17%	17%	18%	18%
2nd lien is interest only (IO)	56%	51%	56%	51%	46%	45%	45%	45%
Legal Holdup								
1st lien is non-recourse	55%	56%	55%	56%	38%	38%	38%	38%
2nd lien is non-recourse	2%	2%	2%	2%	2%	2%	2%	2%
1st lien is judicial state	30%	27%	30%	27%	42%	39%	42%	39%
Second lien characteristics								
2nd lien is HELOC	63%	65%	63%	66%	54%	61%	53%	62%
2nd lien is piggyback (within 2mo of 1st lien)	59%	37%	59%	36%	54%	33%	54%	33%
2nd lien is fully drawn	15%	12%	15%	13%	11%	10%	11%	10%
2nd lien is frozen	42%	45%	41%	46%	36%	41%	35%	42%
2nd lien UPB covered by home equity (avg.)	21%	20%	21%	19%	33%	35%	33%	35%

Table 2. Holdup and No Action

The table shows the results of regressions of an indicator of whether the first lien loan had no action on determinants. All regressions are ordinary least squares regressions. The sample includes the groups ASAA (holdup) and ASBB (non-holdup). Columns (1) and (2) measure the dependent variable over the 6-month period from the time the loan was identified as distressed. Columns (3) and (4) measure the dependent variable over the 12-month period from the time the loan was identified as distressed. The sample covers loans that became distressed between December 2009 and April 2012. *Holdup* indicates whether the observation belongs to the holdup group. Controls include the following measures captured at the time of first lien delinquency: an indicator of whether the second lien has defaulted, indicators for five FICO score buckets, indicators for buckets of the leverage of the first lien loan, indicators for buckets of the unpaid balance (in dollars) of the first- and second lien loans, and the fraction of the second lien loan that could be covered by the current value of the house. They also include indicators for categories of the original terms of the first- and second lien loans, for whether the first- and second lien loans had low-documentation, for whether the first lien loan is an ARM, for whether the first- and second lien loans are interest only loans, for whether the second lien loan is a home equity line of credit, for whether the second lien loan is fully drawn, for whether the second lien loan is a credit line and is frozen, and for whether the second lien loan is a piggyback loan (i.e., originated within two months of the origination of the first lien loan). The controls also include a set of dummies for the delinquency quarter, the state in which the secured property is located, the identity of the first lien servicer, and indicators for the origination year of the first lien loan. Standard errors are clustered at the state level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	No action within…			
Horizon:	6 months		12 months	
Sample:	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)
Unconditional mean	49.8	44.1	31.2	26.5
Holdup (0/1)	4.419***	1.742***	3.082***	0.757**
	[5.626]	[6.583]	[4.622]	[2.418]
1st lien controls	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	86,132	219,912	80,943	205,388
Adj R^2	0.135	0.152	0.120	0.128

Table 2.B Holdup and Not Action on Delinquent Mortgages: Alternative Sample Restrictions

The table repeats the regressions in Table 2 on a number of different subsamples: (a) a subsample limited to the servicers that do not get acquired during our sample period, which removes ambiguity about the timing of which entity exercised control over loss mitigation decisions; (b) a subsample limited to loan pairs in which the second lien remained performing during the first 6 months following the delinquency of the first lien; and (c) a subsample that excludes piggyback second lien loans, which helps to evaluate the possibility that piggyback-issuing holdup servicers have an informational advantage over non-holdup servicers of piggyback loans. All regressions include the same set of controls as in Table 2. Standard errors are clustered at the state level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	No action within 6 months of first lien default					
Investor type:	PLS			GSE		
Sample:	Servicers that do not get acquired	2nd lien is current during first 6 months	No piggyback 2nd liens	Servicers that do not get acquired	2nd lien is current during first 6 months	No piggyback 2nd liens
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	41.3	55.1	51.3	43.9	55.5	45.4
Holdup (0/1)	3.428***	3.141***	4.489***	1.522***	1.702***	2.217***
	[5.516]	[4.737]	[5.609]	[6.702]	[3.987]	[7.617]
1st lien controls	Yes	Yes	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	41,997	30,354	46,580	152,789	80,240	122,144
Adj R^2	0.122	0.105	0.131	0.159	0.095	0.135
Only 1st lien defaulted at end of horizon	12.029***	NA	6.705***	15.233***	NA	14.852***
	[11.942]		[5.075]	[15.346]		[16.726]

Table 3. Choice of Loss Mitigation Conditional on Action

The table shows the results of regressions of an indicator of whether the first lien loan had a liquidation or foreclosure in process conditional on being acted upon within 6 or 12 months of delinquency (Panels A and B, respectively) on a set of controls and the holdup indicator. The sample encompasses the groups ASAA (holdup) and ASBB (non-holdup). The sample covers loans that became distressed between December 2009 and April 2012. Columns (1) and (2) present the baseline case for all delinquent first lien loans that received some loss mitigation action. Columns (3) and (4) restrict the sample to loan pairs in which the second lien remained performing during the relevant action horizon. Columns (5) and (6) show the regressions of an indicator for voluntary liquidation outcomes (short sales or deeds-in-lieu) conditional on the first lien loan being liquidated. All regressions are ordinary least squares regressions. All regressions include the same set of controls as in Table 2. Standard errors are clustered at the state level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Probability of Liquidation and Foreclosure Process, 6-month Horizon

Dependent variable:	Liquidation + Foreclosure process				Voluntary liquidation	
Horizon:	6 months		6 months		6 months	
Sample restriction:	Action taken		Action taken on 1st lien and 2nd lien is current		Liquidated	
Sample:	PLS	GSE	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	73.4	74.4	54.7	50.8	8.9	6.5
Holdup	-2.264***	-3.988***	-4.325***	-5.691***	1.851***	1.172***
	[-4.295]	[-15.391]	[-4.102]	[-7.268]	[4.444]	[6.595]
1st lien controls	Yes	Yes	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	43,220	122,870	13,619	35,722	31,712	91,357
Adj R^2	0.166	0.229	0.162	0.202	0.132	0.083

Table 3. Choice of Loss Mitigation Conditional on Action (Cont.)

Panel B: Probability of Liquidation and Foreclosure Process, 12-month Horizon

Dependent variable:	Liquidation + Foreclosure process				Voluntary liquidation	
Horizon:	12 months		12 months		12 months	
Sample restriction:	Action taken		Action taken on 1st lien and 2nd lien is current		Liquidated	
Sample:	PLS	GSE	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	69.2	66.5	45.3	38.1	17.2	11.8
Holdup	-1.316***	-3.992***	-3.875***	-4.508***	2.695***	2.081***
	[-3.014]	[-12.429]	[-3.456]	[-8.295]	[6.311]	[9.732]
1st lien controls	Yes	Yes	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	55,681	150,858	12,745	36,515	38,542	100,373
Adj R^2	0.161	0.213	0.157	0.190	0.143	0.111

Table 4. Holdup and Modification

Panel A shows the results of regressions of an indicator of whether the first lien loan had a modification on determinants conditional on being acted upon within 6 or 12 months of delinquency. Panel B shows the results of regressions on an indicator of whether the second lien loans received modification within the same period as the associated first lien loans. In this panel, the sample is limited to loan-pairs in which the first lien was modified during the first 6 or 12 months following delinquency. All regressions are ordinary least squares regressions and include the same set of controls as in Table 2. The sample encompasses the groups ASAA (holdup) and ASBB (non-holdup). The sample covers loans that became distressed between December 2009 and April 2012. *Holdup* indicates whether the observation belongs to the holdup group. Standard errors are clustered at the zip code level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Likelihood of Modification of Delinquent First Lien Mortgages

Dependent variable:	Modification within …			
Horizon:	6 months		12 months	
Sample restriction:	Action taken		Action taken	
Sample:	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)
Unconditional mean	14.5	11.2	18.8	19.1
Holdup	-0.517	2.167***	-0.918**	2.896***
	[-1.036]	[7.290]	[-2.603]	[8.539]
1st lien controls	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	43,220	122,870	55,681	150,858
Adj R^2	0.182	0.147	0.153	0.143

Table 4. Holdup and Modification (Cont.)

Panel B: Likelihood of Modification of Second Lien Loans Conditional on Modification of First Lien Mortgages

Dependent variable:	2nd lien modification within …			
Horizon:	6 months		12 months	
Sample restriction:	1st lien modified		1st lien modified	
Sample:	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)
Unconditional mean	14.1	15.4	17.8	21.4
memo: share no action	69.6	70.8	53.4	54.0
memo: share written off	14.5	12.1	26.3	21.9
Holdup	4.142***	3.130***	2.673**	3.378***
	[3.998]	[5.612]	[2.428]	[3.606]
1st lien controls	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	6,194	13,580	9,537	26,448
Adj R^2	0.116	0.102	0.110	0.087

Table 5. Holdup and Relative Generosity of Second Lien Modifications

This table presents the distribution of the relative generosity of modifications for first- and second lien loans. The sample is limited to loan-pairs in which both liens were modified. Generosity of modifications is defined in terms of the relative reduction in required monthly payments relative to the original loan. Modified loans are aggregated into five broad categories: those whose required payment increased following modification, did not change, decreased by less than 20%, decreased between 20% and 40%, or decreased by more than 40%. The resulting 5-by-5 matrix of payment change categories for modified first- and second lien loans allows for a simple visualization of their relative generosity. For loan-pairs at or below the diagonal of this matrix, the second lien modification offered similar or better payment reduction than the first lien modification. Two-tailed statistical significance of the difference in means between holdup and non-holdup servicers is denoted by *, **, and *** for the 10%, 5%, and 1% levels, respectively.

Panel A: Distribution of Payment Reductions When First Lien Is Backed by GSEs

	Payment reduction for second-lien relative to first-lien			
Payment reduction category:	Greater	Similar	Smaller	N
Holdup servicers	35.3%	21.5%	43.2%	2,731
Non-holdup servicers	35.6%	21.5%	42.9%	1,310
Difference:	-0.4%	0.0%	0.3%	

Panel B: Distribution of Payment Reductions When First Lien Is Securitized through PLS

	Payment reduction for second-lien relative to first-lien			
Payment reduction category:	Greater	Similar	Smaller	N
Holdup servicers	36.1%	28.1%	35.9%	563
Non-holdup servicers	49.2%	18.2%	32.6%	801
Difference:	-13.1%***	9.8%***	3.3%	

Table 6. Holdup and First Lien Loan Performance

The table shows the results of regressions of an indicator of whether the first lien loan performs after 12 months on determinants. The evaluation period covers months 7 through 12 following delinquency. In cases where no action was taken on the delinquent first lien mortgage (columns (1) and (2)), an indicator value of 1 corresponds to loans self-curing by the end of the 12-month period. In cases in which the delinquent first loan was modified (columns (3) and (4)), the value of 1 corresponds to the modified loan continuing to perform by the end of the 12-month period following the original delinquency. All regressions are ordinary least squares regressions. The sample includes the groups ASAA (holdup) and ASBB (non-holdup). The sample covers loans that became distressed between December 2009 and April 2012. *Holdup* indicates whether the observation belongs to the holdup group. Controls include the following measures captured at the time of first lien delinquency: an indicator as to whether the second lien has defaulted, indicators for five FICO score buckets, indicators for buckets of the leverage of the first lien loan, indicators for buckets of the unpaid balance (in dollars) of the first- and second lien loans, and the fraction of the second lien loan that could be covered by the current value of the house. They also include indicators for categories of the original terms of the first- and second lien loans, for whether the first- and second lien loans had low-documentation, for whether the first lien loan is an ARM, for whether the first- and second lien loans are interest-only loans, for whether the second lien loan is a home equity line of credit, for whether the second lien loan is fully drawn, for whether the second lien loan is a credit line and is frozen, and for whether the second lien loan is a piggyback loan (i.e., originated within two months of the origination of the first lien loan). The controls also include a set of dummies for the delinquency quarter, the state in which the secured property is located, the identity of the first lien servicer, and indicators for the origination year of the first lien loan. Standard errors are clustered at the state level. *t-statistics* are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	First-lien loan performs after…			
Horizon:	12 months		12 months	
Sample restriction:	No action taken at month = 6		Modified loans at month = 6	
Sample:	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)
Unconditional mean	13.2	21.4	58.3	78.7
Holdup	1.466**	0.876***	4.473**	2.401***
	[2.074]	[3.080]	[2.277]	[3.056]
1st lien controls	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	39,867	89,100	6,035	13,319
Adj R^2	0.113	0.125	0.216	0.169

Table 7. Holdup and Second Lien Loan Performance

The table shows the results of regressions of an indicator of whether the second lien loan continues to perform in months 7 through 12 following the first lien delinquency. The sample is limited to loan-pairs for which the second lien was performing at the time of first lien mortgage delinquency. Columns (1) and (2) show the results for the sample that includes all first lien loans regardless of their loss mitigation disposition. Columns (3) and (4) restrict the sample to those loan-pairs in which the first lien received no loss mitigation action in the first six months, and columns (5) and (6) restrict the sample to pairs in which the first lien was modified during the first six months. All regressions are ordinary least squares regressions and include the same set of controls as in Table 6. The sample includes the groups ASAA (holdup) and ASBB (non-holdup). The sample covers loans that became distressed between December 2009 and April 2012. Standard errors are clustered at the zip code level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Second-lien loan still performing after…					
Horizon:	12 months		12 months		12 months	
Sample restriction:	All loans		No action taken at month = 6		Modified loans at month = 6	
Sample:	PLS	GSE	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	66.6	71.4	68.5	73.9	77.3	85.0
Holdup	2.211***	0.419	1.612**	-0.871*	4.421*	0.188
	[3.190]	[0.902]	[2.029]	[-1.775]	[2.000]	[0.141]
1st lien controls	Yes	Yes	Yes	Yes	Yes	Yes
2nd lien controls	Yes	Yes	Yes	Yes	Yes	Yes
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,185	71,216	15,298	41,002	3,519	8,528
Adj R^2	0.070	0.064	0.076	0.072	0.090	0.078

Figure 1. Timing of Second Lien Loan Delinquency Relative to Delinquency on the Associated First Lien Loan

This figure depicts the distribution of when the second lien loan becomes delinquent relative to the delinquency on the associated first lien loan. The results are presented separately for borrowers whose first lien loans are securitized through the GSEs and those whose first lien loans are securitized through PLSs.

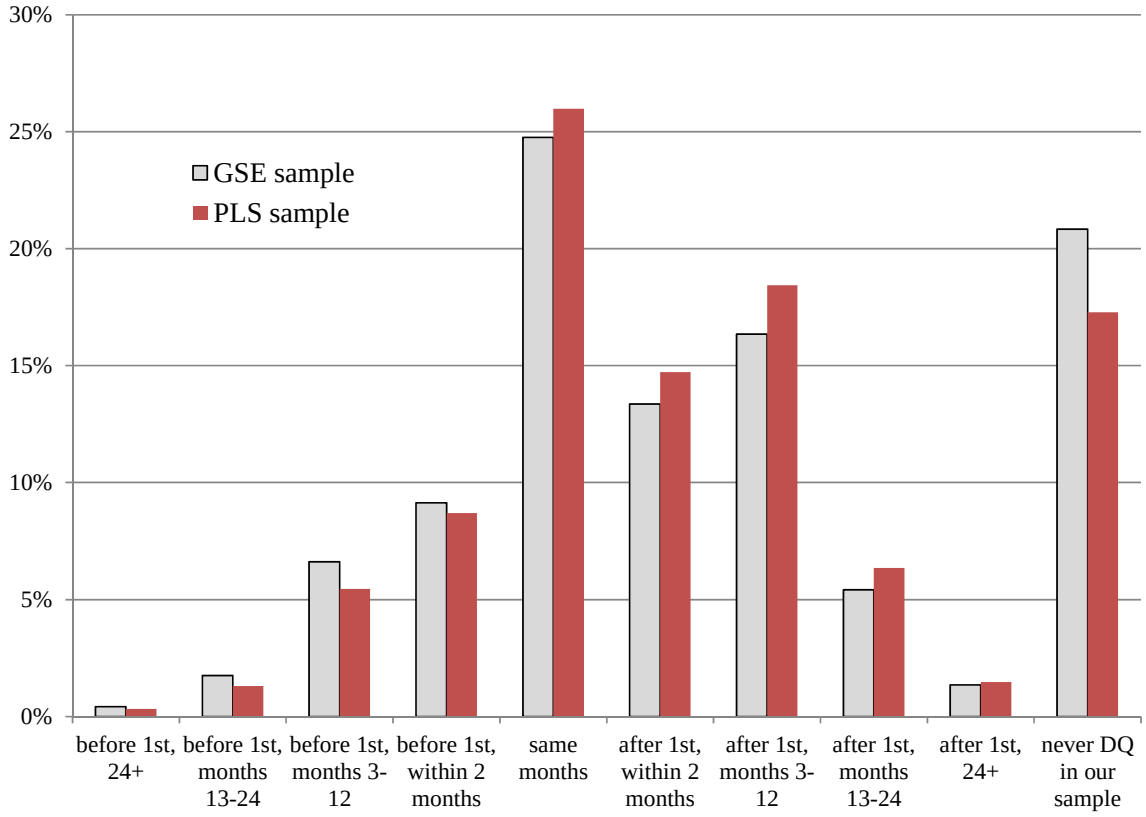
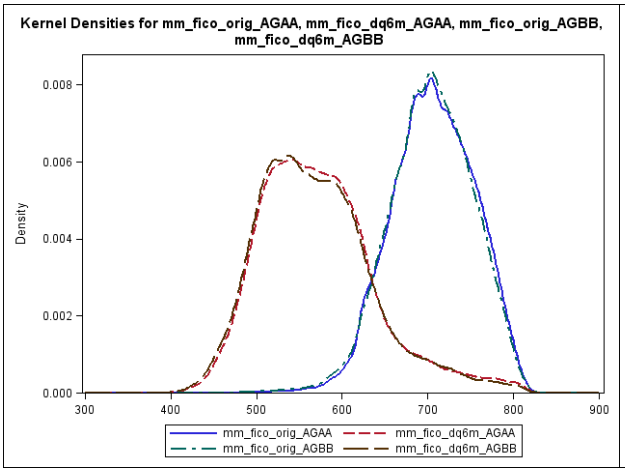


Figure 2. Distribution of FICO Scores and First Lien Loan-to-Value Ratios

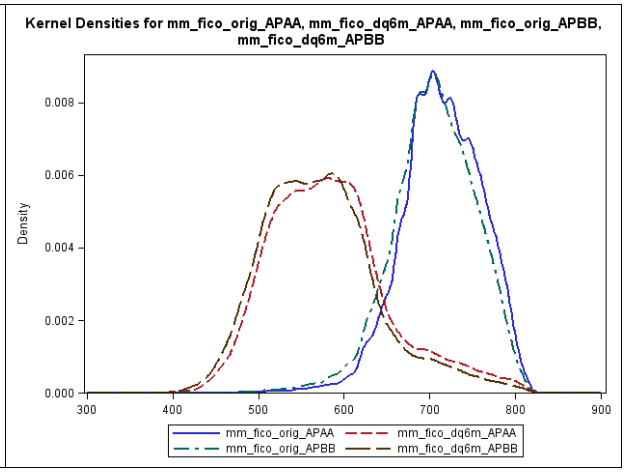
The top panels of the figure plot estimated kernel densities of FICO scores for the holdup (ASAA) and non-holdup (ASBB) groups at two points in time: origination and in six months following loan delinquency. The top left panel presents the results for GSE-securitized loans, and the top right panel presents the results for PLS loans. The bottom panels repeat this exercise for first lien loan-to-value ratios (LTV).

Panel A. FICO Scores Kernel Densities

GSE loans

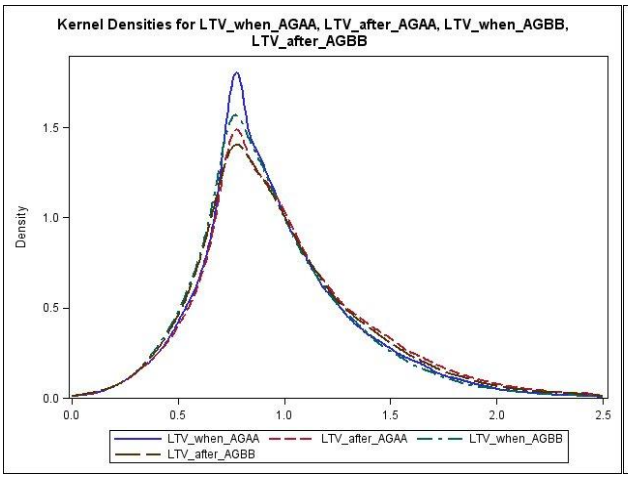


PLS loans



Panel B. First Lien LTV Ratio Kernel Densities

GSE loans



PLS loans