

**Works of Friction?
Originator-Sponsor Affiliation and Losses on Mortgage-Backed Securities**

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Abstract

This paper examines how the severity of moral hazard problems in the securitization process is related to the structure and performance of securitized pools of residential Alt-A mortgages created during the 2003–2007 period. We argue that the severity of moral hazard problems is likely to vary inversely with originator-sponsor and originator-servicer affiliation as well as originator concentration. We refer to the lack of affiliation and originator dispersion as measures of *distance from loss*. Overall, we find that, after controlling for borrower and deal characteristics, cumulative loss and foreclosure rates are significantly higher for mortgage-backed securities (MBSs) in which originators are not affiliated with the sponsor or servicer and in deals with more originators (i.e., the loss distance is greater). We also find that the losses and foreclosures occur earlier in MBSs with greater distance from loss. While these relations are more prominent for deals structured during the 2006–2007 period, we find that the distance was also related to losses before the peak of the housing market. Consistent with investors recognizing the potential loss exposure from greater distance from loss, we find that the average yields are higher on MBSs with greater distance. We also find that the percentage of securities rated AAA is decreasing in the distance. Finally, deals with greater distance are significantly more likely to employ overcollateralization accounts (that require the sponsor to have greater skin in the game). These results suggest that, while ex post investors might have misestimated their exposure to losses arising from incentive conflicts with the originator, ex ante frictions were reflected in the pricing and the structure of MBSs.

”Old-fashioned mortgage lending is like a marriage: both the bank and the borrower have an incentive to make things work. Securitization, at least in this market, was more orgiastic, involving lots of participates in fleeting relationships.” The Economist, May 15, 2008.

1. Introduction

The above caption summarizes the widely held view that securitization fundamentally altered the incentives of key players in the mortgage origination and funding process during the so-called housing bubble.¹ A basic problem with the “originate-to-distribute” model of lending, the argument goes, is that mortgage originators and the MBS sponsor have too little “skin in the game”. In contrast to traditional lending in which vertically integrated lenders own and service the loans that they originate, securitization involves a number of different agents performing different services often for fees that could be unrelated to the performance of the securitized pool of loans. As a result, originators and sponsors could pay too little attention to the riskiness of the mortgages that they originate or place into pools that they sponsor. The credit crisis that began in 2007, critics contend, is a direct result of a decline in lending standards that were fostered by the “originate-to-distribute” model of securitization.² In response to these concerns, the recently passed financial reform legislation requires sponsors to maintain a loss exposure in the mortgage pools that they securitize.³

Several recent studies provide empirical support for the above argument. In particular, these studies provide evidence that during the 2003–2007 period, securitization was associated with an expansion in the supply of credit to subprime borrowers and that default rates have been significantly higher for mortgages that were securitized. For example, Mian and Sufi (2009) find that the ease of securitizing subprime mortgages resulted in an unprecedented expansion in the supply of mortgage credit to subprime zip codes (i.e., zip codes with higher percentage of households with poor credit scores and high latent demand) despite the lack of significant income growth in these zip codes. Moreover, the authors find that zip codes that experienced the biggest increase in mortgage securitizations between 2002 and 2005 also experienced the biggest increase in mortgage default rates from 2005 to 2007, suggesting lax lending standards associated with securitized mortgages. Keys, Mukherjee, Seru, and Vig (2009) (hereafter KMSV) examine the relation between screening and securitization by exploiting a purported rule of thumb in underwriting that makes it much easier to securitize mortgages when the borrower has a

¹ See Ashcraft and Schuermann (2008) for a detailed discussion of the key frictions that may arise in the securitization of subprime mortgages.

² See for example, Quigley (2008), Blinder (2008), and Mishkin (2008).

³ The Financial Reform Bill requires companies that sell mortgage back securities to retain a material portion (generally 5%) of credit risk of securitized exposures and prohibits the originator or sponsor from directly or indirectly hedging or otherwise transferring this risk. For a summary of the provisions of the Bill, see http://banking.senate.gov/public/_files/FinancialReformSummary231510FINAL.pdf

FICO credit score above a 620 threshold. They find that mortgages just above the 620 threshold are much more likely to be securitized than mortgages just below the 620 threshold. More importantly, they also find that default rates are higher for securitized mortgages with FICO scores just above the threshold than just below the threshold, suggesting less diligent screening of loans that originators expect to securitize.⁴

Finding that securitized loans have higher default rates is, however, only one piece of the “originate-to-distribute” puzzle and is not necessarily an indication that the model is flawed. For example, riskier mortgages could be securitized because investors in mortgage-backed securities (MBSs) have broader diversification opportunities than the originator and thus may be better positioned to bear the credit risk. More importantly, as Gorton (2009) points out, the other part of the argument that securitization promoted lax lending has to be that deal sponsors and ultimately investors systematically misunderstood or ignored how securitization affects the incentives of originators and ultimately the risk of the underlying mortgages. This part of the argument is puzzling given an extensive literature on how loan sales affect the originating bank’s incentives to ex ante screen and ex post monitor borrowers (see, for example, Gorton and Pennacchi (1995), Drucker and Puri (2009), and Parlour and Plantin (2008)). The well-known result from this literature is that when purchasing loans (or securities backed by loans) rational investors will recognize the potential adverse selection problems that can arise when loans are sold by informationally advantaged sellers and price the securities to reflect the seller’s informational advantage (i.e., a “lemons” discount) and/or design the loan or securitization contract to mitigate the agency problems associated with the sale. For example, in the context of securitization, DeMarzo (2005) shows that tranching and the retention of residual interest by the deal sponsor may be an optimal way to create incentive compatible securities that allow intermediaries to efficiently lever their capital while earning returns on their private information.

One possible reason the structure and pricing of mortgage-backed securities failed to fully reflect these incentive problems is that an additional friction in the market for structured mortgage products led investors to overlook the risks inherent in these securities. One such friction might be mistakes in credit ratings on which investors put undue reliance (see, for example, Mason and Rosner (2007) and Griffin and Tang (2009)).

In this paper, we examine the relation between the severity of agency problems in mortgage securitization and the structure, pricing, and performance of MBSs issued against pools of residential Alt-

⁴ A number of other recent studies examine the relationship between subprime mortgage securitization, lending standards, and mortgage default rates. See, for example, Demyank and Van Hemert (2009), Purnanandam (2009), Dell’Aricca, Igan, and Laeven (2008), and Krainer and Laderman (2009). Krainer and Laderman use data that includes both securitized and non-securitized loans. While they find that securitized loans are on average riskier, they also find evidence of discontinuities in default rates around the 620 FICO threshold (as well as several other FICO scores).

A mortgages.⁵ Our sample consists of 526 deals completed between 2003 and 2007. We select MBSs issued against Alt-A mortgages as collateral because, as KMSV (2009) point out, private “soft” information is likely to be a more important component in originating these loans than for subprime loans. For these deals, we collect information on the structure of the deals (e.g., the number and rating of tranches, the amount of subordination, the type of credit enhancement, and the yield on securities issued), the characteristics of the mortgages in the pool (e.g., borrower FICO scores, loan to value ratios, geographic location, use of mortgage proceeds, and fraction of adjustable or fixed rate mortgages), ex post house price changes as well as the identity of the deal sponsors, originators, and servicers. We also obtain data on deal performance in terms of foreclosure rates and cumulative net loss rates from ABSnet.

To measure the severity of incentive conflicts between originators and MBS investors, we focus on differences across deals in terms of the number of originators contributing mortgages, whether the originator is also the sponsor of the issuing entity (the SPV), and whether the originator retains servicing rights on the mortgages in the pool. As Ashcraft and Schuermann (2008) explain, the securitization of mortgages involves a number of different players. For example, Figure 1 provides a summary of the key players in a typical residential MBS deal. Originator loss exposure and reputational concerns are likely to vary with the number of originators and sponsor’s affiliation with the originators and servicers. As explained in detail later, the sponsor often retains first loss exposure by virtue of the sponsor holding the most junior unrated equity or subordinated bond tranches. For deals structured with an overcollateralization account (OC), the sponsor typically holds the OC account as well. Thus, when the sponsor is the sole originator, greater loss exposure (as well as upside profit potential) is retained by the originating entity than when the sponsor is unaffiliated with the originators. Also, originators that expect to retain servicing rights could have greater ex ante incentives to engage in screening activity, since the value of mortgage servicing rights is increasing in the expected duration of the mortgage. Moreover, the incentives to free ride on information production are likely to be greater when the number of originators is larger.⁶ We use the lack of originator-sponsor or originator-servicer affiliation as well as originator dispersion as measures of *distance from loss*. Agency problems are expected to be greater the greater the distance from loss.

During our sample period, there is considerable diversity across deals in terms of the number of originators and whether the sponsor of the deal is also an originator. There are three basic types of deals in

⁵ Alt-A mortgages (short for Alternative A-paper) are mortgages that do not meet the underwriting guidelines of Government Sponsored Enterprises (GSEs) such as Fannie Mae and Freddie Mac because of reduced borrower income or asset documentation (i.e., low or no documentation loans), high borrower debt to income or loan to value ratios. The credit score and credit history of Alt-A borrowers are much better than those of subprime borrowers.

⁶ As discussed later, originators may not have an informational advantage relative to sponsors when mortgages are sourced through third party mortgage brokers.

our sample. The first type is one in which there is only one originator who also serves as the sponsor and servicer of the MBS (we call these “affiliated deals”). For example, in the case of CWALT 2007-24, subsidiaries of Countrywide Financial served as the sole originator and sponsor (in addition to being master servicer and servicer). The second type of deals are ones in which the sponsor is affiliated with only one of several originators (“mixed deals”). For example, in the case of CWALT 2006-OC8, Countrywide was the sponsor but was one among several originators including IndyMac (a sponsor of its own MBSs). The third type of deals are ones in which the sponsor is unrelated to the originator(s) (“unaffiliated deals”). For example, Bear Stearns Alt-A Trust 2006-4 is a deal sponsored and underwritten by Bear Stearns involving Countrywide and at least five other unaffiliated originators (and servicers).

The diversity of deal structure is evident in the following statistics: 51% of the deals in our sample have a single originator. In 95% of these deals, the originators are affiliated with the sponsor of the MBS. Among deals with multiple originators, 65% were sponsored by an entity affiliated with one of the originators. Twenty percent of our sample consists of deals in which the sponsor is not affiliated with any of the originators. The frequency of sponsor-originator affiliation and the frequency of deals with multiple originators do not vary substantially over the sample period.

We begin by examining the relation between the performance of the underlying mortgage pools and our distance measures. Our primary measure of deal performance is the cumulative net loss rate defined as cumulative loss of principal due to default (net of recoveries) divided by the original pool balance. We also measure performance by foreclosure rates and the speed losses are incurred. Simple univariate comparisons reveal significant differences based on distance from loss. For example, as shown in Figure 3, the average cumulative net loss rate as of August 2009 for affiliated deals is 2.1 % versus 4.4% for unaffiliated deals (the difference is significant at the 1% level). We find similar differences in foreclosure and the speed at which losses are incurred. A part of these differences in performance is explained by differences in the observable risk characteristics of the mortgage collateral—with unaffiliated deals consisting of riskier loans. However, controlling for ex ante observable risk characteristics associated with the mortgages in the pools (such as average FICO score, loan to value, ex post changes in housing prices, vintage, whether the interest rate is adjustable or fixed etc.) and sponsor fixed effects we find that performance is significantly worse for MBSs with greater distance.

Interestingly, we find that distance from loss matters the most where a greater proportion of the pool consists of low documentation loans. This finding is consistent with KMSV’s (2009) argument that securitization reduces the originators’ incentives to screen borrowers based on soft information, since soft information cannot be readily transferred to investors. However, our results suggest that incentives are weakened the most when originators are not affiliated with the sponsor. In addition, we find that distance is significantly related to losses also in earlier periods and for earlier deals. For example, as of the July of

2006, foreclosure and cumulative loss rates were significantly higher for unaffiliated deals that took place in the 2003 to 2005 period.

While our primary focus is on deal level performance, we also examine the relationships between originator-sponsor affiliation and the performance of individual mortgage loans. In particular, for a subsample of the deals we were able to obtain information on the characteristics and performance of individual loans within the pools. This information comes from ABSNETLOAN and covers approximately 350,000 mortgage loans originated in the 2006-2007 time period.⁷ In addition to the characteristics of the mortgage and underlying collateral we obtained information on whether the mortgage was in default or delinquent as of August 2009. Using this information we are able to examine differences in performance based on whether or not the originator retained loss exposure. For example, we are able to examine whether the performance of loans originated by Countrywide differs based on whether the loan is placed in an MBS sponsored by Countrywide or in a deal sponsored by an unaffiliated party. Consistent with the deal-level results, we find that, controlling for mortgage loan characteristics and vintage, default rates are lower on loans held in affiliated deals than loans made by the same originator but held in unaffiliated deals.

We turn next to an examination of whether the structure and yields of mortgage-backed securities reflect investors' (or rating agencies') expectations of greater incentive or information problems associated with deals with greater distance. We find that, controlling for mortgage and borrower characteristics, deals with greater distance have higher average yields and require greater subordination for the AAA-rated securities. We also find that the likelihood that the deal contains an overcollateralization (OC) account is higher when distance is greater. Moreover, the OC account trigger (the level of overcollateralization beyond which distributions are permitted to the sponsor) is higher when the sponsor is unaffiliated with the originators.

Our paper adds to the growing literature on the relation between securitization and lending standards. While several recent papers examine the characteristics of subprime loans that were securitized and performance differences based on securitization, we are not aware of any existing empirical work that examines the relation between the potential frictions and the structure and pricing of MBS issued against pools of nonconforming mortgages.⁸ Overall, our results indicate that originators' exposure to loss through affiliation with the sponsor matters in terms of MBS performance. More importantly, our results suggest

⁷ ABSNETLOAN has comprehensive loan-level information on originators beginning in 2006. As we discuss later, the subsample of deals for which we have loan level performance measures are similar to the deals in our overall sample.

⁸ As discussed in the next section, several recent papers examine the relationship between potential incentive conflicts and the structure and performance of CLOs and commercial mortgage-backed securities (CMBS) (see Benmelech, Dlugosz, and Ivashina (2009) and Gan and Mayer (2006)).

that other players in the securitization process recognized the incentive effects that affiliation creates and priced and structured MBS to reflect the alignment of incentives. It is important to emphasize however that we focus only on how relative performance varies with distance to loss. As we discuss later, other mechanisms, such as originator reputation or representations and warranties imply that unaffiliated originators may face losses when pools that they originate perform poorly. Moreover, while we observe the yields on MBSs vary with distance from losses, we do not address the far more difficult question of whether frictions were ex ante correctly priced.

Finally, it is unclear why, despite higher agency costs, some originators who also sponsor MBS deals elect to sell mortgages into the pools sponsored by others. One explanation is that for some loans the originator does not have an informational advantage relative to the pool sponsor concerning the quality or value of mortgages being placed in the pool. There are several possible reasons for this. First, some large originators sourced mortgages through their own retail networks (using their own loan officers), while at the same time acquiring mortgages from unaffiliated brokers (the so-called wholesale channel). Unfortunately, we do not have information on whether a mortgage was acquired through the retail or wholesale channel.⁹ A second and related reason is that the lemons discount associated with the pricing of unaffiliated pools might be less than the cost of a more thorough due diligence on the part of the originator. In this case, the originator may rationally decide not to produce soft information. Moreover, if the sponsor has an informational advantage in terms of valuing mortgages, then, as in DeMarzo (2005), the sponsor's incentive to diversify (to increase the size of the senior tranche that can be issued) may lead the sponsor to purchase mortgages from multiple originators.

The rest of the paper is organized as follows. In section 2, we provide background on the securitization of Alt-A mortgages, various players involved in the process, and the structuring of mortgage-backed securities. In section 3, we describe our data and the performance measures that we use. In section 4, we examine the relation between ex post performance and distance from loss. In section 5, we examine the robustness of our deal-level results by examining performance of individual loans. In section 6, we examine the relation between deal structure and distance from loss. The final section provides a summary of our findings and our conclusions.

2. Background on Securitization of Alt-A mortgages

2.1 The players

⁹ Despite the importance of this information for evaluating the risk of the underlying collateral, information on the channel through which a loan was acquired is not reported in the offering prospectus of the securitization or in databases of individual loans (see Krainer and Laderman (2009)).

During the peak of the housing boom, securitization became the primary way of funding subprime and Alt-A mortgages. For example, as shown in Table 1, 91 percent of the Alt-A mortgages that were originated in 2006 and 2007 were securitized. However, after mid-year 2007, virtually no private label securitizations of subprime and Alt-A mortgages took place. One curious feature of the Alt-A market is how frequently these mortgages were securitized. Given the limited documentation associated with these mortgages, one might expect a premium to be placed on originator screening based on soft information (see KMSV). However, securitization is generally thought to reduce originators' incentives to produce soft information since this type of information is difficult to transfer.

As discussed in the introduction, securitization involves a number of players. To motivate our analysis, in this section we provide a brief overview of the securitization process. More detailed descriptions of the process can be found in a number of sources including Gorton (2009), Ashcraft and Schuerman (2008), and Culp (2006). As shown in Figure 1, the securitization process begins with originators extending mortgage credit to borrowers. Until the loan is sold, the originator provides funding and bears the risk of loss—so called “warehousing risk”. Initial financing may come from a variety of sources including deposits (if the originator is a bank or a thrift institution), short-term warehouse loans, commercial paper, and equity. The arranger or sponsor purchases loans from one or more originators and then sells them to a bankruptcy remote trust.

The sponsor sets underwriting guidelines for the pool. Guidelines typically establish parameters such as minimum FICO scores and loan to value ratios for mortgages purchased by the pool as well as the overall characteristics of the pool at the cut-off date—such things as the average FICO, the proportion of mortgages purchased from various originators, and geographic diversification for the overall pool. The guidelines for purchase and the characteristics of the mortgages purchased as of the cut-off date are described in detail in the offering prospectus for the deal.

To qualify as a sale for accounting and regulatory purposes, the sale must be without recourse, meaning the originator cannot retain long-term credit risk exposure (through partial sale or providing guarantees) on individual loans that are sold.¹⁰ However, even though loans are sold without recourse, originators retain some (albeit reduced) exposure to losses on the loans that they originate. For example,

¹⁰ According to Financial Accounting Standards No. 140, an originator must sell 100% of a loan to meet the full sales requirement under accounting rules governing loan sales (see Downing, Jaffee, and Wallace (2008)). For regulatory purposes, loans sold with recourse are subject to the regulatory capital requirements according to Office of the Comptroller of the Currency Interpretive Letter #927 March 2002. As discussed in that letter: “The general presumption with securitization transactions is that a bank is not exposed to risk of loss beyond its contractual obligation. It is this presumption that allows banks to treat securitized assets as sold for risk-based capital purposes (i.e., not apply recourse treatment). Once a bank provides support to a securitization beyond the bank's contractual obligation, the presumption of the bank's limited exposure to loss no longer holds. When a bank provides non-contractual credit support to a securitization, the expectation is raised among securitization investors and bank supervisors that the bank will provide similar future support if needed”.

originators provide “representations and warranties” (reps and warranties) to the sponsor concerning how the mortgages sold were originated (i.e., in conformance with the sponsor’s underwriting standards), the absence of fraud, and that the mortgages are not in default at the time of sale. In the case of a breach, the originator is obligated to repurchase the loan from the trust.¹¹ Early payment defaults may also be covered by reps and warranties that require the originator to repurchase loans that experience delinquencies within the first 90 days after origination if fraud is suspected. Thus, even though loans are sold to the trust without recourse, reps and warranties imply that, at least initially, the originator retains some loss exposure.

Originators also bear the risk that mortgages that were intended for sale must be retained due to disruptions in the securitization market. Purnanandram (2009) argues that the inability of originators to securitize nonconforming mortgages after August 2007 led to a significant increase in loan losses among institutions that had been actively engaged in originating subprime and Alt-A mortgages for securitization purposes.

In addition to contractual exposure to credit losses and warehousing risk, the subsequent performance of an originator’s securitized loans may impact the originator’s reputation and the profitability of its subsequent securitization activity. For example, past performance of an originator’s loans can impact credit rating agencies’ estimate of the loss distribution associated with an MBS that consists of (or includes) the originator’s mortgages, which in turn, can affect the amount of credit enhancement required in the securitization, and ultimately the originator’s gain from the sale (i.e., the value of the mortgages sold).¹² Thus, even though an originator’s loss exposure may be less when loans are securitized rather than held in portfolio, originators still have some “skin in the game” when mortgages are securitized.

The sponsor is responsible for conducting due diligence of the originator, structuring the deal, and consulting with credit rating agencies concerning the credit enhancement needed, given the characteristics of the mortgages in the pool. The sponsor is also responsible for SEC filings and the selection of the servicers and trustees. For the MBSs in our sample, the sponsor also typically serves as the underwriter for the securities issued.

Structuring refers to the process of segmenting the cash flows associated with the underlying mortgages into a set of securities with different cash flow characteristics. Structuring is designed to

¹¹ Concerns with the adequacy of representations and warranties for some RMBS have led to proposals for greater standardization. See U.S. Structured Finance Newsletter Issue 28, August 9, 2009 accessed at <http://www.dbrs.com/research/229767/u-s-structured-finance-newsletter/asf-proposes-enhanced-rmbs-representations-and-warranties.pdf>

¹² For a description of the rating process of RMBS, see Mason and Rosner (2007) and Ashcraft and Schuermann (2008).

provide credit enhancement that allows the trust to issue investment grade securities against a portfolio of risky subprime and Alt-A mortgages. As Gorton (2009) explains, Alt-A MBSs employ two types of structures:

1. A senior/subordinating structure involving tranches of senior and subordinated bonds
2. An excess spread/overcollateralization (XS/OC) structure. Overcollateralization refers to the fact that collateral balance exceeds the face value of bonds issued. Excess spread refers to the fact that the average coupon rate on the bonds issued is less than the coupon rate on the underlying mortgages in the pool.

One objective of the sponsor is to structure the deal in such a way as to achieve the lowest overall cost of funding given the characteristics of the underlying pool of mortgages. Sponsors are compensated through fees charged to investors, through any premium paid by investors on securities over par value, and through holding the most junior unrated bond or in the case of an XS/OC structure the residual interest of the MBS (see Ashcraft and Schuermann (2008)).

The most junior bonds and/or residual interest of a deal represent effectively an equity interest in the underlying collateral. For the MBSs in our sample (described in detail later), the offering prospectuses typically state that the sponsor will initially hold the residual interest in the pool.¹³ For example, the prospectus of Bear Stearns Alt-A Trust 2006-7 in which Bear Stearns was the deal sponsor states that:

“The Class R Certificates and the Class R-X Certificates, which are not offered pursuant to this prospectus, will represent the residual interests in the real estate mortgage investment conduits established by the trust. Holders of the Residual Certificates will be entitled to receive any residual cash flow from the mortgage pool... The initial owner of the Residual Certificates is expected to be Bear Stearns Securities Corp.”

By holding the most junior position, the sponsor retains first loss exposure (up to the amount of the most junior tranche) as well as any upside profit potential and thus an interest in the performance of the underlying pool of mortgages. The way this works varies with the structure employed. In a senior/subordinated structure, the primary source of credit enhancement is subordination. In particular, subordinated and mezzanine tranches are set thick enough for the loss exposure of the senior bonds to warrant an investment grade rating. This is done through sequential amortization in which senior bonds are paid first and allocating losses first to most junior bonds.

The ordering of cash flows is more complicated when an XS/OC structure is employed. Excess spread is available to cover some losses with the OC account serving as a second loss position. The OC

¹³ Publicly traded sponsors in our sample also report in the 10-K that they intend to retain residual interest in the pools they sponsor.

target value, performance triggers, and step down dates determine when, based on timing and the performance of the underlying collateral, funds can be released to subordinated bondholders and the residual holder. The amount of initial overcollateralization and excess spread determine the sponsor's initial first loss exposure. Overall, the retention of the residual interest in the underlying mortgage pool is designed to contractually align the interest of the sponsor with investors and, as Gorton (2009) argues, may explain the large losses report by prominent sponsors during the recent housing downturn.

A key player not listed in Figure 1 is the credit rating agency. Rating agencies assign credit ratings on the securities issued by the trust. As explained in Coval, Jurek, and Stafford (2008), Griffin and Tang (2009), and Ashcraft and Schuermann (2008), ratings are based in part on the characteristics of the underlying pool of mortgages that in turn determine the estimated loss distribution. Credit rating agencies rely, in part, on proprietary historical databases to estimate the relation between the mortgage loan underwriting characteristics and probability and severity of losses. Loss estimates are adjusted to reflect economic conditions in the geographical market in which the mortgages were originated. Given the loss distribution, the rating agency determines the amount of credit enhancement (in terms of subordination or third party credit support) needed to attain a given rating.¹⁴

The remaining group of players in the securitization process is the servicers. The servicers are responsible for collection and remittance of mortgage payments, customer service to the mortgagor, advancing payments to the trust, and managing workouts and foreclosures in the event of a default. The master servicer is charged with monitoring the activities of the mortgage servicers. For many of the MBSs in our sample (described in detail below), an affiliate of the originator served as the servicer for the loans. Servicers are compensated by periodic servicing fees paid by the trust. As Ashcraft and Schuermann (2008) point out, rating agencies recognize that servicers can have a significant impact on the cash flows from the mortgage pool—principally through servicer activities in managing delinquent loans and loan modifications.

2.2. Affiliation, originator concentration, and loan performance

Our primary focus is on the informational frictions that arise from the division of tasks in the securitization process. Adverse selection is widely recognized as inherent in the MBS market. However, unlike previous studies of how securitization affects screening incentives, we examine how performance varies with the degree of vertical integration associated with the securitization process. As discussed in the introduction, we examine how originator-sponsor affiliation, originator-servicer affiliation, and originator

¹⁴ Rating agencies have been widely criticized for allegedly inflating ratings on residential MBSs and structured products during the housing boom (see, for example, Benmelech and Dlugosz (2009)).

concentration are related to the performance and structure of MBSs issued against pools of Alt-A mortgages. By focusing on relative performance differences among MBSs, we abstract from the more general question of how and whether securitization adds value and why certain loans are sold while others are held in portfolio.¹⁵

At the outset, it is unclear how, if at all, originator-sponsor affiliation is related to quality of loans and the ex post performance of mortgages that are securitized. One possibility is that reps and warranties and reputational concerns provide sufficient incentives to make affiliation and originator concentration unimportant.

Another possibility, discussed in Benmelech, Dlugosz, and Ivashina (2009), is that adverse selection problems are greater when the sponsor also originates loans. The basic idea is that when the sponsor is also an originator there is one less screener involved in the process, creating the opportunity for the originator to pass poorer quality loans to investors. This is similar to the concern raised over universal banking in which commercial banks can make loans as well as underwrite securities (see Krosner and Rajan (1994)). Consistent with this argument, Benmelech et al. find that loans originated by the sponsors of Collateralized Loan Obligation (CLO) are more likely to be downgraded.

There are couple of reasons, however, why originator-sponsor affiliation might be associated with better loan performance. First, affiliation implies that the originator (or its affiliate) retains *ceteris paribus* more loss exposure, which should increase the originator's incentive to engage in screening.

A second reason affiliation may be associated with better performance is that for some mortgages, the sponsor may have an informational advantage over the originator concerning the value of the mortgages. As discussed in DeMarzo (2005), even though the attributes of the underlying mortgages may be public information, information asymmetries may still exist because the models used to value the mortgages are proprietary, leading to the sponsor having an informational advantage over the originator concerning the secondary market value of the mortgages purchased. The sponsor's informational advantage is likely to be the greatest when the originator has acquired the mortgages from an unaffiliated broker (and thus is relatively uninformed about the borrower) or for certain types of mortgages (discussed below). DeMarzo (2005) shows that in the case of an informed issuer, diversification benefits of pooling are greater because diversification reduces idiosyncratic risk, which allows the issuance of more debt that is less sensitive to the issuer's private information (similar to the idea in Diamond (1984)). Thus informed issuers may prefer greater diversification across originators and originators may prefer to sell mortgages

¹⁵ Theoretical models of the securitization explain the value added of securitization either in terms of transactions costs, market incompleteness, or information asymmetries. Typically, these models are based on the assumption that the originator assigns a discount to retained assets either because of regulatory capital requirements or because of the availability of more valuable investment opportunities (see DeMarzo and Duffie (1999)).

acquired from third-party brokers to unaffiliated sponsors, leading to less rigorously screened loans going into pools with unaffiliated originators and sponsors.

For certain types of mortgage products in which repayment is highly dependent on house price appreciation, originator screening of potential borrowers might have less of an impact on mortgage value in the secondary market. If unaffiliated originators have less of an incentive to screen, then unaffiliated deals should consist of mortgages where screening is less important. One type of mortgage where performance is highly dependent on house price appreciation is a hybrid adjustable rate mortgage (ARM). Gorton (2009) and Nadauld and Sherlund (2008) argue that one of the defining features of subprime adjustable rate mortgage (ARM) is that it is designed to force refinancing within several years. For example, a 2/28 hybrid ARM has initially a relatively low fixed rate that resets after two years to a higher variable rate for the remaining 28 years.¹⁶ Thus, the borrower has an incentive to refinance before the step-up date. The ability to refinance will obviously depend on appreciation in the value of the house in the intervening period. This is particularly true in the case of ARMs with relatively high initial loan to value ratios and ARMs that permit negative amortization (or have interest only features). Nadauld and Sherlund's (2008) findings concerning ratings arbitrage is consistent with this story. In particular, they argue that credit rating agencies assigned ratings during the 2004-2007 period based on expected continued price appreciations. Investment banks, they argue, recognized this and engaged in a type of ratings arbitrage by sponsoring deals that were more dependent on a continued house price appreciation.¹⁷

As discussed in the next section, we empirically examine whether affiliation is related to the characteristics of pool collateral, loan performance, and the structure and pricing of the securities issued using a hand-collected database of Alt-A securitizations during the 2003-2007 period. We first examine whether there are systematic differences in the characteristics and geographical diversification of mortgages placed in affiliated, mixed, and unaffiliated pools. The above discussion suggests that there are reasons to suspect that observationally riskier mortgages will be placed into mixed or unaffiliated pools. Next, we examine the loss and foreclosure rates to investigate whether affiliation is related to performance. If affiliation increases screening incentives then we would expect that, controlling for the observable characteristics of the mortgages in the pool and vintage, ex post performance will be better in affiliated deals. We further examine the relationship between performance originator sponsor affiliation using data on individual loan performance. This analysis allows us to compare for a given originator how

¹⁶ In describing these mortgages Gorton (2009) states that "... no other consumer loan has the design feature that the borrower's ability to repay is so sensitively linked to appreciation of an underlying asset."

¹⁷ Note that sponsors holding the residual interest of the pool can hedge their exposure to housing price declines and subprime exposure generally (using, for example, ABX contracts). The basis risk associated with the hedging strategy will obviously depend on how closely the characteristics of the sponsored mortgage pool match the characteristics of the hedging instrument.

performance varies with affiliation with the sponsor. Finally, we investigate the relation between affiliation and the structure and pricing of MBS to determine the extent to which investors expected affiliation to affect screening incentives.

3. Data

3.1. MBS sample

Our primary data source for residential MBS deals is ABSnet, a subsidiary of Standard & Poor's (S&P). ABSnet does not classify deals as being Alt-As. To the best of our knowledge, how collateral is described is an originator/sponsor designation. Thus, to construct a comprehensive sample of Alt-A deals, we first select deals of trusts whose names include the words "ALT" or "Alternative" (e.g., Countrywide ALT, Banc of America Alternative Loan Trust etc.). Next, we include the deals of residential MBS trusts such as Lehman XS Trust, Structured Asset Securities Corp, and IndyMac Residential Asset Securities Trust for which we could determine from the offering prospectuses that the underlying collateral consists of lender designated Alt-A loans.¹⁸ We focus on deals completed between 2003 and 2007 and exclude private placements, pools that consist of second-lien mortgages, and NIM (net interest margin) deals. Also, since our key variables are based on originator-sponsor affiliation, we exclude deals without information on originator identities in the deal prospectus.¹⁹ Finally, we exclude deals with missing information on ex post performance in ABSNET. Our final sample consists of 526 deals that include 1,495 mortgage pools.

The aggregate value of the mortgages backing these deals is approximately \$375 billion. As discussed later, the characteristics of Alt-A mortgages in our sample mortgage pools are similar to those reported by Mayer, Pence, and Sherlund (2009) that examine loan-level data from LoanPerformance on a broader sample of mortgages securitized in Alt-A pools, which suggests that our sample is representative of the entire universe of securitized Alt-A loans.

Figure 2 presents the aggregate volume of Alt-A deals in our sample by vintage. As shown, the deal volume increases dramatically in 2005 and reaches a peak in 2006 before declining in 2007.

¹⁸ In other words, the prospectus describes the pool as consisting primarily in Alt-A mortgages.

¹⁹ In 2005, the SEC passed Regulation AB that provides disclosure and reporting requirements for SEC filings involving asset-backed securities. Item 1110 of the regulation is on disclosures about originator identities. According to Section (a), the deal prospectus must include the identities of originators that originated 10% or more of the pool assets. This regulation became effective on December 31, 2005. Prior to this date, while most of our sample sponsors voluntarily disclosed the identities of originators and the fraction each one originated, some including Countrywide and Washington Mutual did not. Therefore, we exclude deals sponsored by Countrywide and Washington Mutual in 2003, 2004, and 2005 that did not contain originator information.

Comparing Figure 2 to the aggregate data of Alt-A activity reported Table 1 indicates that our sample, except for 2004, reflects the general trend in the Alt-A market.²⁰

3.2. Originator affiliation and concentration measures

In order to construct measures of originator affiliation and concentration, we hand-collect information from the deal prospectus (available through ABSnet) on originator and sponsor identities and percent of mortgages originated by each originator. In our sample, there are 18 different sponsors and 86 different originators. Sixteen of the originators are affiliated with one of the sponsors. Commercial banks and thrift institution such as Bank of America, J.P. Morgan, Wells Fargo, Countrywide, and IndyMac are examples of originators that also sponsor MBS deals. Also, some investment banks originate mortgages through their subsidiaries. For example, Bear Stearns securitized mortgages originated by its subsidiary EMC Mortgage Inc and Lehman Brothers sponsored deals that included mortgages issued by two of its subsidiaries Aurora Loans Services LLC and SIB Mortgage.²¹

For each MBS, we measure the fraction of mortgages (by dollar value) originated by the sponsor or the sponsor's affiliates (*PCTAFF*). Moreover, we define three dummy variables *D_AFF*, *D_MIXED*, and *D_UNAFF* that equal one if the deal is an affiliated deal, mixed deal, and unaffiliated deal, respectively.

We also compute measures of originator concentration. The idea here is that free riding may mute originator reputation concerns and thus screening incentives in pools where individual originators' shares are very small. Since the deal prospectus typically reports only the identities of originators that originated 10% or more of the pool assets, the sum of the reported originators' shares might be less than one. In the average deal in our sample, originators whose names and shares are disclosed in the prospectus originated 90.4% (by dollar value) of the pool assets. When computing originator concentration measures, we divide the fraction of mortgages whose originators are unknown by 9.9% to obtain a lower bound estimate of the number of originators. For example, suppose the prospectus mentions the names of three originators that collectively originated 85% of the mortgages. In this case, we assume that there are two additional originators in the deal; one originated 9.9% of the mortgages and the other originated the remaining 5.1%. We measure originator concentration in two ways: (1) *ORNUM* is the number of originators; (2) *ORCON* (i.e., originator concentration) is the sum of the squared originator's shares.

²⁰ This is due to our excluding deals without originator information in the 2003–2005 period. Including these deals leads to a pattern very similar to the one presented in Table 1.

²¹ Some investment banks in our sample acquired mortgage brokers during the booming credit market of 2006 and 2007 to enter in the mortgage origination business. Examples include Deutsche Bank's acquisition of MortgageIT and Merrill Lynch's acquisition of National City Mortgage.

We also distinguish between originators (and sponsors) that are affiliated with a depository institution and those that are not. The idea here is that depository institutions are “brick and mortar” institutions that are less likely to use the wholesale channel in mortgage originations than non-depository institutions, so they may be more informed about the quality of mortgages that they originate. In addition, depository institutions may have lower costs of acquiring information about a borrower if the borrower also has a deposit relationship. Finally, depository institutions are subject to regulatory oversight in loan originations that might force them use relatively stricter lending standards and thus issue relatively better quality loans.

We identify depository institutions by reading the business descriptions of the originators and sponsors as well as the entities that they are affiliated with from Hoover’s and company web pages. Eleven out of the 18 sponsors and 36 out of the 86 originators in our sample are depository institutions. For each pool, we measure the fraction of mortgages (by dollar value) originated by depository institutions (*PCTDEP*). We also distinguish between originating depository institutions according to their affiliation with the sponsor: *PCTAFFDEP* (*PCTUNAFFDEP*) equals the dollar-weighted fraction of mortgages originated by depository institutions affiliated (unaffiliated) with the sponsor.

Since the value of mortgage servicing rights is increasing in the expected duration of the mortgage, originators that expect to retain servicing rights may have greater ex ante incentives to engage in screening activity. As a result, servicer-originator affiliation may be related to the performance of the underlying collateral and ex ante deal structure. To examine the relation between servicer-originator affiliation and performance, we collected information from the offering prospectus concerning the servicers and their affiliation to the originator. Since a trust can contain mortgages from multiple servicers and originators, we constructed a variable *PCTORSVC*, which equals the percentage (by dollar volume) of mortgages in the pool serviced by the originators (or their affiliates).

Table 2 presents deal-level summary statistics for our various measures of distance to loss. As shown, 70% of the mortgages in the average deal are originated by entities affiliated with the sponsor. Also, 56% of the deals in our sample are affiliated deals, 24% are mixed deals, and 20% are unaffiliated deals. The evidence suggests that deal sponsors are actively involved in originating mortgages that they securitize.²² In terms of originator concentration, we find that the sample average number of originators is 2.6 and originator concentration equals 0.71, suggesting high concentration. We find that, on average, 71% of the mortgages by dollar value are originated by depository institutions (51% originated by affiliated depository institutions and the rest by unaffiliated ones). We also find, on average, 78% of the

²² In contrast, 97% of corporate loans CLOs in 2007 were structured by financial institutions that did not originate loans and instead acquired pieces of loans at syndication or in the secondary market with the purpose of securitization, according to Securities Industry and Financial Markets Association (SIFMA).

mortgages are serviced by an entity affiliated with the originators of the mortgages. Finally, we examine whether there are any time-series variations during our sample period in the mean values of the originator affiliation and concentration measures and have not found significant time trends (not tabulated). For example, the proportion of unaffiliated deals was 22% and fraction of mortgages originated by depository institutions was approximately 75% both in the 2003 and 2007 vintages. Overall, the findings in Table 2 suggest that originators frequently maintain “skin in the game” through affiliation with the sponsor and through the retention of servicing rights.

3.3. Performance measures

We use two measures of ex post deal performance obtained from ABSnet: cumulative net loss rate and foreclosure rate. Cumulative net loss rate is the sum of all losses of principal suffered to date divided by the original pool balance. Foreclosure rate, on the other hand, is defined as the face value of all loans that are in the process of being foreclosed at the end of the month as a percentage of the end of month pool balance. The advantage of the cumulative net loss rate as a performance measure is that it is unaffected by changes in the pool balance and reflects performance over the life of the deal. However, the cumulative net loss rate does not include unrealized losses from pipeline default events such as foreclosures. Since it is important to examine both realized and expected losses to obtain a more comprehensive understanding of deal performance, we present results based on the cumulative net loss rate and foreclosure rate.²³

Figure 3 presents deal-level average cumulative net loss rate as of August 2009 (*CUMLOSS*) by vintage. As shown, *CUMLOSS* is significantly below 1% for the 2003 and 2004 vintages, approximately 2% for the 2005 vintage, and above 4% for the 2006 and 2007 vintages. Interestingly, *CUMLOSS* is higher for vintages in which aggregate Alt-A deal volume (presented in Table 1 and Figure 2) is higher. This may be due to the fact that these vintages were less seasoned when housing prices began to decline or alternatively due to expansion in credit supply accompanied with declines in lending standards. Though not presented, results based on the foreclosure rates as of August 2009 (*FORCL*) are very similar.

4. Relation between originator-sponsor affiliation and deal performance

4.1. Univariate analysis of performance

²³ Since we do not have a reliable method of estimating the loss rates associated with mortgages in foreclosure, we are unable to combine the two performance measures into a single measure of performance. Moreover, note that since foreclosure rate is calculated using end of month rather than original pool balance and previously foreclosed mortgages are not included in the end of month pool balance, deals that experience losses relatively fast might have relatively lower foreclosure rates in later periods.

In this section, we examine whether ex post deal performance is related to originator-sponsor affiliation. Specifically, we examine the differences in the mean *CUMLOSS* and *FORCL* for affiliated vs. unaffiliated deals. Our findings from a univariate analysis are presented in Figure 4. As shown, we find that affiliated deals perform substantially better ex post than mixed and unaffiliated deals. In particular, we find that the average *CUMLOSS* for affiliated deals (2.1%) is about half of that for unaffiliated and mixed deals (the differences are significant at the 1% level). Also, while the average *FORCL* for affiliated deals equals 8.5%, the average *FORCL* for mixed and unaffiliated deals equals 13.1% and 15.2%, respectively (again, the differences are significant at the 1% level). Overall, the evidence suggests that affiliated deals are associated with significantly lower ex post realized and pipeline losses than mixed and unaffiliated deals. We also compare the performance of mixed and unaffiliated deals. Mixed deals have slightly lower average *CUMLOSS* and *FORCL* than unaffiliated deals (only the difference in *FORCL* is statistically significant). Overall, the results presented in Figure 4 indicate that originators' exposure to greater losses through affiliation with the sponsor matters in terms of ex post loss rates of the pool of mortgages.

An alternative way to measure performance is to examine the speed at which the mortgage pool reaches or exceeds a certain cumulative loss threshold. We would expect mortgages screened less carefully by originators to experience earlier defaults. Therefore, if affiliation with the sponsor increases the originator's incentives to screen potential mortgagors more carefully, cumulative net loss rates should increase faster in unaffiliated deals than in affiliated deals. The evidence presented in Figure 5 confirms this conjecture. Figure 5 provides the median cumulative loss rate by event month, where event month is defined as the number of months from origination. As shown, regardless of vintage, cumulative net losses increase much faster in unaffiliated deals than in affiliated deals.²⁴

4.2. Mortgage characteristics and originator-sponsor affiliation

The evidence discussed in the previous section indicates that on average affiliated deals perform better than unaffiliated and mixed deals. However, in order to understand how originators' incentives affect deal performance at the margin, we need to account for potential differences in the characteristics of affiliated vs. unaffiliated deals. For example, one potential explanation for the better ex post performance of affiliated deals is that these deals belong to earlier vintages that are associated with lower *CUMLOSS* and *FORCL*, on average. However, as discussed in Section 3.2., the fraction of affiliated deals does not

²⁴ For every vintage, the average monthly cumulative net loss rate is almost equal to zero during the first twelve months after deal inception, regardless of originator-sponsor affiliation. This is primarily because foreclosing a delinquent mortgage and realizing losses takes time. Also, originators typically provide sponsors warranties to buy back mortgages that default during the first three months after the sale.

vary much during our sample period, so the better performance of affiliated deals cannot be attributed to their timing.

An alternative explanation is that the observable risk characteristics of securitized mortgages might differ by whether the deal is affiliated or not. For example, as discussed in Section 2.2., if unaffiliated originators have less of an incentive to screen potential borrowers, then unaffiliated deals should consist of mortgages where screening is less important. For mortgages with ARM and negative amortization features, for example, since repayment is highly dependent on continued house price appreciation, originator screening of potential borrowers may have less of an impact in mortgage value in the secondary market. Thus, unaffiliated deals may be more likely to include mortgages with ARM and negative amortization features that suffered the biggest losses during our sample period.

Table 3 presents deal characteristics for the entire sample (left panel), affiliated deals (middle panel), and unaffiliated deals (right panel). We treat the deals as if the mortgages are homogeneous, sharing a common structure defined by the weighted average characteristics. We collect information on deal characteristics from deal prospectuses and Bloomberg.

We start by examining the representativeness of our sample by comparing the characteristics of mortgages in our sample pools to those in Mayer, Pence, and Sherlund (2009, Table 2 pages 31-32) whose sample includes loan-level data on approximately 90% of all the residential Alt-A mortgages securitized during our sample period. The evidence suggests that the two samples are quite similar. For example, the median FICO score of Alt-A mortgages in Mayer, Pence, and Sherlund (2009) is 706, very close to the mean and median weighted average FICO score (711 and 710, respectively) associated with our sample deals.²⁵ Also, 71% of the Alt-A mortgages in their sample and 75% of those in our sample have no or limited documentation. Finally, average coupon rates of mortgages in both samples are quite similar (approximately 6.6%).

We next examine and compare the characteristics of affiliated and unaffiliated deals. Our risk measures are similar to those used by rating agencies (see Cao, Gillis, Mason, Parisi, and Wang (2009)) and Ashcraft and Schuerman (2008)). Our first set of risk measures are mortgage-value-weighted FICO credit score (*WAFICO*), loan-to-value ratio (*WALTV*), annual mortgage coupon rate (*WAC*). Everything else the same, a high *WAFICO* and low *WALTV* (and *WAC*) are associated with lower default risk. As shown, all three measures indicate that unaffiliated deals are riskier than affiliated deals. In particular,

²⁵ Mayer, Pence, and Sherlund (2009) equally weight all mortgages when computing summary statistics. We, on the other hand, compute the sample mean and median values of deal level weighted average values of key mortgage characteristics. Therefore, the summary statistics from the two studies are not directly comparable and numerical comparisons provided here are only suggestive.

mortgages in unaffiliated deals have on average 9 points lower *FICO* scores, 23 bps higher coupon rates, and 6.3% higher loan-to-value ratios than mortgages in affiliated deals.

We also examine in Table 3 the fraction of dollar deal value that consists of adjustable rate or hybrid (*ARM*) and limited or no documentation (*LIMDOC*) mortgages and whether the deal consists of negative amortization mortgages (*D_NEGAMO*). The increase in benchmark interest rates subsequent to 2004 might have disproportionately increased the default risk of *ARM* mortgages. Also, hybrid *ARM* may appeal to liquidity constrained borrowers attracted to lower initial “teaser rates” as well as borrowers hoping to refinance before the reset date on the *ARM* based on increases in housing prices (see Gorton (2009)). Negative amortization mortgages are viewed as riskier because the borrower does not build up as much equity during the negative amortization period as would be the case in an amortizing mortgage. For these reasons, the decline in house prices that started in mid-2006 is likely to have a greater impact on default rates for negative amortization and *ARM* products. In the case of *LIMDOC* loans, since credit risk relevant information such as income and assets is not completely verified, there is greater uncertainty regarding the borrower’s ability to make timely mortgage payments. Thus, deals that include *LIMDOC* mortgages are expected to have ceteris paribus higher ex post default rates.²⁶ Overall, consistent with unaffiliated deals being riskier, we find that, relative to affiliated deals, unaffiliated deals are substantially more likely to include mortgages with *ARM* and negative amortization features and include slightly more (based on median) limited- or no-documentation mortgages.

Mortgages taken out for purchasing rather than refinancing purposes and mortgages for single family houses are generally considered less risky. Therefore, we examine whether affiliated vs. unaffiliated deals differ along these dimensions and find that a slightly smaller fraction of the mortgage pool in affiliated deals consists of purchase loans, but the average fraction of single family mortgages is about the same for both groups.

Finally, we examine whether mortgages in unaffiliated deals are concentrated in areas (i.e., states) with greater pre-deal house price run ups and post-deal house price declines (i.e., where house price bubble was the most severe). To calculate house price changes associated with a deal, first, for each deal we obtain from Bloomberg information on the composition of the deal by mortgage location. Bloomberg provides only the names and shares of the top four states by dollar value of mortgages in the deal, so our house price change measures are based on changes in house prices in the top four states (more on this below). On average, 61% of the mortgages in a given deal are issued in the top four states. Second, for each state, we obtain quarterly house price indices from the Federal Housing Finance Agency (formally

²⁶ As Bhargwai and Sengupta (2008) argue, credit risk is multidimensional. For example, lenders may require higher *FICO* scores for loans with limited documentation. As a result, we may fail to detect any impact of individual risk factors on ex post default rates.

known as OFHEO). The OFHEO house price index is a weighted repeat sales index based on transactions involving single-family homes whose mortgages have been purchased or securitized by Fannie Mae or Freddie Mac. Our primary reason for using the OFHEO index is its geographic coverage (the Case-Shiller index covers a broader set of property types but does not cover all states).²⁷ We use the OFHEO index to compute the percentage change in the state's house prices either during the year prior to the deal or from the end of quarter before the deal's inception to the end of the 2nd quarter of 2009 (or for some of our analyses the end of the 2nd quarter of 2006). Finally, using these data, we calculate weighted-average house price change associated with a given deal (dHP) as:

$$dHP = \sum_{s=1}^4 w_s dHP_s + \frac{1}{46} (1 - \sum_{s=1}^4 w_s) \sum_{o=1}^{46} dHP_o \quad (1)$$

where s represents the states with top four shares of the mortgage pool according to Bloomberg, o represents the remaining 46 shares, dHP_s represents the change in house prices in state s , w_s represents fraction of mortgages (by dollar value) from each of the top four states. Note that dHP equals $HPRUNUP$ if the house price change is calculated for the year preceding the deals and $dHPPOST$ if house price change is calculated from the end of quarter before the deal inception to the end of the 2nd quarter of 2009 (or 2006).

Implicit is the assumption in equation (1) that all states other than the top four states have equal representation in the deal. We calculated alternative house price change measures to check the robustness of our results to this assumption. For example, we calculated $dHPPOST$ assuming that price changes in all states other than the top four are equal to 0%. We also created a third measure assuming the weight of the mortgages from the top four states sum up to one. Both measures are highly correlated with the one that we report in the paper and all our results are robust to using the alternative ex post house price change measures.

As shown in Table 3, the average $HPRUNUP$ and $dHPPOST$ for affiliated and unaffiliated deals are statistically indistinguishable. However, the median $dHPPOST$ is 3% lower (significant at the 1% level) in unaffiliated deals, indicating slightly bigger ex post house price declines for unaffiliated deals.

Finally, we examine the relation between affiliation and our other measures of distance to loss. By definition, affiliated deals have a single originator. In all but one affiliated deal, the sole originator is also the servicer of the mortgages in the pools. In contrast, for unaffiliated deals, the originator retains servicing rights for 39% of the mortgages in the pool. Lastly, the proportion of mortgages originated by

²⁷ See http://realestate.about.com/od/realestateinvesting/qt/ofheo_caseshill.htm, for a description of the differences between the two house price indices.

depository institutions is significantly higher for affiliated than for unaffiliated deals. In sections 4.5-4.7, we examine how variations in these other measures of distance to loss are related to ex post performance.

Overall, the univariate evidence presented in Table 3 indicates that mortgages in unaffiliated deals are riskier along several dimensions and experienced slightly bigger ex post price declines than mortgages in affiliated deals.²⁸ Thus, part of the differences in the *CUMLOSS* and *FORCL* for affiliated vs. unaffiliated deals might be attributed to differences in risk and ex post house price changes. Therefore, in order to determine whether sponsor-originator affiliation has an impact on ex post deal performance at the margin, we need to control for various deal characteristics in a multivariate regression framework. We turn to this in the next section.

4.3. Regression results

Tables 4 presents our first set of regressions. The dependent variable, *CUMLOSS* or *FORCL*, is modeled as function of measures of originator-sponsor affiliation, various risk measures, ex post house price changes associated with the deal, and vintage dummies (2003 is the base year). We estimate all regressions at the deal rather than at the pool level because deals contain cross default provisions providing senior claimants with a subordinate claim on the cash flows from other pools. In addition, the residual interest (*XS/OC*) is a subordinate claim on the entire pool. Our results are robust to pool level estimations.²⁹ We also include sponsor dummies to account for unobserved deal characteristics that might be systematically associated with certain sponsors.

As shown in Regression 1, *PCTAFF* is significantly (at the 1% level) and negatively related to *CUMLOSS*, indicating that deals in which a bigger portion of the underlying mortgages is originated by the sponsor perform better subsequently. Everything else in the model held constant, a one standard deviation increase in *PCTAFF* is associated with a 0.27% ($=0.41 \times 0.652\%$) decline in *CUMLOSS* (8.6% when evaluated at the mean). Also, in Regression 2, when we include *D_MIXED* and *D_UNAFF* as measures of originator-sponsor affiliation and leave the affiliated deals as the omitted group, we find that both mixed deals and unaffiliated deals have higher loss rates than affiliated deals. For example, the coefficient on *D_UNAFF* indicates that *CUMLOSS* for unaffiliated deals is 0.76% (22.9% when evaluated at the mean) higher than that for affiliated deals, on average.

²⁸ We also estimate a Probit model, using the variables in Table 3 in addition to vintage dummies, to examine differences between affiliated and unaffiliated deals in a multivariate framework. The results from the Probit regressions are consistent with the evidence presented in Table 3 and the coefficients on vintage dummies are insignificant; as such we do not present the Probit results for brevity.

²⁹ As discussed later in section 6, we find that unaffiliated deals are more likely to have an OC/XS structure. When we add an OC/XS indicator to the regressions in Table 4, we find that OC/XS is positively related to ex post losses. However, the sign and significance of affiliation measures are not sensitive to the inclusion of the OC/XS indicator. We do not tabulate these results for brevity.

We next examine the relationship between affiliation and rate of pipeline losses. *FORCL* is the dependent variable in Regressions 3 and 4. As shown, we find a significant negative relation between *FORCL* and originator-sponsor affiliation. Overall, the evidence is consistent with the view that originator-sponsor affiliation has a positive impact on deal performance at the margin.

Table 4 provides additional insights into the determinants of losses for Alt-A deals. For example, riskier deals (those with lower *WAFICO* or higher *WAC*) experience greater losses ex post. Although, *WALTV* is not significantly related to *CUMLOSS* or *FORCL*, it picks up a positive and significant coefficient when used without other measures of deal risk (i.e., *WAC* and *WAFICO*). Another significant determinant of deal performance is *ARM*. For example, based on the coefficient estimate of *ARM* in Regression 1, all else held constant, deals that entirely consist of adjustable rate or hybrid mortgages have 2.9% greater cumulative loss rates than deals that only consist of fixed rate mortgages. The magnitude of changes in ex post house prices also appears to be important. Based on the coefficient of *dHPPOST*, a 10% decrease in house prices is associated with a 50 to 60 bps increase in *CUMLOSS*. Moreover, we find that *D_NEGAMO* is an important determinant of deal performance. Since we include the interaction of *D_NEGAMO* and *WAC* in regressions to account for variations in the *WAC* slopes of deals with and without a negative amortization feature, it is difficult to interpret the coefficient of *D_NEGAMO* in those regressions. However, when we estimate the regressions without the interaction term, we find that *D_NEGAMO* is associated with 75 to 80 bps greater *CUMLOSS*, on average (not tabulated). Finally, note that coefficient estimates of 2006 and 2007 vintage dummies are statistically insignificant in all four regressions, suggesting that our affiliation measures, deal risk controls, sponsor dummies, and ex post house price changes entirely explain the greater loss rates of deals that belong to later vintages.

We estimated the relation between *CUMLOSS* (or *FORCL*) and originator-sponsor affiliation using several alternative specifications (not tabulated). For example, since the average coupon rate (*WAC*) is correlated with the collateral risk measures, we estimated the regressions in Tables 4 excluding *WAC*. We continue to find a negative and significant relation between our performance measures and originator-sponsor affiliation. However, in this specification, we find that coefficient estimates for *WALTV*, *LIMDOC*, and *PURCHASE* are all positive and statistically significant at the 1% level (as are the other risk factors) suggesting that *WAC* reflects in part these risk factors. We also examine whether the effect of ex post house prices on loss rates varies with the proportion of the pool that consists of *ARM*. Consistent with *ARM* representing heightened exposure to house price risk we find that the coefficient on the interaction of *dHPPOST* and *ARM* is negative and statistically significant at the 1% level.

4.4. Regression results for high versus low *LIMDOC* samples

If unaffiliated originators have less of an incentive to screen potential borrowers than affiliated originators and this, at the margin, creates a difference in the average performance of affiliated and unaffiliated deals, one would expect the difference to be bigger in the sub-sample of deals that include more mortgages whose values are more sensitive to the originator's private information (e.g., low- or no-documentation mortgages, see KMSV (2009)). Thus, ex post default rates are likely to be relatively more sensitive to originator-sponsor affiliation in high *LIMDOC* deals.

We examine this issue by estimating performance regressions separately for deals that include above versus below sample median *LIMDOC*. The median *LIMDOC* for our sample deals is 77.5%. Our findings are presented in Table 5. The regressions in the table are specified in the same way as in Table 4, but for brevity, we report the coefficient estimates and *t*-statistics for originator-sponsor affiliation measures and *t*-statistics for differences in the coefficient estimates across the two *LIMDOC* groups. As shown, consistent with the conjecture described above, deal performance appears to be significantly more sensitive to originator-sponsor affiliation when *LIMDOC* is above the sample median. This is despite the fact that our sample consists of Alt-A deals that by definition have relatively high *LIMDOC*, which biases us against finding any performance difference between high versus low *LIMDOC* deals.

4.5. Originator-sponsor affiliation and deal performance as of July 2006

So far, we have examined the cumulative performance of our sample deals between deal completion and August 2009. One potential concern with this is that during our performance horizon some unusual events took place (i.e., house prices declined sharply in most US states after mid-2006 for the first time since the 1920s and the US economy entered into the worst recession since the Great Depression) and thus the determinants of deal performance over this horizon might be different from the determinants of Alt-A deal performance generally. In addition, if rating agencies and investors follow a learning by doing approach based on prior experience, the experience of earlier pools will affect the rating and pricing of subsequent pools.

To address these issues, we examine the relation between originator-sponsor affiliation and ex post deal performance before the beginning of the decline in the US housing market. In particular, we estimate the relation between ex post performance and our distance to loss measures, using performance measures as of July 2006 (housing prices started declining in the US after this date) for 141 deals completed between 2003 and 2005. The average cumulative net loss rate (foreclosure rate) for these deals as of July 2006 was 0.12% (0.68%).

The regression results are presented in Table 6. Note that *dHPPOST* is calculated from deal close to July 2006. As shown, originator-sponsor affiliation is associated with significantly lower loss and foreclosure rates in earlier periods too. Thus, the evidence suggests that the positive relation between

originator-sponsor affiliation and ex post deal performance is not unique to the 2006–2007 period. Also, riskier deals and deals with more adjustable rate mortgages appear to have greater loss rates, as before. Finally, we do not find a significant relation between deal performance and *dHPPOST*; which is not surprising given that house prices increased in all states between 2003 and July 2006.

4.6. Depository vs. non-depository originators and sponsors

One explanation for why originator-sponsor affiliation is associated with lower loss rates is that affiliation may be associated with whether the originator is a depository institution. In particular, some originators in our sample are depository financial institutions while others are mortgage brokers or subsidiaries of investment banks. Depository originators may have specialized screening abilities or an ongoing relationship with the borrower that leads to better loan performance. In addition, depository institutions may be less likely to rely on the wholesale channel in mortgage originations, and may be subject to greater regulatory oversight forcing them to use stricter standards in lending. Thus, depository originators may be more likely than non-depository originators to be informed about their borrowers and to make higher quality loans. As a result, mortgages originated by depository originators might perform better ex post. Moreover, if loans originated by depository institutions are more likely to be securitized by an affiliated sponsor, then the lower loss rates that we observe may arise from the identity of the originator and not because of greater distance from loss.

We examine this issue in Table 7. First, we examine whether the dollar-weighted fraction of mortgages originated by depository institutions (*PCTDEP*) is related to deal performance while controlling for originator-sponsor affiliation. In Regression 1, we model *CUMLOSS* as a function of *PCTDEP* and other deal characteristics as well as vintage and sponsor dummies. As shown, we find that *PCTDEP* is negatively and significantly (at the 5% level) related to *CUMLOSS*, indicating better performance for deals in which more of the mortgages by dollar value were originated by depository institutions. Everything else in the model held constant, a one standard deviation increase in *PCTDEP* is associated with 0.33% decrease in *CUMLOSS* (10.7% when evaluated at the mean). However, we also find that the coefficient on *D_UNAFF* is positive and statistically significant, indicating that, controlling for the proportion of loans originated by depository institutions, distance to loss continues to be related to higher cumulative losses.

In Regression 2 we examine whether it matters in terms of deal performance whether the originating depository institutions are affiliated with the sponsor, so we decompose *PCTDEP* into two: *PCTAFFDEP* and *PCTUNAFFDEP*. When the sponsor is an investment bank *PCTAFFDEP* equals zero, so we estimate Regression 2 using only deals sponsored by depository institutions. Note that *PCTAFFDEP* equals *PCTAFF* in this sample and the omitted group in the model is unaffiliated non-

depository originators. As shown, we find that *CUMLOSS* is negatively and significantly related to *PCTAFFDEP* but unrelated to *PCTUNAFFDEP*. Also, we reject at the 1% level the hypothesis that the coefficients of *PCTAFFDEP* and *PCTUNAFFDEP* are equal.

The significant negative coefficient of *PCTAFFDEP* in Regression 2 together with the insignificant coefficients of *PCTUNAFFDEP* suggests that what matters in terms of deal performance is the fraction of mortgages originated by *affiliated* depository institutions and not depository institutions *per se*. Finally, in Regressions 3 and 4, when we measure performance using *FORCL* instead of *CUMLOSS*, we obtain very similar results.

4.7. Originator concentration and originator-servicer affiliation

While affiliated deals by definition have sole originators, all mixed deals and most unaffiliated deals have multiple originators. When the number of originators increases, each originator's incentive to free ride on information production is likely to increase as well. As a result, mixed and unaffiliated deals with more originators (or lower originator concentration) might perform worse going forward. As discussed earlier, whether the originator retains servicing rights may also be related to ex post performance. While virtually all mortgages in affiliated deals are serviced by the originator, for unaffiliated and mixed deals, there is considerable variability in originator-servicer affiliation. For unaffiliated and mixed deals, we examine whether further distance from loss (in terms of originator concentration and originator-servicer affiliation) is related to performance.

In Regressions 1 and 2 in Table 8, we examine the relation between *CUMLOSS* and *ORNUM* and *ORCONC*, respectively, for a combined sample of unaffiliated and mixed deals. As shown, everything else held constant, unaffiliated and mixed deals with more originators or lower originator concentration have significantly greater average ex post net loss rates. Moreover, as shown in Regressions 4 and 5, these deals also have substantially higher foreclosure rates. The estimated economic impact of originator concentration on deal performance is also important. For example, based on Regressions 1 and 4 and assuming everything else in these models held constant, a one standard deviation (4.47) increase in the number of originators is associated with 0.49% and 3.26% increase in *CUMLOSS* and *FORCL*, respectively (10.6% and 21.1% when evaluated at the mean).

Turning next to the servicer results, as shown in Regression 3, we find significantly lower cumulative net loss rates as the percentage of mortgages in the pools serviced by the originator increases. *PCTORSV* is also negatively related to *FORCL*, as shown in Regression 6, but the relation is not statistically significant.

Overall, the results in Table 8 suggest that for unaffiliated and mixed deals originator concentration and originator servicer-affiliation further shorten the distance to loss and are associated with better ex post performance.

5. Loan level analysis of the relationship between performance and affiliation

Our analysis thus far has been focused on deal-level performance. A potential concern with the deal-level analysis is that deal-level measures of risk and house price changes may mask important differences in risk characteristics of individual mortgages within a pool. By examining the performance of individual mortgages within the pool we can control for individual loan characteristics as well as originator effects. In particular, with loan-level data we are able to use originator fixed effects to examine how a particular originator's decision to securitize a loan directly versus through another sponsor is correlated with ex post performance. As a result, we mitigate the potential impact of heterogeneities in different originators' lending standards on our findings

ABSNETLOAN provides information on the characteristics, originator and sponsor identities, and performance of approximately 50% of the loans in our Alt-A sample. Originator information for individual loans is not available for most unaffiliated deals prior to January 2006, so our analysis of individual loan performance is limited to the 2006-2007 vintages. Complete information on individual mortgage characteristics, FICO scores, and other credit characteristics are available for over 350,000 loans from 223 deals (involving 128 affiliated, 53 mixed, and 42 unaffiliated deals).

. We measure performance at the loan level by whether or not, as of August 2009, the loan was in default or more than 60 past due. A loan is defined as in default if it is in foreclosure (including REO) or was liquidated. We created an affiliation dummy variable that equals one if the originator of the loan is affiliated with the sponsor of the MBS.

Table 9 contains two Probit regressions relating the likelihood of default (or delinquency) to originator-sponsor affiliation as well as a set of controls that include changes in housing prices, borrower's FICO score, loan to value, and total debt to income, and various loan and collateral characteristics. We also include in the regression vintage and originator fixed effects.

As shown, we find a negative and statistically significant effect of originator-sponsor affiliation on loan performance. To provide some indication of economic significance of affiliation, we computed to default probabilities associated with affiliated versus unaffiliated loans, holding all other explanatory variables at their mean values. The predicted default probability for unaffiliated loans is about twice as high for unaffiliated than for affiliated loans (0.258 versus 0.133). These results provide further evidence that originator-sponsor affiliation is an important determinant of loan performance.

6. Relation between originator concentration and affiliation and deal structure

In the previous section, we showed evidence that deals in which the originators are affiliated with the sponsor perform better ex post. In this section, we examine whether MBS investors recognized this relation and whether MBS deals are structured to mitigate the adverse incentive effects of distance from loss.

We use four measures of deal structure in our analysis: *YIELD* equals the weighted-average yield (%) of mortgage-backed bonds issued as of deal close (and as reported by ABSnet); *PCTAAA* is 100 times the face value of mortgage-backed bonds that are rated AAA by S&P or Moody's at deal close divided by deal value (excluding the overcollateralization); *D_OC* is an indicator variable that is equal to 1 if the deal has credit enhancement in the form of overcollateralization (i.e., the face value of mortgages in the pool exceeds the face value of the bonds that are secured by those mortgages); *OCTARGET* equals 100 times overcollateralization target amount divided by deal value at deal inception. Note that for some deals *YIELD* is missing in ABSnet so we estimate the determinants of *YIELD* using only deals with non-missing information.

We examine the relation between these four deal structure variables and *PCTAFF* in Table 10. We focus our analysis on *PCTAFF*, although our results are robust to using the other measures distance to loss (as shown in Table 11 and discussed later). We estimate the determinants of *D_OC* with probit (and report marginal effects) and those of the remaining three deal structure variables with ordinary least squares. If markets ex ante recognized originator's incentive conflicts, investors should have demanded higher yields and more credit enhancement in the form of overcollateralization and subordination in unaffiliated deals. As a result, we should find a negative relation between *PCTAFF* and *YIELD*, *D_OC*, and *OCTARGET* and a positive relation between *PCTAFF* and *PCTAAA*.

In Regression 1, we examine the relation between originator-sponsor affiliation and MBS yields. As shown, we find that as the fraction of mortgages from affiliated originators increases deals have lower average yields. Our results suggest that investors recognized the incentive effects that affiliation creates on behalf of originators and priced MBS to reflect the alignment of incentives. All else held constant, a one standard deviation increase in *PCTAFF* is associated with approximately 5 basis points decline in *YIELD* (roughly 1% when evaluated at the mean). Of course, more than 90% of the deal consists of AAA-rated MBS whose prices should be much less sensitive to this incentive problem than the prices of mezzanine MBS. It is important to recognize here that while we observe that the yields on MBS vary with originator-sponsor affiliation, we do not address the far more difficult question of whether frictions were ex ante correctly priced. Finally, consistent with yields reflecting the underlying risk of the collateral, yields vary inversely with the weighted average FICO scores and the weighted average loan to value of mortgages in the pool. We also find that the average yield is higher for pools that contain loans with negative

amortization. Surprisingly, even though loss and foreclosure rates are higher for pools with more ARM mortgages, we find no significant relation between yields and the proportion of ARMs in the pool.

In Regressions 2 to 4, we examine whether originator-sponsor affiliation is related to the extent to which credit enhancement mechanisms are used. We find that greater proportion of the MBSs backed by the mortgage pool are rated AAA when originators are affiliated with the sponsor. As expected, the proportion of AAA-rated securities issued is also significantly related to risk measures such as *WAFICO* and *WALTV*. In addition, the proportion of AAA-rated securities issued is negatively related to the proportion of ARMs in the pool and whether the pool contains mortgages with negative amortization. We find similar results concerning other measures of credit enhancement such as whether there is an overcollateralization account and the size of the OC account.

In Table 11, we report the coefficient estimates and significance levels for alternative distance to loss measures in deal structure regressions. Consistent with market participants recognizing the incentive effects of originator-sponsor affiliation and originator concentration, we find that yields are significantly lower and the percent of securities rated AAA is significantly higher for affiliated deals and deals with greater originator concentration. We do not find a significant relation between average yields and the percent of mortgages originated by depository institutions. However, we do find that percentage of mortgages originated by depository institutions is negatively and significantly related to the likelihood and amount of overcollateralization accounts and positively (not significant) related to the percent of securities rated AAA. Moreover, using just mixed and unaffiliated deals, we find that a greater fraction of the MBSs are rated AAA in deals where the percent of mortgages serviced by the originators is higher. Overall, the evidence is consistent with the view that MBS investors recognized the incentive conflicts on behalf of originators in the mortgage securitization process and deals were structured taking into account these conflicts.

6. Conclusions

In this paper, we examine the relation between ex post performance, ex ante deal structure, and various measures of distance from loss, using a sample of residential Alt-A MBS deals from the 2003–2007 period. We exploit differences in MBS deals in terms of the affiliation of key players in the securitization process to examine the extent to which “frictions” affect ex post performance. Overall, we find significantly higher loss and foreclosure rates for deals involving unaffiliated originators and sponsors, for deals involving originators who are not depository institutions, and for deals in which the servicer is not affiliated with the originator(s). This evidence is supportive of the argument that incentive conflicts endemic to the securitization process are associated with higher loss rates associated with mortgages that were securitized (or intended to be securitized). More importantly, we examine the

heretofore-overlooked question of whether investors recognized these incentive conflicts ex ante when pricing and structuring MBSs. Controlling for differences in the risk characteristics of the underlying mortgage collateral, we find that yields are significantly higher and the proportion of AAA-rated securities is lower when distance from loss is greater. We also find that overcollateralization is more frequently employed for unaffiliated deals. Taken together these results are consistent with investors rationally accounting for agency conflicts when pricing mortgage-backed securities.

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Appendix – Variable Definitions

We obtain information on deal structure, pricing, and performance from ABSnet; quarterly house price indices from the Federal Housing Finance Agency (formally known as OFHEO); composition of the deal by mortgage location from Bloomberg; and mortgage characteristics as well as the identities and exposures of the key players from deal prospectuses (available through ABSnet).

PCTAFF equals dollar-weighted percentage of securitized mortgages originated by the deal sponsor's affiliates

D_AFF, **D_MIXED**, and **D_UNAFF** are dummy variables that equal one if the deal is an affiliated deal, mixed deal, and unaffiliated deal, respectively

ORNUM equals number of originators

ORCONC is the sum of squared originators' shares (by dollar value) of the pool

PCTDEP equals dollar-weighted percentage of securitized mortgages originated by a depository financial institution

PCTAFFDEP (**PCTUNAFFDEP**) equals dollar-weighted fraction of mortgages originated by depository institutions affiliated (unaffiliated) with the sponsor

PCTORSVC equals the fraction of mortgages by dollar value serviced by the originator(s)

WAFICO is the mortgage value weighted average FICO score for mortgages in the pool

WALTV is the mortgage value weighted average loan to value ratio for mortgages in the pool

WAC is the mortgage value weighted average coupon rate for mortgages in the pool

ARM equals fraction of mortgages in the pool by dollar value that are adjustable rate or hybrid

D_NEGAMO is a dummy variable that equals to 1 if the deal consists of negative amortization mortgages

LIMDOC equals the fraction (by dollar value) of limited- or no-documentation mortgages

PURCHASE equals the fraction (by dollar value) of mortgages whose purpose is a purchase (and not refinancing)

FAMILY equals the fraction (by dollar value) of mortgages for family ownership

HPRUNUP is the weighted-average house price change associated with the states that the mortgages in the pool are originated in during the year before deal completion

dHPPOST is the weighted-average house price change associated with the states that the mortgages in the pool are originated in from the year before deal completion to August 2009 (or for some of our analyses to July 2009)

YIELD equals the weighted-average yield (%) of mortgage-backed bonds issued as of deal close (and as reported by ABSnet). According ABSnet glossary: "The yield on a bond is the internal rate of return that

equates the price paid for the bond to the expected future cash flows... Yields in the ABS market often follow standards published by The Bond Market Association.”

PCTAAA is 100 times the face value of mortgage-backed bonds that are rated AAA by S&P (or Moody’s) at deal close divided by deal value (excluding the overcollateralization)

D_OC is an indicator variable that is equal to 1 if the deal has credit enhancement in the form of overcollateralization (i.e., the face value of mortgages in the pool exceeds the face value of the bonds that are secured by those mortgages)

OCTARGET equals 100 times overcollateralization target amount divided by deal value at deal inception.

Cumulative net loss rate is the sum of all losses of principal suffered to date divided by the original pool balance.

Foreclosure rate is defined as the face value of all loans that are in the process of being foreclosed at the end of the month as a percentage of the end of month pool balance.

Table 1**Mortgage issuance and securitizations by vintage**

The table below presents the aggregate volume (in billions) of conforming and non-conforming (i.e., subprime and Alt-A) mortgage originations and issuances (i.e., securitizations) by vintage for the period 2001 to mid-2008. We obtain the data from Inside Mortgage Finance.

Vintage	Subprime			Alt-A			Conventional/Conforming		
	Originations	Issuances	Ratio	Originations	Issuances	Ratio	Originations	Issuances	Ratio
2001	\$160	\$87	46%	\$60	\$11	19%	\$1,265	\$914	72%
2002	\$200	\$123	53%	\$68	\$54	79%	\$1,706	\$1,270	74%
2003	\$310	\$195	58%	\$85	\$74	87%	\$2,460	\$1,912	78%
2004	\$540	\$363	67%	\$200	\$158	79%	\$1,210	\$892	74%
2005	\$625	\$485	75%	\$380	\$332	87%	\$1,092	\$879	81%
2006	\$600	\$448	74%	\$400	\$385	91%	\$990	\$816	83%
2007	\$191	\$201	105%	\$275	\$249	91%	\$1,162	\$1,062	91%
2008 (until June)	\$14	\$2	14%	\$27	\$2	7%	\$611	\$585	96%

Table 2
Summary statistics for distance to loss measures

The table below provides summary statistics for various distance-to-loss measures associated with 526 residential Alt-A MBS deals completed between 2003 and 2007. We obtain the data that we use in variable construction from deal prospectuses posted on Edgar. PCTAFF equals dollar-weighted percentage of securitized mortgages originated by the sponsor's affiliates. We also define three dummy variables D_AFF, D_MIXED, and D_UNAFF that equal one if the deal is an affiliated deal, mixed deal, and unaffiliated deal, respectively. ORNUM equals number of originators and ORCONC is the sum of squared originators' shares (by dollar value) of the pool. PCTDEP equals dollar-weighted percentage of securitized mortgages originated by a depository financial institution. PCTAFFDEP (PCTUNAFFDEP) equals the dollar-weighted fraction of mortgages originated by depository institutions affiliated (unaffiliated) with the sponsor. Finally, PCTORSVC equals the fraction of mortgages by dollar value serviced by the originators.

Variable:	N	Mean	5th percentile	Median	95th percentile	Standard deviation
PCTAFF	526	0.70	0.00	1.00	1.00	0.41
D_AFF	526	0.56	0.00	1.00	1.00	0.50
D_MIXED	526	0.24	0.00	0.00	1.00	0.43
D_UNAFF	526	0.20	0.00	0.00	1.00	0.40
ORNUM	526	2.62	1.00	1.00	8.00	2.20
ORCONC	526	0.71	0.14	0.86	1.00	0.32
PCTDEP	526	0.71	0.00	1.00	1.00	0.39
PCTAFFDEP	526	0.51	0.00	0.63	1.00	0.48
PCTUNAFFDEP	526	0.19	0.00	0.00	1.00	0.32
PCTORSVC	522	0.78	0.00	1.00	1.00	0.38

Table 3
Characteristics of affiliated and unaffiliated deals

The table below presents the characteristics of a sample of residential Alt-A MBS deals completed between 2003 and 2007 by whether the sponsor is also the originator of the securitized mortgages (affiliated deals) or whether the sponsor originated none of the securitized mortgages (unaffiliated deals). The variable definitions are available in the appendix. We use ***, **, and * to denote that the mean and median difference between affiliated and unaffiliated deals is significant at the 1%, 5% and 10% level (two-tailed), respectively.

Variables:	All deals			Affiliated deals				Unaffiliated deals		
	N	Mean	Median	N	Mean	Median		N	Mean	Median
WAFICO	480	710.94	710.20	272	713.93	713.08	***	96	705.05	706.00
WALTV	526	73.60	73.55	294	71.55	71.64	***	104	77.89	75.58
WAC (%)	526	6.55	6.63	294	6.47	6.56	**	104	6.70	6.85
ARM (%)	526	40.60	0.00	294	22.15	0.00	***	104	56.93	100.00
D_NEGAMO	526	0.13	—	294	0.07	—	***	104	0.32	—
LIMDOC (%)	525	74.50	76.20	294	72.88	72.81	***	104	76.39	84.72
PURCHASE (%)	522	46.02	45.68	293	42.72	41.93	**	104	47.80	48.55
FAMILY (%)	522	63.26	62.71	293	64.31	63.06		104	63.17	62.22
HPRUNUP (%)	525	7.48	7.67	294	7.67	7.98		104	7.30	7.48
dHPPOST (%)	525	-1.43	-7.53	294	-0.37	-6.27	***	104	-3.24	-9.73
ORNUM	526	2.62	1.00	294	1.00	1.00	***	104	4.75	5.00
ORCONC	526	0.71	0.86	294	1.00	1.00	***	104	0.39	0.28
PCTDEP	526	0.71	1.00	294	0.84	1.00	***	104	0.61	0.67
PCTORSVS	522	0.81	1.00	293	0.99	1.00	***	103	0.39	0.32

Table 4

The determinants of cumulative net loss and foreclosure rates as of August 2009

The table presents coefficient estimates and *t*-statistics (based on robust standard errors) from four ordinary least squares (OLS) regressions that we estimate to examine the relationship between originator-sponsor affiliation and residential Alt-A MBS deal performance. Our sample consists of deals completed between 2003 and 2007. We obtain data on deal characteristics from the prospectus and performance from ABSnet. The dependent variable is deal performance measured either as cumulative net loss rate (left panel) or as foreclosure rate (right panel), both as of August 2009. PCTAFF equals dollar-weighted percentage of securitized mortgages originated by the sponsor's affiliates. We also define three dummy variables D_AFF, D_MIXED, and D_UNAFF that equal one if the deal is an affiliated deal, mixed deal, and unaffiliated deal, respectively. The definitions of the other explanatory variables are available in the appendix. We use ***, **, and * to denote that the coefficient estimate is significantly different from zero (two-tailed) at the 1%, 5%, and 10% level, respectively.

Explanatory variables	Cumulative net loss rate (%)		Foreclosure rate (%)	
	(1)	(2)	(3)	(4)
PCTAFF	-0.804** (-2.48)	—	-4.211*** (-6.28)	—
D_UNAFF	—	0.869** (2.37)	—	3.564*** (4.61)
D_MIXED	—	0.341 (1.27)	—	1.391** (2.45)
WAFICO	-0.026*** (-3.23)	-0.026*** (-3.20)	-0.121*** (-7.17)	-0.124*** (-7.21)
WALTV (%)	-0.008 (-0.26)	-0.008 (-0.26)	-0.015 (-0.24)	-0.006 (-0.10)
WAC (%)	2.500*** (7.93)	2.475*** (7.87)	2.705*** (4.15)	2.425*** (3.66)
ARM (%)	0.029*** (9.69)	0.029*** (9.50)	0.071*** (11.41)	0.071*** (10.91)
D_NEGAMO	15.631*** (7.10)	15.434*** (7.04)	19.724*** (4.33)	17.543*** (3.80)
WAC (%) x D_NEGAMO	-2.535*** (-7.60)	-2.502*** (-7.54)	-3.556*** (-5.16)	-3.185*** (-4.56)
LIMDOC (%)	0.007 (0.74)	0.006 (0.67)	0.050*** (2.70)	0.046** (2.41)
PURCHASE (%)	0.029** (2.17)	0.031** (2.32)	0.047* (1.71)	0.058** (2.04)
FAMILY (%)	0.001 (0.09)	0.006 (0.37)	0.014 (0.40)	0.038 (1.08)
dHPPPOST (%)	-0.056** (-2.40)	-0.058** (-2.46)	-0.147*** (-3.05)	-0.158*** (-3.20)
D_VINTAGE04	-1.281** (-2.46)	-1.294** (-2.48)	-0.734 (-0.68)	-0.893 (-0.82)
D_VINTAGE05	-1.229 (-1.55)	-1.276 (-1.61)	0.452 (0.28)	0.092 (0.06)
D_VINTAGE06	-0.818 (-0.81)	-0.839 (-0.83)	1.205 (0.58)	1.023 (0.48)
D_VINTAGE07	-1.102 (-1.03)	-1.126 (-1.05)	2.104 (0.95)	1.763 (0.78)
Sponsor fixed effects	Yes	Yes	Yes	Yes
Number of observations	474	474	475	475
Adjusted R ²	77.7%	77.6%	81.2%	80.4%

Table 5**The sensitivity of affiliation coefficients to the level of documentation**

We estimate deal performance regressions for two sub-samples (above and below fraction of mortgages in the pool that are no- or limited-documentation (i.e., LIMDOC)) to examine whether the relationship between originator-sponsor affiliation and deal performance varies according to LIMDOC. We estimate separate regressions for each affiliation measure. The dependent variable is deal performance measured either as cumulative net loss rate (left panel) or as foreclosure rate (right panel), both as of August 2009. While the models that we estimate are identical to the models presented in Tables 4 and 5, for brevity, we present the coefficient estimates and t -statistics (based on robust standard errors) for originator-sponsor affiliation measures. We also test whether the coefficient estimates for affiliation measures are equal across the two sub-samples. Two-tailed t -statistics from these tests are also presented in the table. We use ^{***}, ^{**}, and ^{*} to denote that the coefficient estimate or the difference between the coefficient estimates of two sub-groups is significantly different from zero (two-tailed) at the 1%, 5%, and 10% level, respectively

Affiliation measure	Cumulative net loss rate (%)			Foreclosure rate (%)		
	LIMDOC below median	LIMDOC above median	t -stat for difference	LIMDOC below median	LIMDOC above median	t -stat for difference
PCTAFF	-0.500 [*] (-1.94)	-0.936 ^{***} (-3.04)	2.08 ^{**}	-2.234 ^{***} (-3.71)	-4.700 ^{***} (-7.52)	2.77 ^{***}
UNAFF	0.023 (0.07)	1.235 [*] (1.72)	2.50 ^{**}	1.155 ^{***} (3.55)	4.495 ^{***} (6.68)	2.90 ^{***}

Table 6**The determinants of cumulative net loss and foreclosure rates as of July 2006**

We estimate the relationship between originator-sponsor affiliation and deal performance using a sample of residential Alt-A MBS deals completed between 2003 and 2005. The dependent variable is deal performance measured either as cumulative net loss rate (Regressions 1 and 2) or as foreclosure rate (Regressions 3 and 4), both as of July 2006, just before house prices started declining. The definitions of explanatory variables are available in the appendix. We present coefficient estimates and *t*-statistics (based on robust standard errors) in the table. We use ***, **, and * to denote that the coefficient estimate is significantly different from zero (two-tailed) at the 1%, 5%, and 10% level, respectively.

Explanatory variables	Cumulative net loss rate (%)		Foreclosure rate (%)	
	(1)	(2)	(3)	(4)
PCTAFF	-0.031*	—	-0.546***	—
	(-1.88)	—	(-3.70)	—
D_UNAFF	—	0.036**	—	0.526***
	—	(2.11)	—	(3.48)
D_MIXED	—	0.024	—	0.036
	—	(1.40)	—	(0.24)
WAFICO	-0.001	-0.001	-0.015***	-0.016***
	(-1.57)	(-1.59)	(-3.22)	(-3.39)
WALTV (%)	0.007***	0.007***	0.019	0.019
	(2.72)	(2.68)	(0.78)	(0.79)
WAC (%)	0.059***	0.057***	0.831***	0.754***
	(3.08)	(3.02)	(4.92)	(4.50)
ARM (%)	-0.000**	-0.000**	0.001	0.001
	(-1.99)	(-2.20)	(0.59)	(0.58)
D_NEGAMO	0.275	0.260	4.421	4.102
	(0.58)	(0.55)	(1.05)	(0.97)
WAC (%) x D_NEGAMO	-0.049	-0.046	-0.855	-0.806
	(-0.48)	(-0.46)	(-0.95)	(-0.89)
LIMDOC (%)	-0.000	-0.000	0.004	0.005
	(-0.08)	(-0.07)	(0.82)	(0.93)
PURCHASE (%)	-0.001	-0.001	0.008	0.011
	(-1.47)	(-1.47)	(0.91)	(1.25)
FAMILY (%)	-0.002*	-0.002*	0.010	0.013
	(-1.78)	(-1.76)	(1.01)	(1.29)
dHPPOST (%)	-0.001	-0.001	0.013	0.013
	(-0.71)	(-0.88)	(1.52)	(1.45)
D_VINTAGE04	-0.046*	-0.048**	0.242	0.216
	(-1.93)	(-2.04)	(1.16)	(1.03)
D_VINTAGE05	-0.099**	-0.105***	0.186	0.146
	(-2.51)	(-2.67)	(0.53)	(0.42)
Number of observations	140	140	141	141
Adjusted R ²	51.6%	51.7%	60.5%	60.1%

Table 7**Deal performance by whether the originators are depository institutions**

We estimate ordinary least squares (OLS) regressions to examine the relationship between deal performance and the fraction of mortgages originated by depository financial institutions, using a sample of residential Alt-A MBS deals completed between 2003 and 2007. The dependent variable is deal performance measured either as cumulative net loss rate (Regressions 1 and 2) or as foreclosure rate (Regressions 3 and 4), both as of August 2009. PCTDEP equals dollar-weighted percentage of securitized mortgages originated by a depository financial institution. PCTAFFDEP (PCTUNAFFDEP) equals the dollar-weighted fraction of mortgages originated by depository institutions affiliated (unaffiliated) with the sponsor. The definitions of other explanatory variables are available in the appendix. We present coefficient estimates and *t*-statistics (based on robust standard errors) in the table. Other controls include deal risk and house price change measures (as in Tables 4 and 5) as well as vintage dummies. We use ^{***}, ^{**}, and ^{*} to denote that the coefficient estimate is significantly different from zero (two-tailed) at the 1%, 5%, and 10% level, respectively.

Explanatory variables	Cumulative net loss rate (%)		Foreclosure rate (%)	
	All deals	Deals of depository sponsors	All deals	Deals of depository sponsors
	(1)	(2)	(3)	(4)
PCTDEP	-0.800 ^{**} (-2.33)	—	-0.523 (-0.72)	—
PCTAFFDEP	—	-1.676 ^{***} (-3.66)	—	-3.537 ^{***} (-3.05)
PCTUNAFFDEP	—	0.604 (1.02)	—	1.830 (1.22)
D_UNAFF	1.034 ^{***} (2.78)	—	3.671 ^{***} (4.66)	—
D_MIXED	0.346 (1.29)	—	1.394 ^{**} (2.46)	—
Other controls	Yes	Yes	Yes	Yes
Sponsor fixed effects	Yes	Yes	Yes	Yes
Number of observations	474	320	475	321
Adjusted <i>R</i> ²	77.8%	78.9%	80.4%	84.3%

Table 8

Originator concentration, originator-servicer affiliation, and deal performance for unaffiliated and mixed deals

We estimate ordinary least squares (OLS) regressions to examine whether originator-concentration and originator-servicer affiliation are related to ex post deal performance, using a sample of residential Alt-A MBS deals completed between 2003 and 2007. Since there is very little or no variation in originator-concentration and originator-servicer affiliation in affiliated deals we limit this analysis to unaffiliated and mixed deals. The dependent variable is deal performance measured either as cumulative net loss rate (Regressions 1 to 3) or as foreclosure rate (Regressions 4 to 6), both as of August 2009. ORNUM equals number of originators and ORCONC is the sum of squared originators' shares (by dollar value) of the pool. PCTORSVC equals the fraction of mortgages by dollar value serviced by the originators. The definitions of other explanatory variables are available in the appendix. We present coefficient estimates and *t*-statistics (based on robust standard errors) in the table. Other controls include deal risk and house price change measures (as in Tables 4 and 5) as well as vintage dummies. We use ***, **, and * to denote that the coefficient estimate is significantly different from zero (two-tailed) at the 1%, 5%, and 10% level, respectively.

Explanatory variables	Cumulative net loss rate (%)			Foreclosure rate (%)		
	(1)	(2)	(3)	(4)	(5)	(6)
ORNUM	0.109*	—	—	0.729***	—	—
	(1.85)	—	—	(4.85)	—	—
ORCONC	—	-1.312**	—	—	-7.696***	—
	—	(-2.32)	—	—	(-5.72)	—
PCTORSVC	—	—	-1.053**	—	—	-0.236
	—	—	(-2.37)	—	—	(-0.22)
D_MIXED	-0.701**	-0.727**	-0.794**	-2.100***	-2.425***	-1.907**
	(-2.26)	(-2.35)	(-1.96)	(-2.64)	(-3.11)	(-1.98)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Sponsor fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	205	205	203	205	205	203
Adjusted R^2	82.4%	82.6%	77.8%	77.7%	78.7%	74.7%

Table 9

Loan performance from securitization date to August 2009

The table below presents the determinants of loan performance for loans that belong to our Alt A sample for which we could obtain originator information and mortgage loan characteristics from ABSNETLOAN. *Default* is an indicator variable that equals 1 if the loan is foreclosed (includes REOs) or liquidated for a loss between the securitization date and August 2009. *60+ Delinquency* is an indicator variable that equals 1 if the loan is active (i.e., neither defaulted nor prepaid) as of August 2009 but is delinquent for 60 days or more. *% change in house prices* is defined as the percentage change in house prices in the borrower's state from the securitization quarter to August 2009. Both regressions are estimated via Probit regressions. Marginal effects of the coefficient estimates along with *t*-statistics (based on robust standard errors) are reported in the table.

Explanatory variables	Pr(Default=1) (1)	Pr(60+ day delinquent=1) (2)
Dummy: Originator and sponsor are affiliated	-0.09*** (-22.01)	-0.01*** (-4.10)
Original borrower FICO score	-0.00*** (-79.85)	-0.00*** (-46.00)
Original loan-to-value ratio	0.01*** (98.32)	0.00*** (34.90)
Original coupon rate	0.02*** (47.62)	0.00*** (9.15)
Dummy: Adjustable rate mortgage	0.05*** (29.48)	0.02*** (9.65)
Dummy: Negative amortization mortgage	0.11*** (22.16)	0.02*** (5.58)
Original coupon rate x Dummy: Negative amortization	-0.02*** (-25.39)	-0.00*** (-5.06)
Dummy: Limited documentation	0.08*** (56.61)	0.03*** (22.28)
Dummy: Loan purpose is PURCHASE	0.00** (2.09)	-0.01*** (-8.64)
Dummy: Single family house	-0.00*** (-3.35)	0.00*** (4.42)
% change in house prices	-0.50*** (-138.00)	-0.12*** (-33.51)
Original Debt/Income	-0.00*** (-17.73)	-0.00* (-1.85)
Dummy: Silent second	0.10*** (66.12)	0.02*** (12.03)
Dummy: 2007 vintage	-0.03*** (-18.98)	-0.00 (-0.70)
Originator fixed effects	Yes	Yes
Number of observations	363,107	212,939
Pseudo R^2	17.6%	5.5%

Table 10

Deal structure and originator-sponsor affiliation

We estimate ordinary least squares (OLS) (Columns 1, 2, and 4) and probit (Column 3) regressions to examine whether the percentage of mortgages originated by entities affiliated with the deal sponsor (PCTAFF) is related to various measures of deal structure, using a sample of residential Alt-A MBS deals completed between 2003 and 2007. YIELD equals the weighted-average yield (%) of mortgage-backed bonds issued as of deal close (and as reported by ABSnet). PCTAAA is 100 times the face value of mortgage-backed bonds that are rated AAA by S&P or Moody's at deal close divided by deal value (excluding the overcollateralization). D_OC is an indicator variable that is equal to 1 if the deal has credit enhancement in the form of overcollateralization (i.e., the face value of mortgages in the pool exceeds the face value of the bonds that are secured by those mortgages). OCTARGET equals 100 times overcollateralization target amount divided by deal value at deal inception. Note that for some deals YIELD is missing in ABSnet so we estimate the determinants of YIELD using only deals with non-missing information. The definitions of other explanatory variables are available in the appendix. We present coefficient estimates and *t*-statistics (based on robust standard errors) in the table. In Column 3, we report the marginal effects of the estimated probit coefficients. We use ^{***}, ^{**}, and ^{*} to denote that the coefficient estimate is significantly different from zero (two-tailed) at the 1%, 5%, and 10% level, respectively.

Explanatory variables	YIELD (1)	PCTAAA (2)	D_OC (3)	OCTARGET (4)
PCTAFF	-0.100 ^{**} (-2.14)	0.651 ^{***} (3.46)	-0.926 ^{***} (-4.36)	-0.119 ^{**} (-2.38)
WAFICO	-0.005 ^{***} (-2.91)	0.042 ^{***} (6.09)	-0.014 (-1.44)	0.004 ^{**} (2.37)
WALTV (%)	-0.016 ^{**} (-2.27)	-0.129 ^{***} (-4.55)	0.114 ^{**} (2.19)	0.036 ^{***} (4.83)
WAC (%)	0.915 ^{***} (14.31)	-0.659 ^{**} (-2.53)	0.674 ^{**} (2.00)	0.422 ^{***} (6.06)
ARM (%)	-0.000 (-0.38)	-0.014 ^{***} (-6.18)	0.007 ^{***} (2.58)	0.002 ^{***} (2.91)
D_NEGAMO	3.431 ^{***} (7.59)	-4.399 ^{**} (-2.38)	8.454 ^{***} (3.66)	3.211 ^{***} (6.51)
WAC (%) x D_NEGAMO	-0.458 ^{***} (-6.80)	0.347 (1.25)	-1.110 ^{***} (-3.14)	-0.455 ^{***} (-6.14)
LIMDOC (%)	-0.001 (-0.56)	-0.002 (-0.31)	-0.004 (-0.37)	-0.003 (-1.33)
PURCHASE (%)	0.004 (1.64)	-0.011 (-0.98)	0.032 ^{**} (2.18)	-0.002 (-0.82)
FAMILY (%)	0.005 (1.43)	-0.040 ^{***} (-3.11)	0.007 (0.47)	0.001 (0.38)
HPRUNUP (%)	0.003 (0.37)	-0.099 ^{***} (-3.16)	-0.081 ^{**} (-2.08)	-0.007 (-0.84)
D_VINTAGE04	0.014 (0.15)	0.262 (0.70)	0.851 (1.35)	0.084 (0.84)
D_VINTAGE05	0.024 (0.27)	0.073 (0.20)	1.185 ^{**} (1.99)	-0.084 (-0.86)
D_VINTAGE06	0.064 (0.77)	1.171 ^{***} (3.66)	0.650 (1.16)	-0.249 ^{***} (-2.91)
D_VINTAGE07	0.077 (0.86)	-0.313 (-0.90)	0.832 (1.48)	-0.115 (-1.24)
Number of observations	382	477	477	477
Adjusted <i>R</i> ²	76.0%	63.9%	47.5%	43.4%

Table 11**Deal structure and various measures of distance to loss**

We estimate ordinary least squares (OLS) (Columns 1, 2, and 4) and probit (Column 3) regressions to examine whether the severity of agency problems in securitization is related to various measures of deal structure, using a sample of residential Alt-A MBS deals completed between 2003 and 2007. For each measure of distance to loss, we estimate four regressions. For brevity, we report the coefficient estimates and *t*-statistics associated with the distance to loss measures although the models are specified the same way as in Table 11. YIELD equals the weighted-average yield (%) of mortgage-backed bonds issued as of deal close (and as reported by ABSnet). PCTAAA is 100 times the face value of mortgage-backed bonds that are rated AAA by Standard & Poor's (S&P) or Moody's at deal close divided by deal value (excluding the overcollateralization). D_OC is an indicator variable that is equal to 1 if the deal has credit enhancement in the form of overcollateralization (i.e., the face value of mortgages in the pool exceeds the face value of the bonds that are secured by those mortgages). OCTARGET equals 100 times overcollateralization target amount divided by deal value at deal inception. Note that for some deals YIELD is missing in ABSnet so we estimate the determinants of YIELD using only deals with non-missing information. We estimate the regressions associated with PCTORSVC using only unaffiliated and mixed deals. The definitions of explanatory variables are available in the appendix. We present coefficient estimates and *t*-statistics (based on robust standard errors) in the table. In Column 3, we report the marginal effects of the estimated probit coefficients. We use ***, **, and * to denote that the coefficient estimate is significantly different from zero (two-tailed) at the 1%, 5%, and 10% level, respectively.

Distance-to-loss measures	YIELD (1)	PCTAAA (2)	D_OC (3)	OCTARGET (4)
PCTAFF	-0.100** (-2.14)	0.651*** (3.49)	-0.926*** (-4.36)	-0.119** (-2.38)
D_UNAFF	0.099** (2.00)	-0.826*** (-4.14)	0.869*** (3.84)	0.089* (1.66)
D_MIXED	0.126*** (2.61)	0.208 (1.08)	0.852*** (4.14)	0.148*** (2.86)
ORCONC	-0.154** (-2.53)	0.476** (1.97)	-1.053*** (-4.08)	-0.172*** (-2.70)
PCTDEP	0.012 (0.26)	0.309 (1.37)	-0.501** (-2.04)	-0.133** (-2.23)
PCTORSVC	0.086 (1.33)	1.026*** (3.54)	0.251 (0.91)	0.151* (1.78)

Figure 1

Key Players in the Non-Agency Mortgage-backed Securitization Process
(Adapted from Prospectus for Bear Sterns Alt-A Trust 2006-4)

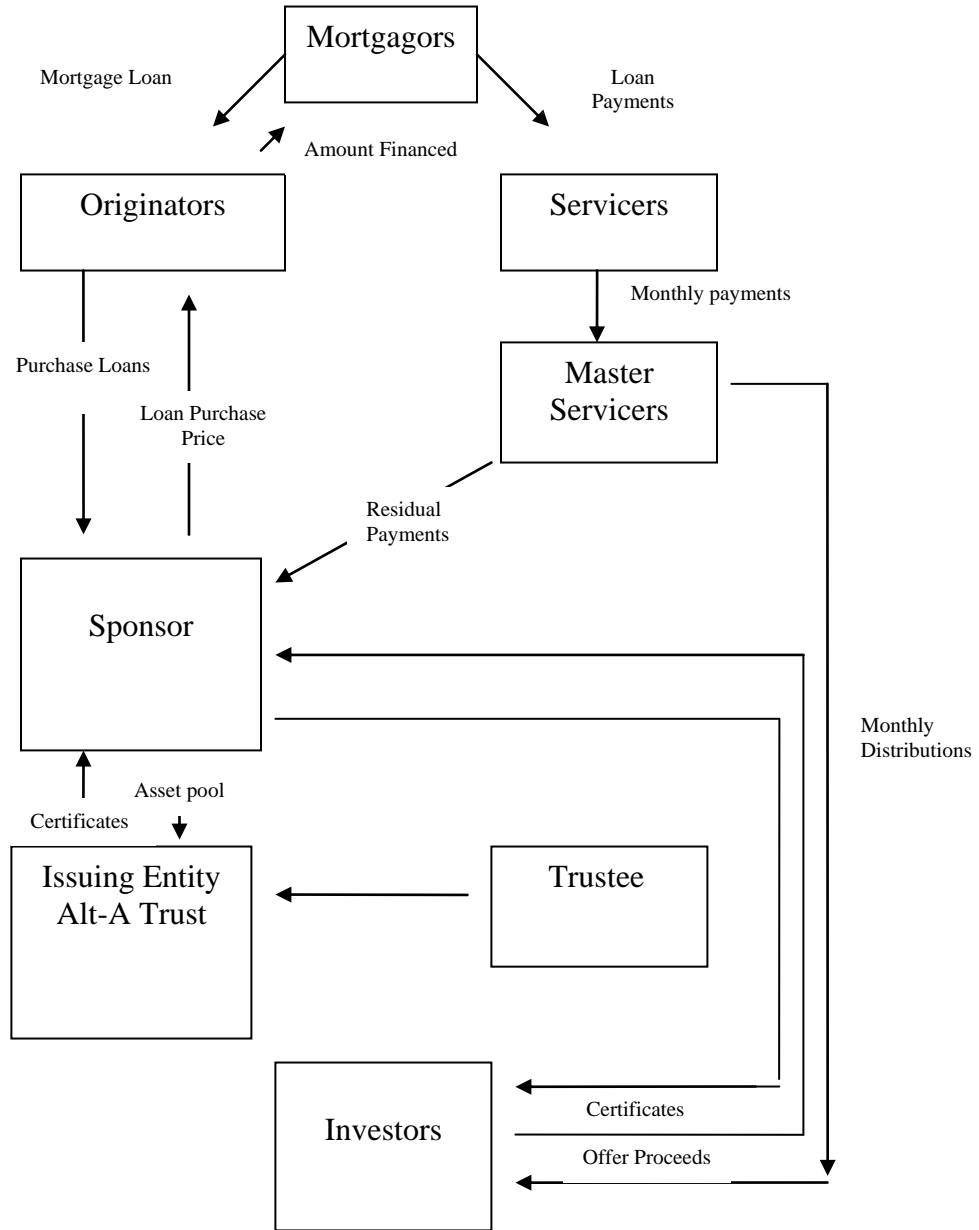


Figure 2. Aggregate ALT-A residential MBS deal volume by vintage

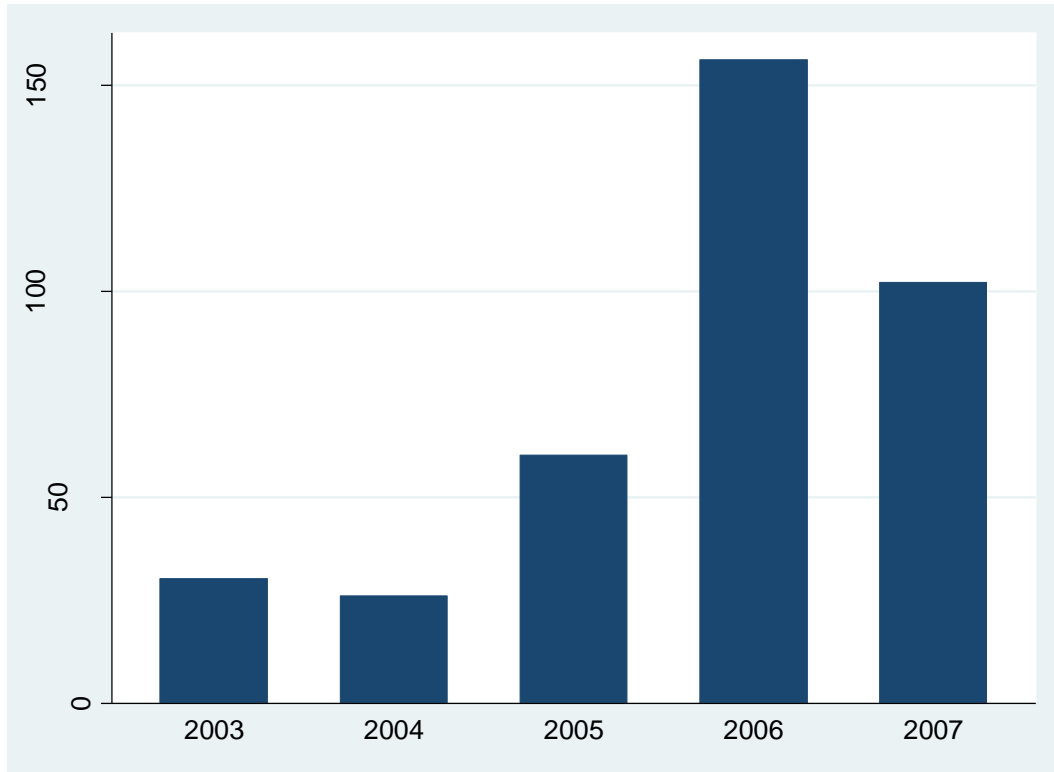


Figure 3. Average cumulative net loss rate of Alt-A residential MBS pools as of August 2009 by vintage

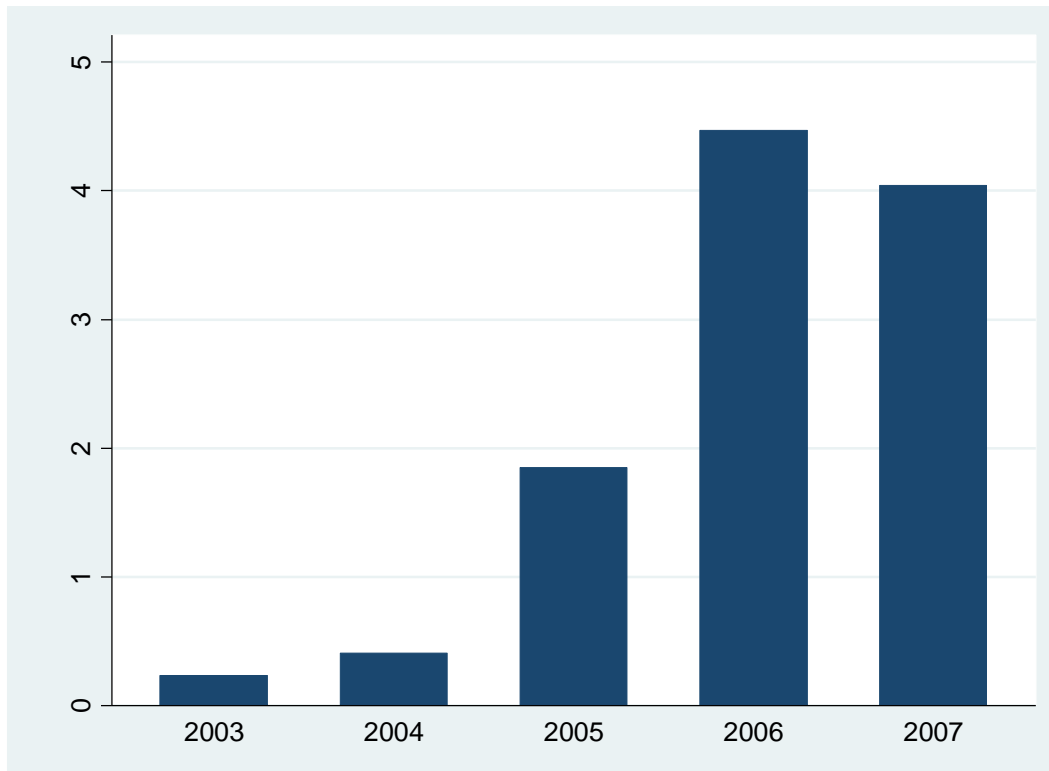


Figure 4.a. Average cumulative net loss rate as of August 2009 by originator-sponsor affiliation

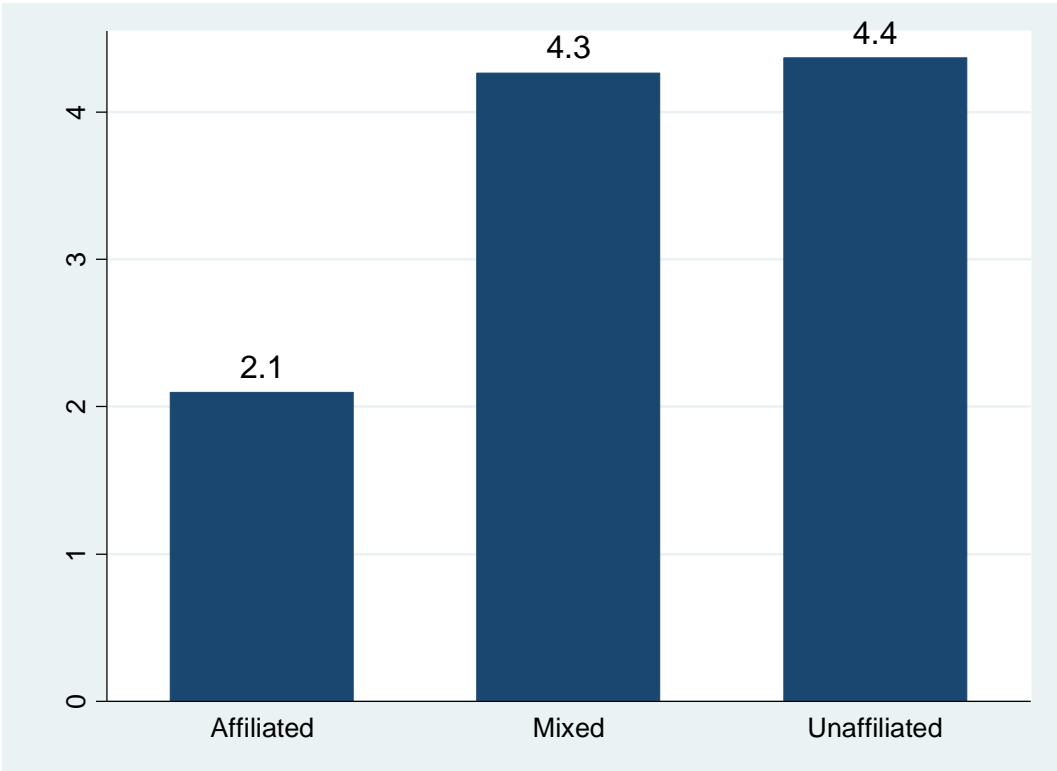


Figure 4.b. Average foreclosure rate as of August 2009 by originator-sponsor affiliation

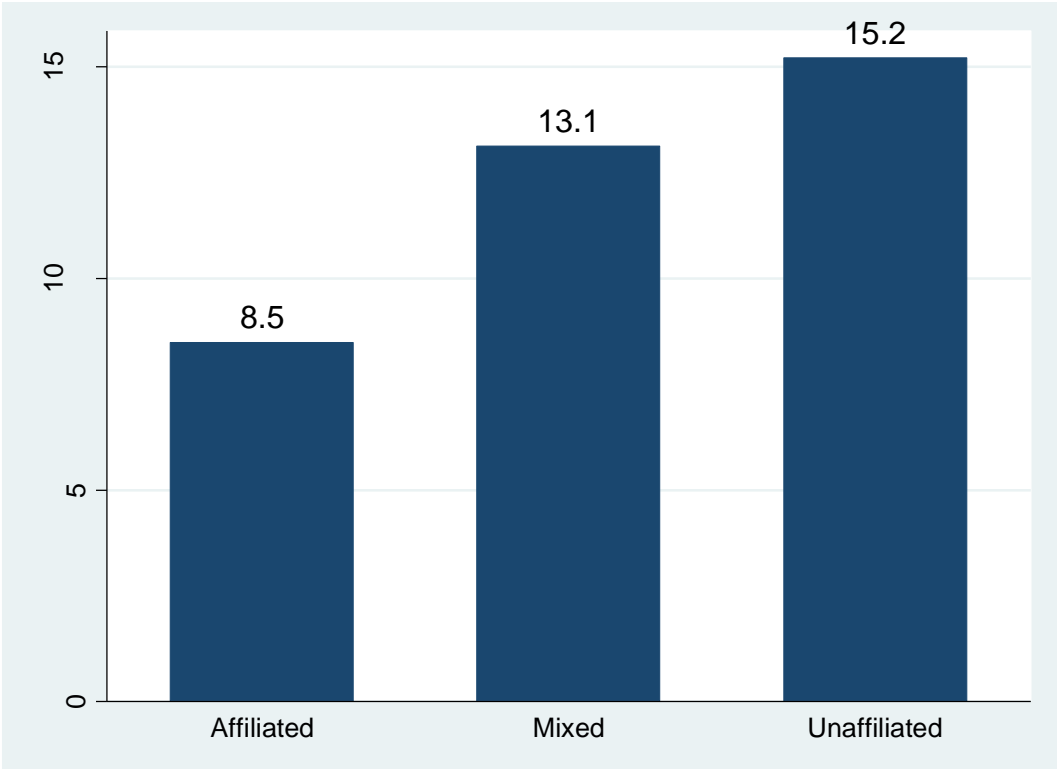


Figure 5

Monthly median cumulative loss rates by originator-sponsor affiliation and vintage

The figures below present the median monthly cumulative net loss rate by event-month, where event month is defined as the number of months from origination. Straight lines represent unaffiliated deals and dashed lines represent affiliated deals. We use a balanced panel of deals to calculate monthly medians.

