

# CMBS and Conflicts of Interest: Evidence from Ownership Changes for Servicers\*

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## Abstract

Self-dealing is potentially important but difficult to measure. I study special servicers in commercial mortgage-backed securities (CMBS), who sell distressed assets on behalf of bondholders. Around 2010, ownership changes for four major servicers raised tunneling concerns that they may direct benefits to new owners' affiliates (buyers and service providers). Loans liquidated after ownership changes have greater loss rates than before (8 percentage point, \$2.3 billion in losses), relative to other (placebo) servicers. Together with a case study that tracks self-dealing purchases, the findings point to potential steering conflicts that could incentivize tunneling through fees to service providers.

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# 1 Introduction

Self-dealing has been alleged to harm investors but it is hard to measure (Shleifer and Vishny, 1997). The wave of foreclosures of securitized assets has put a spotlight on intermediaries that manage securitized assets on behalf of bondholders. There is anecdotal evidence that some intermediaries appear to tunnel private benefits to their affiliates at the expense of distant bondholders (Lee, 2014). However, it is hard to quantify the extent of self-dealing for securitized assets because it is hard to track them after securitization. Moreover, self-dealing incentives are endogenous by nature and often correlated with omitted variables.

The commercial mortgage-backed securities (CMBS) market provides a useful context to address the empirical challenges in the self-dealing literature. It is the second most important source of credit in the commercial real estate sector with total assets of \$623 billion (Federal Reserve, 2016). Each CMBS trust comprises a pool of mortgages that are collateralized by non-residential properties. Crucially, it is relatively easier to track the chain of ownership of CMBS assets because real estate transactions are recorded publicly.

I study self-dealing concerns involving four of the major *special servicers* in the CMBS market, servicing around \$500 billion of CMBS debt in 2010. Special servicers are debt firms managing distressed mortgages on behalf of bondholders with the goal of maximizing the net present value of assets. When a loan is non-performing, the special servicer decides whether and how to liquidate it. Loan liquidations typically involve selling the collateral (non-residential properties). As sellers, special servicers have to search for buyers and intermediaries to facilitate the liquidation.

Around 2010, ownership changes for the four special servicers linked them with new affiliates, presenting potential self-dealing conflicts. The new owners are vertically integrated financial institutions with affiliates that may be potential buyers of CMBS liquidations or potential intermediaries that facilitate real estate transactions (lenders, brokers, and online auction platforms). The scales of the servicers can present efficiency benefits and complementarities for the vertically integrated business models of the new owners, helping to overcome significant search frictions in commercial real estate. However, the links to the new affiliates also heightened concerns that special servicers may be incentivized to sell assets at a discount to the new owners or to steer business opportunities to affiliates to earn fees.

At the same time, the volume of distressed CMBS assets, which remained relatively low before 2010, started to increase sharply. Market participants grew concerned that these two factors (the

rise in potential sales by servicers and the potential links to affiliates) would sharply increase the potential for these servicers to self-deal with affiliates. Yoon (2012) reports that special servicers appear to be “burdened by conflicts of interest caused in part by new ownership” and allegedly “cutting bad deals”.

Motivated by concerns over the ownership changes for the four servicers, I begin by estimating the impact of these events on outcomes for liquidated loans. I compare the changes in loan loss rates (realized losses divided by loan balance before losses) for the four (treated) special servicers before and after their ownership changes relative to other (placebo) servicers. The placebo servicers have fewer affiliates with potential tunneling conflicts, relative to the treated servicers.

I find that loans liquidated after treated special servicers changed owners have loss rates that are 8 percentage points higher than before, relative to placebo servicers. This translates into aggregate losses of \$2.3 billion, representing 20% of total losses from liquidations by treated servicers under new ownership.

My panel data analysis includes 9272 loans liquidated from 2003 to 2012, controls for special servicer fixed effects, month of liquidation fixed effects, and pre-determined loan attributes. The key regressor is the interaction between an indicator for loans liquidated by treated servicers and an indicator for liquidations after ownership changes. The identification assumption is that unobserved determinants of loan loss rates do not change differentially for treated versus placebo servicers, conditional on the fixed effects and loan attributes.

I present robustness checks to address several threats to identification. Since the events happened around 2010, a key confounder is unobserved market conditions. Here, the placebo servicers serve as counterfactuals to the extent treated and placebo servicers face common market conditions. The effect remains stable using various controls for market conditions. Second, while loans are not randomly assigned across servicers, trends in the quality of liquidated loans indicate that compositional differences in loans are unlikely to explain away the main effect.

Another major threat relates to the liquidity crises that triggered the ownership changes for treated servicers. Like many debt firms, when credit spreads widened from 2008 to 2009, the balance sheets worsened dramatically for the previous owners of the servicers, triggering the need for capital infusion. Treated servicers could have been relatively more capacity constrained and overwhelmed by their own problems, accumulating a stockpile of distressed debt. The concern is that some of the differences in losses *after* the ownership changes reflect differences in stockpiling *before* the ownership changes. Moreover, the stockpiling effect is merely a transitory difference

that dissipates once the stockpile of debt has been resolved (even while new ownership remained).

To address concerns that the greater loss rates for treated servicers are confounded by a (transitory) stockpiling effect, I show that the results survive excluding the 18 months right before and after the ownership changes. Additionally, the patterns remain similar if I exclude a three-year window instead of 18 months, using auxiliary data from Bloomberg which provides a longer post period (6 years instead of 3 years). This suggests the results are not driven by transitory confounders.

Next, I provide a bounding exercise to assess how much of the difference in losses in the post period could be driven by the *stockpiling effect* instead of the *ownership change effect*. Unconditional trends in the volume of losses reveal a bunching pattern, with an “excess mass” in losses after ownership changes that may reflect new owners’ liquidations of the stockpile of distressed debt. However, a conservative bounding exercise shows that stockpiling explains at most 21% of the difference in losses.

Importantly, there are no bunching patterns for conditional trends, perhaps because both treated and placebo servicers did not anticipate the sudden increase in distressed debt. Indeed, conditional differences between treated and placebo servicers reveal no bunching pattern, after controlling for servicer and month fixed effects. Overall, while self-dealing concerns generally arise in endogenous settings, the weight of the evidence suggests the 8 p.p. greater loss rate is unlikely to be explained away by the confounders discussed above.

Turning to mechanisms, I explore the three self-dealing conflicts raised by market participants: (i) *buying* (new owners buying assets sold by special servicers), (ii) *steering* (servicers steering business opportunities to affiliated service providers and earning fees), and (iii) *price discrimination* (affiliated service providers charging bondholders higher fees to sell CMBS assets). The price discrimination channel suggests bondholders would pay greater liquidation expenses. However, I find that liquidation expenses are not higher after ownership changes for treated servicers, relative to placebo servicers, which is inconsistent with the price discrimination channel.

Next, I estimate that liquidations after ownership changes have an average sale price that is 14% lower than before, relative to placebo servicers. The magnitude of this price discount is large enough to explain the \$2.3 billion in aggregate losses reported above. Notably, monthly liquidation volumes increase by 229% for treated servicers relative to placebo servicers. The price discount and increase in liquidation volume are consistent with both the buying and steering channels.

To assess the relative importance of the two channels, I complement the core regression analysis

with a case study for one treated servicer. I construct a novel dataset that tracks buyers for a sub-sample of 1000 CMBS properties liquidated by this servicer. Most real estate transactions are recorded publicly but the recorded owners are often limited liability companies. Since commercial properties are high value assets, data firms have invested resources to collect information about the true owners. I hand-match a sub-sample of CMBS liquidations to property transactions to track what happens to securitized assets liquidated by this servicer.

Strikingly, in contrast to the primary market concern over purchases, I only find 14 transactions purchased by affiliates of the special servicer. However, a significant share of sales by this servicer involves affiliated service providers. These affiliated transactions are a central source of commission revenue, constituting half of the total transaction volume for the affiliated brokers. I provide a back of the envelop calculation to illustrate the potential gains from fee streams that are consistent with the magnitudes from the regression analysis above.

The limited purchases and relative importance of affiliated service providers point to the potential significance of the steering channel. This parallels concerns that relate the underpricing of IPO's to commission generation by investment banks (Reuter, 2006; Nimalendran, Ritter, and Zhang, 2007). The steering channel can be important in real estate, where many intermediaries are needed to facilitate transactions. Each CMBS liquidation may represent a bundle of fee streams for affiliated service providers. By contrast, the purchasing channel may present greater litigation risks (some servicers are being sued over self-dealing purchases).

These results shed light on the classic tension between the efficiency benefits from vertical integration and the costs due to self-dealing conflicts in financial institutions. On balance, I find sizable losses to CMBS bondholders that are consistent with concerns over tunneling conflicts but mixed evidence on scale efficiencies. I discuss three ways vertical integration can improve outcomes for bondholders, but do not find strong evidence of efficiency benefits. Bond-level analysis suggests the additional losses are concentrated amongst junior bonds but senior bondholders associated with treated servicers do not have lower loss rates relative to placebo servicers.

One caveat is the imperfect coverage for affiliated service providers makes it harder to assess the full extent of these affiliations. This is a common problem in the self-dealing context as it tends to happen in places where self-dealing is hard to measure. I discuss on-going efforts to improve transparency and provide some lessons for disclosure policies. Another caveat is that there may be other efficiency benefits that I do not observe.

This paper contributes to the literature on self-dealing and tunneling (Shleifer and Vishny,

1997). One approach assesses the extent of tunneling indirectly by investigating the relationship between aggregate outcomes and self-dealing potential.<sup>1</sup> Another approach uses transactions-level data to provide direct evidence of self-dealing in international contexts.<sup>2</sup>

My analyses build upon both approaches to make progress on the endogeneity and measurement challenges in the self-dealing literature. Motivated by market concerns, my core analysis conceptualizes ownership changes for the treated servicers as “shocks to firm affiliations” to provide quasi-experimental variation in self-dealing potential. I study self-dealing in securitized debt markets in the United States and examine effects on both aggregate losses to bondholders as well as disaggregated losses at the loan level. This allows me to investigate the three types of self-dealing mechanisms and control for potential confounders at a finer level. Moreover, the case study provides the first transactions-level measure of self-dealing for securitized assets in the United States.

These findings in CMBS have important implications for the RMBS market as well. There is relatively less work on agency conflicts after securitization (Keys et al., 2013), especially studies on what happens to assets that exit the MBS trust.<sup>3</sup> Regulators have raised concerns over similar ownership changes for RMBS servicers, especially non-bank servicers which have grown in importance and are relatively less regulated (FHFA, 2014). In fact, self-dealing conflicts involving RMBS servicers and their affiliates are part of on-going investigations and lawsuits alleging servicers directed businesses to benefit affiliates (Goodman, 2010; Lee, 2014).<sup>4</sup> My analysis sheds light on potential self-dealing conflicts in the CMBS context, which can affect trust in securitized

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<sup>1</sup>Bae, Kang, and Kim (2002) shows that the effects of acquisitions by Korean business groups on stock prices can hurt minority shareholders but controlling shareholders benefit through their affiliates. Lemmon and Lins (2003) compares the stock returns for firms with ownership structures that have varying degrees of self-dealing potential during the East Asian crisis. Djankov et al. (2008) studies the relationship between legal protection of minority rights and stock market outcomes for 72 countries.

<sup>2</sup>Previous studies include analyses for markets in China (Jiang, Lee, and Yue, 2010), Hong Kong (Cheung, Rau, and Stouraitis, 2006), Korea (Baek, Kang, and Lee, 2006), and Bulgaria (Atanasov, 2005). Kroszner and Strahan (2001), La Porta, de Silanes, and Zamarripa (2003), and Engelberg, Gao, and Parsons (2012) examine lending behavior for connected lenders but focus on non-securitized debt.

<sup>3</sup>Agarwal et al. (2011) and Piskorski, Seru, and Vig (2010) study the effects of securitization on how RMBS servicers resolve distressed residential mortgages by comparing securitized loans against bank-held loans. Agarwal et al. (2015) and Maturana (2014) study the incentives of servicers to workout distressed residential mortgages. Within the CMBS literature, An, Deng, and Gabriel (2009) and Ghent and Valkanov (2015) investigate whether securitized loans are adversely selected, Stanton and Wallace (2012) studies CMBS subordination levels and ratings. Gan and Mayer (2006), Titman and Tsyplakov (2010), Ashcraft, Goriah, and Kermani (2015), and Ambrose, Sanders, and Yavas (2015) study other aspects of agency problems in CMBS.

<sup>4</sup>For example, the Superintendent of the New York Department of Financial Services raised "the possibility that management has the opportunity and incentive to make decisions ... that are intended to benefit ... affiliated companies, resulting in harm to borrowers, mortgage investors..." (Lee, 2014)

markets and curtail investment activity (Zingales, 2015).

The rest of the paper proceeds as follows. Section 2 describes the CMBS context, Section 3 describes the data, Section 4 presents the core analysis of the effect of ownership changes for the four treated servicers. Section 5 discusses self-dealing and alternative considerations. Section 6 concludes.

## 2 Background

### 2.1 Special servicers and ownership changes

A CMBS trust comprises a pool of mortgages collateralized by income-producing commercial properties, such as apartments, hotels, warehouses, and retail properties. Each CMBS trust has a master servicer which services loans that are current or expected to be recoverable. Loans that are delinquent beyond applicable grace periods (typically 60 days) are transferred to the *special servicer*, which usually takes over the operation of the commercial property from the borrower.<sup>5</sup> It then decides whether to keep the distressed mortgage in the trust (by modifying the terms of the mortgage) or not (usually by liquidating the asset).<sup>6</sup>

The servicing standard specified in pooling and servicing agreements generally requires special servicers to maximize the net present value of assets on behalf of CMBS bondholders. However, special servicers have relatively wide latitude to use their judgement. They are appointed by the controlling class holder (usually the most junior tranche in the CMBS trust, known as the B-piece). B-piece buyers often appoint themselves as special servicers.<sup>7</sup> Special servicers usually earn 25 basis points on loans in special servicing, 1% of the resolved loan balance for loan resolutions (modifications or liquidations), and other fees, as stated in the pooling and servicing agreement.

Most special servicers are part of commercial real estate debt firms, with expertise in underwriting commercial real estate debt and operating commercial properties. Like many debt investors, they faced liquidity crises when their balance sheets worsened because spreads widened in late 2008. While the high yield debt investments suffered, their special servicing businesses grew

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<sup>5</sup>In contrast to residential MBS, in the event that borrowers default on their debt, special servicers are needed in CMBS for their expertise in operating commercial properties.

<sup>6</sup>Technically, the special servicer can decide to sell the mortgage (a note sale) or to foreclose the property. In both instances, the loan will exit the CMBS trust.

<sup>7</sup>See Gan and Mayer (2006) and Ashcraft, Goriah, and Kermani (2015) for studies related to this issue. I return to this at the end of the paper.

in importance in light of the rise in delinquent loans after the crisis. Loans in special servicing increased from \$5 billion dollars in 2007 (0.5% of CMBS loans) to \$90 billion dollars in 2012 (12%).

I study the ownership changes for Berkadia (December 2009), C-III (March 2010), LNR (July 2010), and CW Capital (September 2010). The four treated servicers are major special servicers in CMBS. Their scales present complementarities for the new owners' vertically integrated businesses. Using in-house intermediaries can speed up the liquidation process and having a large network of customers can also facilitate the search and matching of buyers, lenders, and sellers. This can benefit bondholders (by improving liquidation outcomes) and also the new owners (through potential fee streams, and by building relationship capital or developing future business opportunities).

Relative to the treatment group, the placebo servicers have fewer affiliates involved with CMBS liquidations. There are 30 placebo servicers with Midland being the largest and other moderately-sized servicers. Table A7 in the appendix lists the affiliates for each of the treated servicers and the top 10 placebo servicers. These servicers are responsible for more than 80% of the liquidations in my primary estimation sample.

Market concerns focused on the ownership changes for the four servicers. Table A7 shows that they are more likely to have affiliated brokerages, online auction platforms, and potential buyers. Some placebo servicers do not engage in acquisitions (several are part of banks that do not have proprietary investments) and some emphasize that they do not use affiliated service providers to facilitate CMBS liquidations. All servicers are lenders, but most placebo servicers are established lenders whilst some treated servicers are new lenders. The appendix (Section B) provides more details.

Figure 1 shows annual liquidation volumes remained below \$2 billion through 2009 but started to increase after that. Before the ownership changes, there was not much debt in distress. The rise in potential sales, combined with the potential links to new affiliates, contributed to a sharp increase in concerns over potential self-dealing conflicts. Insofar as the placebo servicers or the previous owners (in the pre-period) have the potential to engage in self-dealing as well, this would operate against finding an effect.

These ownership changes were controversial and raised concerns among market participants. For example, Standard and Poor issued a statement that "combined with several ownership changes pertaining to some of the largest commercial mortgage servicers, the rise in special servicing ac-

tivity has drawn increased market focus on potential conflicts of interests” (Steward et al., 2012).<sup>8</sup> Steward et al. (2012) goes on to highlight a few self-dealing mechanisms, stating that “market participants...have expressed concern over special servicers’ exercising “fair market value” purchase options, their use of affiliates, and the practice of charging additional fees in connection with loan restructurings.”

## 2.2 Three types of self-dealing mechanisms

The concerns amongst market participants center around three types of self-dealing/tunneling mechanisms that can arise in CMBS liquidations: (i) buying, (ii) steering, and (iii) price discrimination. Self-dealing/tunneling involves transactions that connect the special servicer (acting as a seller on behalf of bondholders) and any affiliate of the new owner, including a buyer or an affiliated service provider.

First, when the ownership changes happened, the primary concern of the market was the ability of special servicers to purchase a liquidated asset by exercising a *fair value option*. This option allows the special servicer to purchase distressed assets in the CMBS trust at a fair value, as specified in the pooling and servicing agreement. The ownership changes heightened the concerns over self-dealing via purchases because the new owners also had distressed debt investment funds and were active buyers of commercial real estate assets. For example, a shareholder of Vornado (a new owner of LNR) stated that “I believe their goal here is to get first shot - potentially with no competitors - to buy mortgages which are being serviced by LNR ... Flow and exclusive first crack is the appeal.” (Troianovski and Wei, 2010)

The second mechanism, steering, relates to the concern that special servicers may be incentivized to steer business opportunities to affiliated service providers. For example, LNR had a partial ownership of an online auction platform (Auction.com) and there were concerns that LNR may be incentivized to direct business opportunities to Auction.com by liquidating more assets. Similarly, other treated servicers also have affiliated lenders, brokerages, or titling agencies that provide various services to facilitate real estate transactions.

The third mechanism, price discrimination, is related to the possibility that affiliated service providers might charge distant bondholders *higher fees* for their services when selling CMBS assets. For example, an RMBS servicer used an affiliated online auction platform (Hubzu) to

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<sup>8</sup>See also Berger (2012), Lancaster et al. (2012), and Wheeler (2012) for related commentary on potential agency conflicts.

auction off foreclosed homes. Hubzu allegedly charged these affiliated auctions a fee of 4.5% (paid by bondholders) but charged fees as low as 1.5% for non-affiliated auctions it competes for in the open market (Lee, 2014).

## 3 Data

### 3.1 CMBS loans

I purchased access to CMBS loans data from November 2010 through November 2012 from Realpoint. This dataset includes the universe of all securitized loans. I observe loan attributes at origination (such as loan-to-value (LTV), year of securitization, and the securitized loan amount) and information about the collateral (such as the property type, age, and the street address of the property). The appendix provides more details (Section A.1).

Crucially, the Realpoint database includes a *realized loss report* that comprises a history of all securitized loans with realized losses to the CMBS trust, reporting the date the losses were incurred, the loss rate, liquidation proceeds, liquidation expenses, as well as the balance before losses. There are 11,332 loans with realized losses, between September 1997 and November 2012. The primary estimation sample uses 9272 loans liquidated between 2003 and 2012. Before 2003, there are fewer than 500 liquidations per year.<sup>9</sup>

One shortcoming of this dataset is the lack of pre-treatment data for time-varying attributes. Realpoint only reports the most recent value for time-varying loan attributes (such as current LTV, current balance, and delinquency). Since all four ownership changes occurred before November 2010, I do not have pre-treatment data for time-varying attributes. Table 1 reports the summary statistics for the full sample of 120,495 securitized loans and the 9,272 liquidated loans in the primary estimation sample.

I also use an auxiliary dataset from Bloomberg, with around 12,000 loans liquidated between January 2000 and August 2016. The benefit of the Bloomberg dataset is the longer post period (6 years instead of 3 years). However, Bloomberg only reports losses (the numerator for loss rates). I maintain the Realpoint data as the primary dataset as it is more comprehensive and I am able to

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<sup>9</sup>My main specification includes special servicer fixed effects and month of liquidation fixed effects. Having more liquidations in a year is useful because liquidation outcomes are noisy and in the earlier years, there is not much variation left after controlling for special servicer and month of liquidation fixed effects.

include more loan-level controls. Wherever appropriate, I use the Bloomberg data to show longer trends in the post period.

## 3.2 Measuring self-dealing relationships

As discussed in Section 2.2, market participants are most concerned about purchases by the new owners of special servicers. They are also concerned about the use of affiliated service providers. The core regression analysis uses comprehensive CMBS data covering loans liquidated by all servicers. This subsection describes measures of self-dealing relationships for one treated servicer in my case study.

I restrict my analysis to liquidations by C-III (which changed owners in March 2010). I choose this special servicer because regressions by special servicer indicate that the patterns are most robust for this special servicer. The sample for the case study includes 1,074 properties that were liquidated from 2010 to 2012 by C-III.

### *Purchases*

To trace the chain of ownership, I handmatch data on CMBS loan liquidations with property transactions data. I use two databases of property transactions, CoStar and Real Capital Analytics. Both databases include information such as the transaction price, transaction date, address, as well as the identity of the buyer. These databases focus on transactions above \$2.5 million but also report some CMBS transactions below this cutoff when available.

I limit the case study to one treated servicer only since the process of merging CMBS loans with commercial property transactions is time consuming. Each property address for the 1,074 properties had to be entered individually into these databases to search for the true owner for each asset.<sup>10</sup>

Most transactions are structured so that buyers are limited liability companies (LLC). However, data firms have invested resources to collect information about the true identity of buyers, their addresses, and contact information. Commercial properties are high value assets and investors are willing to pay for information about the true property owners for prospective investment or leasing

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<sup>10</sup>While I only directly measure relationships for one servicer, the number of transactions is comparable to other papers in the literature. Baek, Kang, and Lee (2006) studies 262 private placements of equity-linked securities in Korea between 1989 and 2000. Cheung, Rau, and Stouraitis (2006) investigates pricing for connected transactions in 375 filings in Hong Kong between 1998 to 2000. Jiang, Lee, and Yue (2010) examines 1,134 firm-years in their data with information on affiliated transactions.

opportunities. Data vendors make significant attempts to identify the true owner, by contacting brokers, property operators, and other sources. The exact methods are proprietary. Each record is confirmed through multiple independent reports from reliable sources. For example, the buyer for an apartment complex, Cherry Grove, is recorded publicly as RFI Cherry Grove LLC. But, the address for RFI Cherry Grove LLC is written in the deed as “RFI Cherry Grove LLC, c/o C-III Acquisitions LLC, 717 Fifth Avenue in New York”. Another commonly used address by C-III affiliates is 5221 North O’Connor Blvd, Suite 600, Irving, Texas. For transactions that were identified as being bought by C-III, I also obtained deeds of sales to confirm that the buyer is affiliated with C-III.

#### *Affiliated service providers*

In addition to information about buyers, Real Capital Analytics also reports the brokers and lenders for property transactions, whenever this information is available. Compared to the data on buyers, the coverage for service providers is less consistent, especially for lenders (sellers’ brokers are an important source of information for Real Capital Analytics). I searched for all transactions from 2010 to 2015 that use an affiliate of C-III as the lender or the broker. The data coverage tends to be more comprehensive for later years.

## **4 Effect of ownership changes for treated servicers**

### **4.1 Effect on loan loss rates**

Section 2 describes market concerns that losses increased after the ownership changes of the treated servicers. I use a panel data specification that compares the changes in loan loss rates for treated special servicers after they changed owners, relative to changes in loan loss rates for other (placebo) special servicers. Specifically, I estimate

$$LossRate_{lit} = \alpha + \beta OwnershipChange_i \times Post_{it} + \gamma X_{li} + \tau_t + \delta_i + \epsilon_{lit} \quad (1)$$

where  $LossRate_{lit}$  is the loss rate (realized losses divided by loan balance before losses) for loan  $l$  liquidated by special servicer  $i$  in month  $t$  (centered around event dates),  $OwnershipChange_i$  is 1 if servicer  $i$  is Berkadia, C-III, CW Capital, or LNR, and  $Post_{it}$  is 1 if loan  $l$  is liquidated after the event date for special servicer  $i$ . For treated servicers, the event date corresponds to the first

day of the month they changed owners. For placebo servicers,  $Post_{it}$  is 1 if month  $t$  is after LNR's event date. The results are similar using other placebo dates (Table 3). Additionally,  $X_{li}$  represents pre-determined controls for loan  $l$ ,  $\tau_t$  is month of liquidation fixed effects,  $\delta_i$  is special servicer fixed effects, and  $\varepsilon_{lit}$  is an idiosyncratic error term.

The parameter of interest is  $\beta$  which tests whether loss rates change differentially after treated servicers changed owners compared to placebo servicers. The identification assumption is that unobserved determinants of  $LossRate_{lit}$  do not change differentially around the event dates for treated versus placebo servicers, conditional on the controls. Standard errors are double clustered by special servicer and month of liquidation.

Column 1 of Table 2 presents the main specification which indicates that loss rates for loans liquidated after treated servicers changed owners are 8 percentage points (p.p.) higher than before, relative to placebo servicers. This is a sizable effect, representing 16% of the mean loss rate (50%). This 8 p.p. effect translates into aggregate losses of \$2.3 billion, representing 20% of total losses by treated servicers under new ownership.<sup>11</sup>

The main specification includes controls that mitigate three sources of omitted variable bias. First, the ownership changes happened around 2010, raising the threat that the differences after ownership changes reflect sharp changes in economic conditions only. To the extent that assets liquidated by placebo servicers face similar economic conditions, they can serve as useful counterfactuals. The trends for placebo servicers indicate *lower* and insignificant loss rates after 2010 compared to before, as prices started to recover after 2010 (dashed line in Figure 1).

Additionally, the month of liquidation fixed effects control non-parametrically for high frequency monthly changes. Moreover, Table A1 in the appendix shows that the effects are similar (10 p.p. instead of 8 p.p.) with coarser time controls (quarter of liquidation, year of liquidation fixed effects, as well as monthly quadratic time trends plus a post indicator). The relative stability of the estimates mitigates concerns about confounding due to time trends (Altonji, Elder, and Taber, 2005).

Second, treated and placebo special servicers may not be comparable. I control special servicer fixed effects. Notably, before the ownership changes, the loss rates were *lower* for treated servicers relative to placebo servicers.

Third, loans serviced by treated versus placebo servicers could be different. I control for pre-

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<sup>11</sup>To calculate the total losses implied by the 8 p.p. effect on loss rates, I multiply it by the total balance before losses for all loans liquidated by treated servicers after the ownership changes (\$29 billion).

determined loan attributes reported in Table 1, including the initial debt service coverage ratio (DSCR) and initial loan-to-value (two loan quality measures commonly used to underwrite commercial mortgages),<sup>12</sup> initial loan balance, indicators for loans with balloon payments, with fixed interest rates, indicators for property types (hotels, industrial properties, apartments, offices, retail), year of securitization, the number of properties, property age, and an indicator for loans with missing loan attributes.

Columns 2 to 4 address concerns that  $\beta$  could be biased by other changes over time. Column 2 adds interactions between loan attributes and the post indicator, to allow for the effects of loan attributes on loss rates to be different before and after the ownership changes. Column 3 adds MSA-by-year fixed effects to control for differences in local market conditions. Notably, the R-squared increases from 0.15 to 0.38, but the coefficient remains stable at 8 p.p.. Column 4 adds special servicer-specific quadratic time trends and a post indicator (but drops month fixed effects).<sup>13</sup> This alleviates the concern that the loan quality is worsening over time differently across special servicers. Again, the effect is similar (9 p.p.).

Table A2 in the appendix presents heterogeneous analyses using different sub-samples, demonstrating that the higher loss rates are not driven by particular loan types. The results are similar for fixed rate loans, office, and retail loans. Notably, the results are not significantly higher for balloon loans (an indicator for high risk loans).

### *Robustness analysis*

Table 3 further probes the robustness of the results on loss rates. The first row repeats the main specification in Table 2 (column 1) but includes liquidations in all years (1997 to 2012) instead of liquidations between 2003 and 2012. The next row includes liquidations between 2004 and 2012. Row 3 repeats the main specification, restricting the sample to loans matched using propensity scores.<sup>14</sup> Row 4 aggregates the loan level data to the special servicer-month level to address concerns of over-rejection (Bertrand, Duflo, and Mullainathan, 2004; Donald and Lang,

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<sup>12</sup>The debt service coverage ratio is the net operating income of a property divided by the debt payment. Ratios above 1 correspond to (safer) loans that have enough operating income to cover debt payments. The initial loan-to-value is the securitized loan amount divided by the value of the property.

<sup>13</sup>For placebo special servicers, I estimate a separate trend for Midland and a common trend for the other placebo servicers.

<sup>14</sup>I first predict the probability of treatment using a logit model with the treatment indicator as the dependent variable, loan controls and month of liquidation fixed effects. I then drop the 25% of loans in the control group with the lowest predicted probability of treatment.

2007; Cameron, Gelbach, and Miller, 2008). The specification is analogous to that of the main loan-level estimation. I include month fixed effects, special servicer fixed effects and report robust standard errors in the parentheses.<sup>15</sup> The next three rows repeat the main specification but use the event dates for Berkadia, C-III, and CW Capital as placebo dates respectively. Row 8 repeats the main specification but further winsorizes loss rates at the top 1% to show that the results are not driven by outliers. Reassuringly, the results are broadly similar across the specifications.

## 4.2 Differences in loan quality

This sub-section discusses potential concerns that the higher loss rates after the ownership changes of the treated servicers may be driven by compositional differences in loans. I consider different measures of loan quality, including pre-determined loan attributes, time-varying attributes, as well as trends in outcomes. I also provide a bounding exercise to assess the potential importance of selection on unobservables.

### 4.2.1 Pre-determined loan attributes

Panel A of Table 4 tests for differences in pre-determined attributes for loans serviced by treated versus placebo servicers. The first row reports results from an OLS regression with an indicator for fixed rate loans as the dependent variable and the ownership change indicator as the regressor. The sample comprises all loans that were securitized before 2008. Standard errors are clustered by special servicer and month of securitization. Additionally, Figure A-1 to Figure A-5 in the appendix plot trends in these loan attributes for liquidated loans, to assess whether changes in these cross-sectional differences can explain the higher loss rates in the post period.

While the loan composition is different along several dimensions, the trends cannot explain the 8 p.p. higher loss rate. For example, loans serviced by the treatment group have an average initial LTV that is significantly higher by 3 p.p. (compared to a mean of 67%) but the trend is declining. This is inconsistent with higher initial LTV driving the higher loss rates. On average, DSCR is lower by 0.02 and insignificant (compared to a mean of 1.49)

Another potential concern is that treated servicers are 41% more likely to have loans with balloon payments (relative to a mean of 74%), which could indicate worse loan performance.

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<sup>15</sup>For the placebo servicers, I estimate a fixed effect for Midland and a common fixed effect for the other placebo servicers.

However, the results are robust to controlling for the balloon loan indicator and heterogeneous analysis in Table A2 in the appendix shows that the results are not significantly stronger for balloon loans (column 2). Importantly, the trend for the balloon indicator (second panel in Figure A-1) is decreasing, which indicates that fewer balloon loans are liquidated over time.

Table 4 also shows that loans serviced by treated special servicers have larger loan balances, are more likely to have fixed interest rates, more likely to be a hotel, office, or retail loan, and are newer. However, their trends are relatively stable and mitigate the concern that the higher loss rates are driven by a decline in the quality of liquidated loans for treated servicers.

In addition, Table A3 in the appendix tests for location differences by including indicators for housing bust markets as the dependent variable. Reassuringly, treated loans are not significantly more exposed to housing bust markets.

#### 4.2.2 Time-varying attributes

Turning to time-varying attributes, ideally, it would be nice to compare these attributes before and after ownership changes to see if loan quality worsened differentially more for treated servicers. I do not have pre-2010 data for time-varying attributes (Section 3). Below, I first discuss treated versus placebo differences in current LTV and current DSCR. Then, I discuss trends in the 60-day delinquency rate.

Panel B of Table 4 reports the average differences in current LTV and current DSCR for the sample of current loans. Figure 2 plots the trends.<sup>16</sup> For current LTV, the average is 4.6% higher for treated loans (p-value of 5%), but the trend is relatively stable (the maximum change in LTV is 1 p.p.). For current DSCR, the average difference is -0.002 and insignificant. The trend is declining slightly over time. As a benchmark, the maximum decline of -0.04 translates into an increase in loss rates of 0.4 p.p. only.<sup>17</sup>

Turning to liquidated loans, Panel C of Table 4 indicates that current LTV is higher by 1.6 p.p. but the difference is not significant and current DSCR is significantly higher (safer) by 0.1. The

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<sup>16</sup>For Table 4, I regress current LTV for loan  $l$ , serviced by servicer  $i$ , reported in month  $t$ , on a treatment indicator and on report month fixed effects (centered around the event dates). The sample includes 893,906 loan-month observations, comprising all loans with positive current balances in month  $t$ . Standard errors are double clustered by servicer and report month. For Figure 2, I add interactions between the treatment indicator and month fixed effects. I do not have enough months to estimate double clustered standard errors for the figure. The conclusions are similar with robust standard errors, clustering by servicer, or no clustering. I chose the most conservative of the three.

<sup>17</sup>The correlation between loss rates and current DSCR is -0.1.

trends in Figure 3 do not indicate any sharp changes for liquidated loans right after time 0. This is not consistent with treated servicers resolving a stockpile of distressed debt right after the new owners relaxed their capacity constraints.

Next, I examine differences in the 60-day delinquency rate. This represents a relatively exogenous measure of loan quality as special servicers have less control over these loans because most loans are only transferred to special servicers after they become delinquent for more than 60 days.

On average, treated loans are 0.2% more likely to become 60-day delinquent, relative to a mean of 0.3% and a standard deviation of 1% (column 1 of Table A4 in the appendix).<sup>18</sup> Figure 4 demonstrates that the trends appear stable. The higher 60-day delinquency rate for treated servicers is a potential concern, though it would have been ideal to test if this difference is greater relative to the pre-period.

Importantly, loan-level analysis demonstrates that the 60-day delinquency is unlikely to be the main driver of the higher loan loss rates (columns 2 to 5 in Table A4). Conditional on pre-determined loan controls, treated loans are not more likely to become 60-day delinquent in my sample period. The difference (0.005) is insignificant and small relative to the mean (0.06). The results are similar weighting observations by their current balance (column 3). Moreover, loans that become 60-day delinquent in my sample do not have higher loss rates (column 4). Finally, augmenting my main specification with a triple interaction (post dummy, ownership change dummy, and a dummy for delinquent loans) delivers an insignificant coefficient (column 5), indicating that the 8 p.p. effect on loss rate is not driven by these delinquent loans only. I provide more details in the appendix.

In summary, while the servicer-month level analysis indicates treated servicers are more likely to have loans that become 60-day delinquent, the loan-level analysis suggests this difference is unlikely to explain the higher loan loss rates I find above.

### 4.2.3 Trends in outcomes

The top panel of Figure A-6 presents annual estimates of  $\beta$  for the loss rate analysis (equation 1). Relative to year -6 (the omitted group), differences in loss rates in the pre-period are negative for two years and positive for three years. While the average effect (8 p.p.) is significant in my main specification, the confidence intervals are wide for the annual estimates.

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<sup>18</sup>The dependent variable is the share of servicer  $i$ 's loans (in dollars) in month  $t$  that first become 60-day delinquent in month  $t$  and the controls include month fixed effects.

The bottom panel of Figure A-6 presents conditional trends in the monthly volume of losses, using the longer post period from Bloomberg. Bloomberg only reports losses (the numerator for loss rates). I estimate equation (2) below.

$$\ln Loss_{it} = \beta OwnershipChange_i \times Post_{it} + \tau_t + \delta_i + \varepsilon_{it} \quad (2)$$

where the dependent variable,  $\ln Loss_{it}$  measures the monthly volume of losses ( $Loss_{it} = \sum_l Loss_{lit}$  aggregates over losses from loan  $l$  liquidated by servicer  $i$  in month  $t$ ). In the pre-period, the estimates are positive for 1 year and negative for 4 years. In the post period, the coefficients are consistently positive, with an average effect of 0.84, significant at the 1% level (column 1 of Table A6).

Finally, as an overall assessment of the potential importance of omitted variable bias, I follow Altonji, Elder, and Taber (2005) and Oster (2016) to calculate how large selection on unobservables will need to be to explain away the entire 8 p.p. effect on loan loss rates. My calculations suggest selection on unobservables will have to be twice as important, which is twice as large as the heuristic cutoff of one. Table A5 in the appendix provides more details.

Overall, the discussion above addresses concerns related to specific loan quality measures, including pre-determined loan attributes, time-varying loan attributes, locations, loss rates, and volume of losses. While there are some differences and loans are not randomly assigned across servicers, the weight of the evidence suggests differences in loan quality cannot explain the 8 p.p. greater loss rate.

### 4.3 Stockpiling effect and liquidity crises before ownership changes

Next, I address the concern that the higher loan loss rates are driven by the liquidity crises that triggered the ownership changes. The concern is treated servicers were capacity constrained before the ownership changes as they were too occupied with their own problems and built a stockpile of distressed loans that should have been liquidated. Therefore, the higher loss rates could reflect a transitory difference in the quality of liquidated loans that dissipates after treated servicers have resolved the stockpile of distressed debt.

First, it is worth noting that the servicing operations of the treated servicers were relatively well-functioning even while the high yield debt investments weakened the balance sheets for the

firms. In addition, both treated and placebo servicers did not anticipate the sudden spike in the volume of distressed CMBS debt. For example, a rating agency report by Fitch in 2009 (just before the ownership changes) stated that “Fitch continues to believe current staffing levels are at capacity for most special servicers” (Petosa, Weems, and Carlson, 2010). To the extent that placebo servicers also experienced crisis-like moments, comparing differences between treated and placebo servicers helps to address this issue.

Second, if treated servicers liquidate the worst loans first, this would result in a divergence in trend right after the ownership change, followed by a convergence towards placebo servicers. However, I do not observe such patterns, as discussed in Section 4.2. Next, I discuss additional tests and a bounding exercise to further address concerns related to the stockpiling channel.

#### 4.3.1 Dropping years right around ownership changes

Table 5 addresses the concern that the greater loss rate in the post period reflects transitory confounders such as the stockpiling channel. Column 1 repeats the main specification with the full estimation sample (8 p.p. effect). Column 2 reports a 10 p.p. effect after dropping a year before and after the ownership changes, column 3 reports a 13 p.p. effect after dropping 18 months. As a benchmark, the average real estate owned (REO) hold time is 12 months for 2012 (Heschmeyer, 2014).

Reassuringly, the effects remain robust across the three columns. These estimates are not statistically different from each other. Table A6 in the appendix shows that the patterns are robust to dropping up to 3 years before and after the ownership changes, using auxiliary data from Bloomberg.

Together, these additional tests suggest the greater losses are not due to confounders that are transitory in nature. Otherwise, the effects would disappear after dropping the years right around the ownership changes.

#### 4.3.2 Bounding exercise for stockpiling effect

Next, I present a back of the envelop bounding exercise to assess the potential importance of the stockpiling channel. The top panel of Figure 5 presents unconditional trends in the monthly volume of losses ( $Loss_{it}$ ) using servicer-month level data aggregated from Bloomberg. The two lines correspond to trends estimated using local linear regressions, for the average treated servicer (top

line) and the average placebo servicer (bottom line). For the treated servicer, there is a bunching pattern in the post period. This excess mass in losses after time 0 may stem from the stockpile of distressed debt accumulated before time 0. Placebo servicers also exhibit a similar trend (with a less pronounced pattern given the scale).

The concern is that the difference in losses may be driven by both an *ownership change effect* plus a *stockpiling effect*. The stockpiling effect arises if a part of the difference in losses *after time 0* stems from a difference in stockpiling *before time 0*. I begin by assuming a counterfactual of no capacity constraints, to estimate how much more treated and placebo servicers could have liquidated before time 0. Under this extreme case, the counterfactual trends would rise sharply when the crisis hit (like a step function).

The bottom panel of Figure 5 illustrates this. This figure is identical to the top panel, but highlights three areas important for the bounding exercise. To the right, the difference in losses between month 0 and month 36 (the post period in my estimation sample) amounts to \$2.6 billion. The goal is to assess how much of the \$2.6 billion can be explained by the stockpiling effect. I briefly describe the three main steps and provide more details in the appendix (Section A.2.9):

**Step 1:** First, I estimate the maximum increase in losses for treated servicers assuming no capacity constraints (*Area T*=\$708 million). I repeat the same for placebo servicers (*Area C*=\$168 million).

**Step 2:** The *stockpiling effect* is the additional difference in losses before time 0 (*Area T* – *Area C* = \$540 million). This represents the difference that could have happened before time 0, assuming the servicers were not delayed by their capacity constraints.

**Step 3:** So, stockpiling explains at most 21% of the difference in losses ( $\frac{\$540\text{million}}{\$2.6\text{billion}}=0.21$ ).

The appendix explains why 21% is likely a conservative upper bound. Importantly, Figure A-7 shows that there is no bunching pattern for conditional trends (differences relative to placebo servicers, controlling for servicer and month fixed effects). This is consistent with the notion that both treated and placebo servicers faced capacity constraints. Therefore, the regression analysis likely differences out part of the stockpiling effect and the bounding exercise using unconditional differences is likely conservative.

In summary, while self-dealing is endogenous by nature and there is no random assignment of self-dealing relationships, the weight of the evidence suggests that changes in market conditions, differences in loan quality, and the stockpiling of distressed debt are unlikely to explain away the main effect.

## 5 Is it self-dealing?

So far, the finding of higher loan loss rates after ownership changes is consistent with market concerns. As discussed in Section 2.2, there are three types of self-dealing mechanisms: (i) buying, (ii) steering, and (iii) price discrimination. While these channels may not be mutually exclusive, this section presents a collection of findings that lend more support to the steering channel compared to the buying and price discrimination channels.

### 5.1 Why are loan loss rates higher?

Loan losses can be greater either because assets are liquidated at lower prices or fees incurred to sell the assets are higher. Column 1 explores the sale price channel using a hedonic regression with log sale price as the dependent variable, special servicer fixed effects, quadratic time trends (and a post indicator), MSA fixed effects, and pre-determined controls.<sup>19</sup> Column 2 repeats the same specification using log of liquidation expenses as the dependent variable.

Table 6 shows that the higher loss rates reflect lower sales prices for the liquidated assets. The estimate suggests the average price is 14% lower for assets liquidated by treated servicers after ownership changes relative to placebo servicers. I calculate that the price discount needed to rationalize the \$2.3 billion in aggregate losses implied by the main effect (Table 2, column 1) is around 10%, which is similar to the price discount estimated here.<sup>20</sup>

Column 2 shows there is no significant effect on liquidation expenses, which is inconsistent with the price discrimination channel. If treated servicers are charging bondholders higher fees to sell the assets, this should lead to greater liquidation expenses after the ownership changes relative to placebo servicers.

Interestingly, column 3 shows that treated servicers are liquidating more after ownership changes. The dependent variable measures the dollar volume of liquidation by special servicer  $i$  in month  $t$  using  $\ln(\sum_l BalanceBeforeLoss_{lit})$ , where I sum over the balance before losses for all loans liquidated by special servicer  $i$  in month  $t$ . This aggregates the data to the special servicer-month level and controls for month fixed effects and special servicer fixed effects. The estimate

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<sup>19</sup>The sale price is missing for about a third of the sample. This sample attrition is not significantly different for treated versus placebo servicers.

<sup>20</sup>The total sales proceeds from liquidations by treated servicers in the post period is \$21 billion. Assuming the counterfactual sales proceeds total \$23.3 billion (\$2.3 billion more), the price discount is 10% (2.3/23.3).

represents an increase in the liquidation volume by 119 log points (229%), or an increase of \$105 million per special servicer per month, using the pre-event average of \$46 million.<sup>21</sup>

## 5.2 Case study: Self-dealing transactions for one servicer

So far, the regression estimates of higher loan loss rates, lower prices, and greater liquidation volume are inconsistent with the price discrimination channel and consistent with both the buying and the steering channels. The buying channel is naturally associated with lower prices (as affiliated buyers prefer lower prices) but it can also be associated with a greater liquidation volume if special servicers are incentivized to liquidate and steer investment opportunities to affiliated buyers.

The steering channel is also consistent with an increase in liquidation volume and lower prices. For example, when a buyer approaches the special servicer to bid for a distressed asset, the servicer could inform the buyer privately that it would accept a lower price if the buyer uses its in-house service providers. This tunneling example directs private revenue streams to the servicer's affiliates to the detriment of bondholders (who suffer from the lower sale price).

This subsection presents evidence from a case study for one treated special servicer (C-III). In March 2010, Island Capital purchased Centerline (the predecessor of C-III) and the servicing rights for \$110 billion of CMBS debt, with \$100 million in equity and \$180 million of assumed debt. Andrew Farkas, Chairman and CEO of Island Capital, described a vertically integrated business strategy for this acquisition: "With C-III we are seeking to acquire real estate oriented debt derivatives and to build special servicing and ancillary businesses to manage those." (Cohen, 2010)

### *Limited purchases*

To track the chain of ownership to see whether C-III is selling assets to affiliates, I merge the sample of CMBS liquidations by C-III with property transactions data. I then identify whether the true buyer is an affiliate of C-III, as discussed in Section 3.2.

Contrary to market concerns about self-dealing through purchases, I only find 14 property transactions, valued at \$171 million, that were bought by C-III. This could be due to the threat of litigation (some special servicers are involved in lawsuits pertaining to the use of the fair value option to purchase CMBS assets) and the high profile nature of this self-dealing conflict. For

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<sup>21</sup>This increase in liquidation volume is not consistent with adverse selection concerns by unaffiliated buyers (they may be willing to pay less for loans liquidated by treated servicers if they expect treated servicers to sell the best loans to affiliates).

example, a few transactions (linking special servicers and the new owners) were presented as the “poster children of questionable behavior” (Yoon, 2012).<sup>22</sup>

Even though many investors thought the servicers would engage in self-dealing by buying assets, these reports and the threat of litigation may increase the costs to engage in self-dealing through purchases. This is consistent with research on the importance of institutions that protect investors (Djankov et al., 2008).

#### *Affiliated service providers*

In contrast to the limited purchases identified above, affiliated service providers appear to be important. While the coverage for data on affiliated service providers is weaker than the coverage for buyers, I provide several sources of information that point to the importance of these providers.

First, Chamberlain and Merriam (2015) reports that the share of Real Estate Owned (REO) sales using an affiliated broker was 30% in 2011 and 90% in 2014. Second, property transactions data from Real Capital Analytics suggests that C-III (the servicer) engages an affiliate in 40% of transactions. Third, data from Real Capital Analytics indicate that close to half of the total transaction volume of C-III’s affiliated brokers involve liquidations where C-III is the special servicer. In other words, liquidations from C-III’s servicing arm is a central source of commission revenue for C-III’s affiliated brokers.

#### *How much can the new owners potentially gain through tunneling?*

To illustrate the potential importance of the steering channel, I provide a back of the envelop calculation that shows that C-III can stand to gain up to 70% of the losses to bondholders. Of the \$2.3 billion in losses for all 4 treated servicers implied by the regression estimates (Table 2), \$462 million is associated with C-III. During the post period, sales proceeds from CMBS liquidations by C-III total \$3.6 billion.

I consider the potential gains to C-III through the benefits to its affiliated lender, brokers, and titling agency in facilitating the \$3.6 billion in liquidations. The expected profits from lending amount to \$89 million.<sup>23</sup> The potential gains from brokerage and titling services amount to \$234

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<sup>22</sup>Also, when a high profile property in New York (666 Fifth Avenue) was sold to Vornado (the new owner of LNR), this transaction received much media attention. As the lawyer representing the sellers explained, “Vornado got “anything but” an advantage from its stake in the special servicer...Everybody knew what was going on.” (Levitt, 2011).

<sup>23</sup>To estimate this, I assume an LTV of 80% and a loan yield of 8% (based on the general lending parameters on C-III’s website). I further assume a 3% charge-off rate and a profit margin of 40%. I estimate the charge-off rate

million. This assumes a commission rate for brokerage services of 6% and 0.5% for titling.<sup>24</sup>

Together, the total potential gains are \$323 million (70% of \$462 million), multiplied by the share of transactions that engage affiliated service providers. Assuming shares of 30% or 90% (using the lowest and highest estimates above) would imply that C-III can gain 21% to 63% of the \$462 million losses to bondholders. These magnitudes are consistent with the larger losses reported in the regression analysis. In addition, there could also be dynamic spillover benefits in the form of future business opportunities. In this sense, the purchase of C-III can be viewed as an investment in relationship capital.

These potential gains in fee streams and the 14% price discount (Table 6) show how unaffiliated buyers and affiliated service providers can potentially benefit at the expense of bondholders. Since commissions and potential fee streams are usually relatively fixed and not a large percentage of the sale price, the marginal benefit from selling at a higher price is not large (Levitt and Syverson, 2008). Many intermediaries tend to focus on transaction volume to drive revenue, and may offer price discounts to unaffiliated buyers to attract them. This can be important for new businesses trying to develop relationships and gain market share. Moreover, bondholders do not have much recourse as the servicing standard in the typical pooling and servicing agreement gives special servicers quite a bit of latitude on how they structure liquidations (unlike the fiduciary standard).

### 5.3 Potential benefits from vertical integration

Of course, vertical integration has potential efficiency benefits as well. I consider three benefits below.

#### *Higher liquidation price*

The fair value option, which allows special servicers to bid for distressed assets, can lead to higher sales prices, especially in situations where there are few or no bidders. Special servicers may bid higher prices for distressed assets relative to other investors if they have private information about the underlying quality of the asset. However, the price discount and greater loan loss rates reported above are inconsistent with this benefit.

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and the profit margin from recent annual reports of publicly traded mortgage REITs. I estimate the profit margin from reported average loan yields and reported average cost of funds or from the income statements. Put together, the expected profits are calculated as  $(1-0.03)*(\$3.6 \text{ billion}*80%*8%*40\%)$ .

<sup>24</sup>I estimate these parameters from market reports and conversations with practitioners. I do not have data on profit margins for these services.

### *Faster liquidations*

Next, using in-house intermediaries can lead to faster liquidations. On average, liquidations by treated servicers are 1.7 months faster relative to placebo servicers. This analysis relies on a comparison between treated and placebo servicers in the post period only as I do not have pre-period data for time to liquidation.<sup>25</sup> Together, the 14% lower sale price reported in Table 6 and the faster time to liquidation implies a monthly discount rate of 8%, suggesting the price discounts appear too steep.

While I do not have pre-period data, a back of the envelop calculation suggests liquidations have to be 7 months faster (relative to the pre-period) to rationalize the 14% price discount.<sup>26</sup> An improvement of 7 months is quite large, considering the average REO holdtime is 12 months (Heschmeyer, 2014). Also, rating agency reports do not indicate significantly faster liquidations after the ownership changes.<sup>27</sup>

### *B-piece conflict and benefits to senior bondholders*

A third benefit of having vertically integrated affiliates pertains to benefits for senior bondholders because the self-dealing conflicts have the potential to offset another conflict in the CMBS structure which tends to hurt senior bondholders. In CMBS, the owner of the first loss tranche (B-piece) acts as the controlling class holder and often appoints itself as the special servicer. This concentration of control rights in (thin) first loss tranches incentivizes special servicers against liquidating loans to prevent the B-pieces from being wiped out. This protects their control rights, potentially at the expense of senior bondholders. In light of the B-piece conflict which *reduces* liquidation, the steering channel which incentivizes more liquidation, can have an off-setting effect.<sup>28</sup>

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<sup>25</sup>The dependent variable is the number of months between 60-day delinquency and liquidation. I include loan controls, time trends, and MSA fixed effects. The sample comprises 2153 loans with data on time to liquidation. The coefficient on the ownership change indicator is significant at the 5% level and the standard error is 0.7.

<sup>26</sup>I use an annual discount rate of 25% (this is at the higher end of target returns for opportunistic real estate investment funds), which implies a monthly discount rate of 1.9%. Therefore, the improvement in speed has to be 7 months faster (the ratio of 14% and 1.9%).

<sup>27</sup>Steward and Wertman (2013) report that the average time it took C-III to foreclose loans ranged from 8 to 11 months before the ownership changes (2008-2010) but it increased to 16 to 18 months after the ownership changes (2011 to 2012). Chamberlain and Merriam (2015) also report that average resolution times were not consistently faster for sales using affiliated brokers relative to non-affiliated sales.

<sup>28</sup>The B-piece holder affects liquidation outcomes through the appointment of special servicers. Since I observe fewer than 100 loans in my estimation sample with changes in special servicers, any potential bias is likely controlled for using special servicer fixed effects (Section A.1).

My analysis of bond-level losses suggests that the additional losses are concentrated amongst junior bonds but senior bond holders do not have lower loss rates for treated servicers compared to placebo servicers. I downloaded bond-level loss rates (realized losses divided by original balance) from Bloomberg in April 2016. The average loss rate for bonds is 23%.

Treated bonds have an average loss rate of 26% compared to 18% for placebo bonds. The losses are concentrated amongst junior bonds (original rating below A). For senior bonds (original rating of A or better), the loss rates are similar (3.7% for treated and 3.5% for placebo). Likewise for AAA-rated bonds (0.3% for treated and 0.2% for placebo).

It is possible that absent the ownership changes, senior bondholders may suffer even greater losses. However, this bond-level analysis is suggestive that the self-dealing mechanism is not enough to lead to lower loss rates for senior bondholders. The appendix provides more details about the bond-level data (Section [A.1](#)).

## 5.4 Discussion

Overall, the chain of evidence above is less consistent with the buying and price discrimination channels, but point to the importance of potential steering conflicts. On balance, I find sizable losses to bondholders after the ownership changes, consistent with concerns over self-dealing/tunneling conflicts. However, I find mixed evidence of efficiency benefits.

### *Impact on trust and broader investment activity*

While the self-dealing mechanisms discussed above can be viewed as transfers from bondholders to the new owners and buyers of CMBS liquidations, there could also be broader efficiency losses that can arise from reduced trust. Figure 6 plots the issuance volume (in billions of dollars) and market shares for special servicers, by year of issuance. Two striking patterns emerge. First, annual CMBS issuance volumes have dropped markedly after the crisis even while other commercial debt instruments have grown in importance.

Second, treated servicers have lost market share. The market share for Midland has increased. Discussions with market participants suggest that Midland has the reputation of being a neutral special servicer because it has no proprietary investment activity. While these are suggestive patterns only, they are consistent with the interpretation that investors' concerns with agency conflicts

amongst treated special servicers could endanger trust in the market and curtail investment activity.<sup>29</sup>

### *Unmeasured connections and lessons for disclosure policies*

In principle, more disclosure of affiliated transactions can improve transparency and enhance trust in CMBS markets. The Investor Reporting Package (IRP) developed by the Commercial Real Estate Finance Council provides a standardized reporting template used widely by servicers, trustees, and data providers in CMBS. At present, there are templates to disclose the involvement of affiliates and the fees charged. However, this information is only provided at the discretion of the special servicer. Moreover, lending relationships are not tracked comprehensively.

To restore trust in the CMBS market, one proposal is to encourage the public disclosure of affiliated transactions. In similar efforts, the Securities Exchange Commission (SEC) is encouraging the disclosure of non arms'-length fees by private equity firms (SEC, 2015).

## **6 Conclusion**

The ownership changes and new business models for four CMBS special servicers provide a lens to study the tension between the benefits of vertical integration and the costs of self-dealing conflicts. Compared to placebo servicers, treated servicers liquidate loans with higher loss rates, lower sales prices, and they also liquidate more after they changed owners. These findings are consistent with self-dealing concerns raised by market participants. I do not find many purchases by new owners but affiliated service providers are potentially important. There is mixed evidence on whether the use of affiliates speed up liquidation. I provide a battery of robustness checks and bounding exercises to show that selection is not likely to explain away the main effect.

These findings have broader implications. For example, the Dodd-Frank Act calls for the implementation of risk retention requirements in securitized markets. While the rule targets adverse selection before securitization, one unintended consequence is that it could enhance agency conflicts *after* securitization. The high costs of the risk retention requirements could limit competition from small issuers and servicers (Geithner, 2011). As the number of servicers in the securities market declines, the likelihood of self-dealing conflicts increases because the servicers that remain

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<sup>29</sup>Recently, nine major issuers and bondholders issued a letter to raise concerns that current servicing practices were damaging the industry's reputation (Commercial Mortgage Alert, 2016).

are likely those with ties to major financial institutions, further exacerbating self-dealing concerns. This also lends support to the importance of independent intermediaries and third party monitors, emphasized in the Dodd-Frank Act.

In future work, it would be interesting to study other aspects of agency conflicts in securitized markets and how they may interact with the risk retention policy and with potential tunneling conflicts. Another direction for research is to investigate how the disclosure of information affects outcomes. Finally, how important are tunneling conflicts in the RMBS context? Servicers in the residential sector also experienced ownership changes and non-bank servicers are growing in importance.

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# Tables

**Table 1: Summary statistics**

Variable name:	All loans			Liquidated loans		
	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>
1(Fixed rate loan)	120495	0.90	0.30	9272	0.87	0.34
1(Balloon loan)	120495	0.74	0.44	9272	0.69	0.46
1(Property is hotel)	120495	0.04	0.20	9272	0.06	0.24
1(Industrial property)	120495	0.07	0.25	9272	0.05	0.22
1(Property is apartment)	120495	0.28	0.45	9272	0.26	0.44
1(Retail property)	120495	0.24	0.43	9272	0.20	0.40
1(Property is office)	120495	0.13	0.34	9272	0.14	0.35
Year of securitization	120495	2002	3.56	9272	2003	3.50
Initial loan balance (in million dollars)	115896	7.78	15.31	8658	6.69	12.30
Number of properties per loan	120495	1.24	4.75	9272	1.21	3.83
Property age	87616	26.55	21.74	6571	26.33	20.23
Initial loan-to-value	110015	66.72	13.76	8543	70.97	9.75
Initial debt service coverage ratio	83636	1.49	0.54	6569	1.37	0.25
Loss rate				9272	0.50	0.49
Sale price (millions)				6375	5.94	12.49
Liquidation expense (thousands)				6307	797	1636

Notes: Summary statistics for pre-determined loan attributes for the full sample of 120,495 securitized loans (left 3 columns) and the primary estimation sample of 9,272 liquidated loans (last 3 columns).

**Table 2:** Effect of ownership changes on loan loss rates

Specification:	Main specification	Post × controls	MSA by year FE	Servicer trends
	(1)	(2)	(3)	(4)
Post × Ownership change	0.08*** ( 0.03)	0.08*** ( 0.03)	0.08*** ( 0.02)	0.09** ( 0.04)
N	9272	9272	9272	9272
R <sup>2</sup>	0.14	0.15	0.38	0.36
Month FE	Y	Y	Y	N
Special servicer FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Post × Controls	N	Y	Y	Y
MSA-year FE	N	N	Y	Y
Special servicer time trends	N	N	N	Y

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Notes: This table reports results from OLS regressions using liquidated loans. The dependent variable is the loss rate for loan  $l$  liquidated by special servicer  $i$  in month  $t$ , centered around event dates. The loss rate is the loan losses divided by the loan balance before losses. The key regressor is the interaction between an indicator that is 1 if special servicer  $i$  is treated and a post indicator that is 1 if month  $t$  is after the event date for special servicer  $i$ . The event date is the month of ownership change for treated servicers. The event date for placebo servicers is LNR's event date. The estimation sample consists of 9,272 loans liquidated between 2003 and 2012. Column 1 reports the main specification with 106 month fixed effects, 33 special servicer fixed effects and 13 pre-determined loan attributes (reported in Table 1), plus a dummy for loans with missing values for any loan attributes. Column 2 repeats column 1 but adds interactions between the post indicator and each loan control. Column 3 adds 1210 MSA-year fixed effects. Column 4 adds a post indicator, six special servicer-specific quadratic time trends (and drops month fixed effects), including trends for each of the 4 treated servicers, Midland and a common trend for other placebo servicers. Standard errors are double clustered by special servicer and month of liquidation, with finite sample adjustments.

**Table 3:** Robustness checks for effect of ownership changes on loss rates

Specification:	Coefficient	Standard Error
	(1)	(2)
1. Sample: All years	0.10***	( 0.03)
2. Sample: 2004-2012	0.06**	( 0.03)
3. Sample: Propensity score	0.09**	( 0.04)
4. Sample: Aggregated data	0.09**	( 0.04)
5. Placebo date: Berkadia date	0.10*	( 0.05)
6. Placebo date: C-III date	0.11**	( 0.05)
7. Placebo date: CW Capital date	0.06**	( 0.03)
8. Winsorize loss rates	0.08***	( 0.03)

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Notes: The first row repeats the main specification in column 1 of Table 2 but includes all years (not just 2003-2012). The second row includes a shorter event window (2004-2012). The third row repeats the main specification, restricting the sample to loans matched using propensity scores. The fourth row aggregates the loan level data to the special servicer-month level, 106 month fixed effects, 6 special servicer fixed effects (including a common fixed effect for placebo servicers besides Midland), and robust standard errors. The next three rows repeat the main loan-level specification but use the event dates for Berkadia, C-III, and CW Capital as placebo dates respectively. The last row winsorizes loan loss rate at the top 1 percent.

**Table 4:** Loan attributes for treated versus placebo servicers

Dependent variable:	Mean	SD	N	Coefficient	Std. Err.
<b>Panel A: All loans</b>					
1(Fixed rate loan)	0.90	0.30	120495	0.15***	( 0.03)
1(Balloon loan)	0.74	0.44	120495	0.41***	( 0.14)
Year of securitization	2002	3.56	120495	0.32	( 0.72)
1(Property is hotel)	0.04	0.20	120495	0.03**	( 0.01)
1(Property is apartment)	0.28	0.45	120495	0.02	( 0.04)
1(Retail property)	0.24	0.43	120495	0.15**	( 0.06)
1(Industrial property)	0.07	0.25	120495	0.01	( 0.02)
1(Property is office)	0.13	0.34	120495	0.07**	( 0.03)
Initial loan balance (in million dollars)	7.78	15.31	115896	3.36**	( 1.58)
Number of properties per loan	1.24	4.75	120495	0.04	( 0.10)
Property age	26.55	21.74	87616	-1.19**	( 0.54)
Initial loan-to-value	66.72	13.76	110015	3.17**	( 1.46)
Initial debt service coverage ratio	1.49	0.54	83636	-0.02	( 0.02)
<b>Panel B: Current loans</b>					
Current LTV	59.64	16.44	893906	4.62**	( 2.22)
Current DSCR	1.41	0.61	833718	-0.002	( 0.03)
<b>Panel C: Liquidated loans</b>					
Reported LTV at liquidation	65.23	11.81	4859	1.60	( 1.99)
Reported DSCR at liquidation	0.93	0.56	4373	0.11**	( 0.05)

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Notes: Each row reports results from an OLS regression with a loan attribute as the dependent variable and the ownership change indicator as the key regressor. Panel A reports differences in pre-determined (at-origination) loan attributes. The sample includes all loans securitized before 2008. Standard errors are double clustered by special servicer and month of securitization. Panel B reports results for current loan-to-value ratios (LTV) for loan  $l$  in month  $t$  and current debt service coverage ratios (DSCR), controlling for report month fixed effects (centered by event dates) and clustering standard errors by special servicer and report months. The sample includes all loans that have a positive loan balance in month  $t$ . Panel C compares the most recent LTV and DSCR reported for liquidated loans, controlling for month of liquidation and clustering standard errors by servicer and by liquidation month.

**Table 5:** Effect on loss rates (dropping years around ownership changes)

Dependent variable:	Loan loss rate		
	Main spec	Drop 1 year	Drop 18 months
Sample:	(1)	(2)	(3)
Post × Ownership change	0.08*** ( 0.03)	0.10* ( 0.05)	0.13** ( 0.06)
N	9272	5617	3937
R <sup>2</sup>	0.14	0.19	0.19
Month FE	Y	Y	Y
Special servicer FE	Y	Y	Y
Controls	Y	Y	Y

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Notes: Column 1 repeats column 1 of Table 2. Column 2 drops one year before and after time 0. Column 3 drops 18 months.

**Table 6:** Mechanisms related to higher loan loss rates

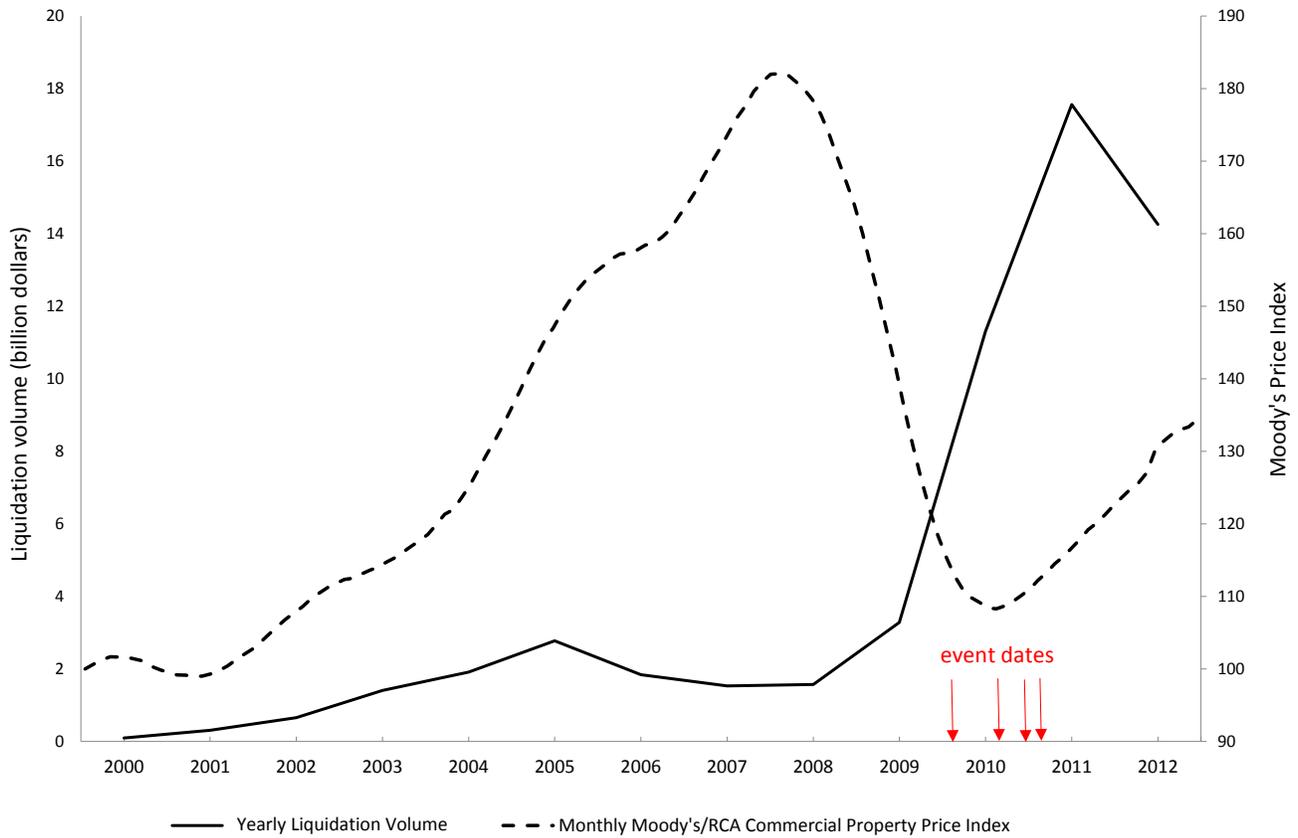
Dependent variable:	Ln(Sale price)	Ln(Expense)	Ln(Volume)
	(1)	(2)	(3)
Post × Ownership change	-0.14* ( 0.08)	-0.10 ( 0.10)	1.19*** ( 0.14)
N	6375	6307	1132
R <sup>2</sup>	0.63	0.34	0.54
Month FE	N	N	Y
Special servicer FE	Y	Y	Y
Controls	Y	Y	N
MSA FE	Y	Y	N
Trends	Y	Y	N

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Notes: Column 1 reports results from a hedonic regression where the dependent variable is log (Sale price) for the liquidated loan, the key regressor is the interaction between the ownership change and the post indicator, controlling for special servicer fixed effects, loan controls, MSA fixed effects, quadratic time trends (centered around event dates) and a post indicator. The sample includes liquidated loans in the estimation sample of Table 2 that have non-missing values for sales prices. Column 2 repeats the same regression with log of liquidation expenses as the dependent variable. Column 3 aggregates the loan level data to the special servicer-month level. The dependent variable is log of the total amount liquidated by special servicer  $i$  in month  $t$ , where the total amount liquidated sums over the balance before losses for all loans liquidated by special servicer  $i$  in month  $t$ . This specification includes special servicer fixed effects, month fixed effects and reports robust standard errors.

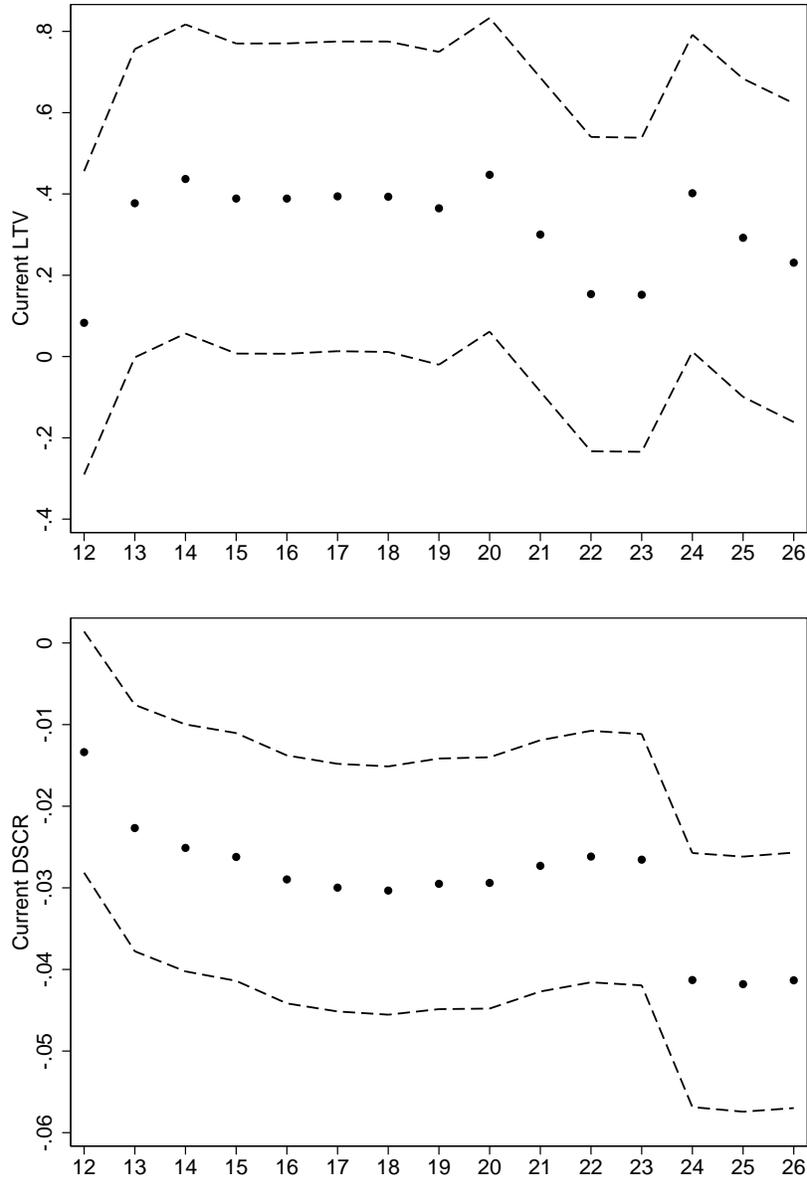
# Figures

**Figure 1:** Trends in liquidation volume and commercial property prices



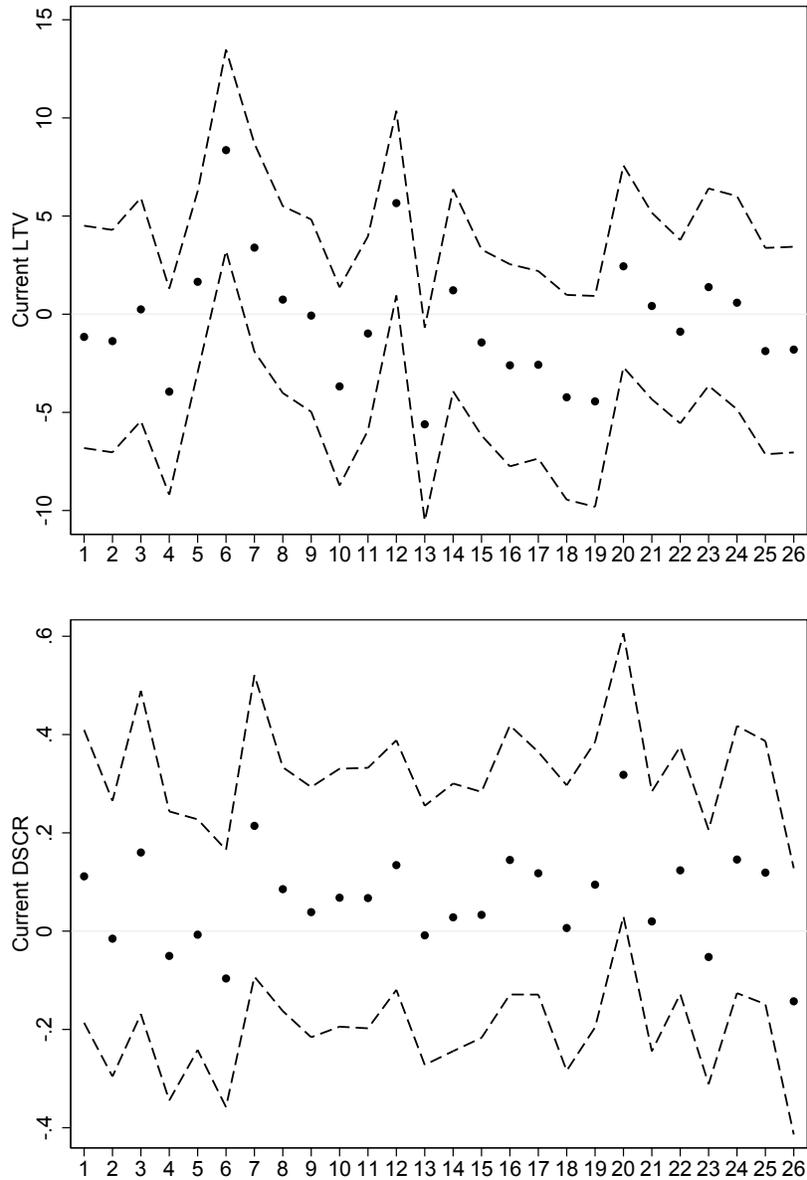
Notes: The solid line plots the annual volume of liquidations in my data. The dashed line plots the monthly Moody's/RCA Commercial Property Price Index. The four arrows indicate the four event dates when special servicers changed owners.

**Figure 2:** Monthly trends for current debt service coverage and loan-to-value ratios



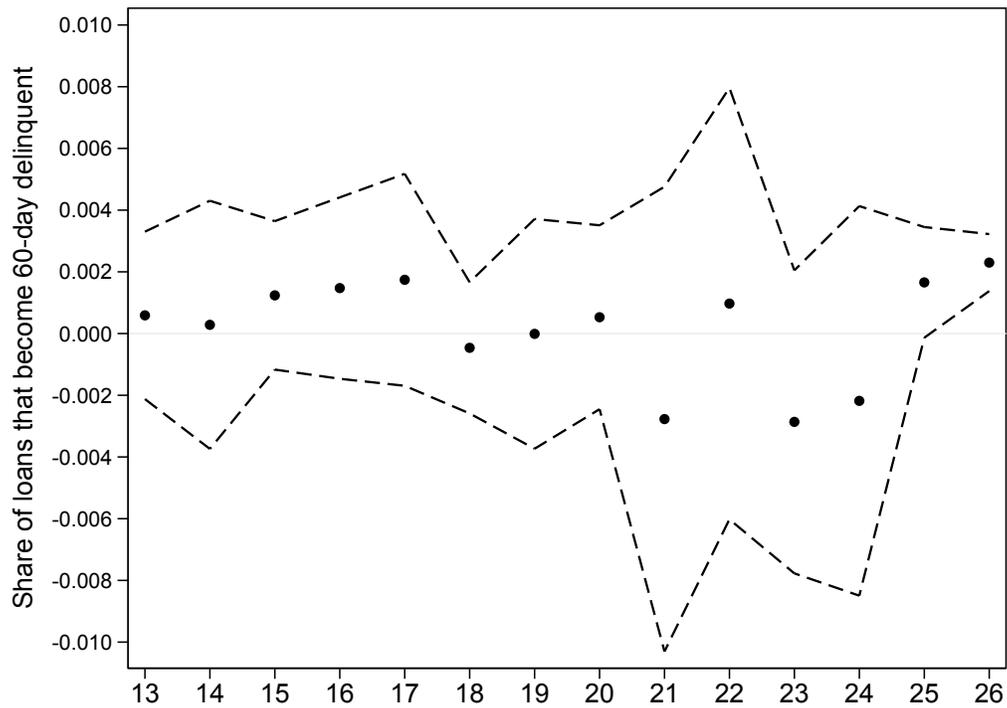
Notes: Each point reports monthly differences in current loan-to-value (LTV) and current debt service coverage ratio (DSCR), relative to month 11 (the omitted group), estimated from a regression of current loan attributes on a treatment dummy, report month fixed effects and their interactions with the treatment dummy. DSCR equals net operating income divided by debt service payments. The sample includes all current loans, from November 2010 to November 2012. The ownership changes span November 2009 (Berkadia) to September 2010 (CW Capital). The first relative month where I have current loan information for Berkadia is month 11. The figure ends at month 26 (the last relative month where I have current loan information for CW Capital). The dashed lines report 95% confidence intervals.

**Figure 3:** Monthly trends in debt service coverage ratio and loan-to-value for liquidated loans



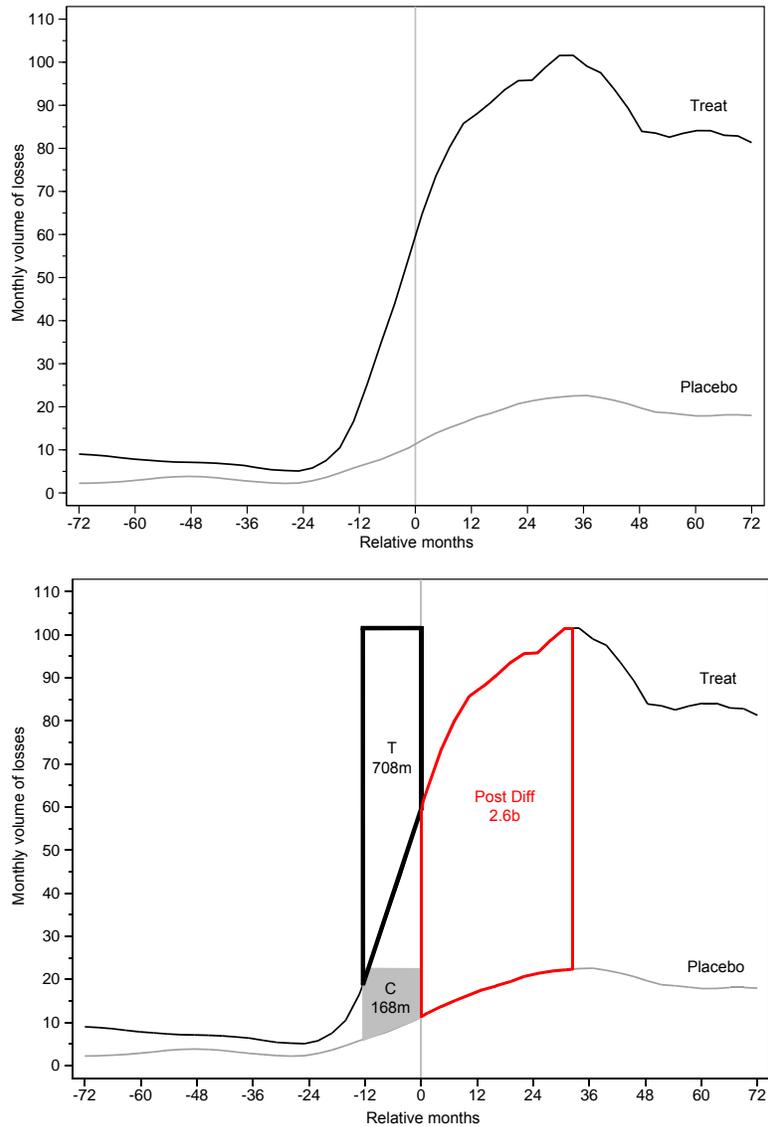
Notes: Each point reports monthly differences in loan-to-value (LTV) and debt service coverage ratio (DSCR) reported for liquidated loans, relative to month 0, estimated from a regression of loan attributes on a treatment dummy, month of liquidation fixed effects and their interactions with the treatment dummy. The sample includes all loans liquidated in the post period, the omitted group is month 0. The dashed lines report 95% confidence intervals.

**Figure 4:** Monthly trend in share of loans that become 60-day delinquent



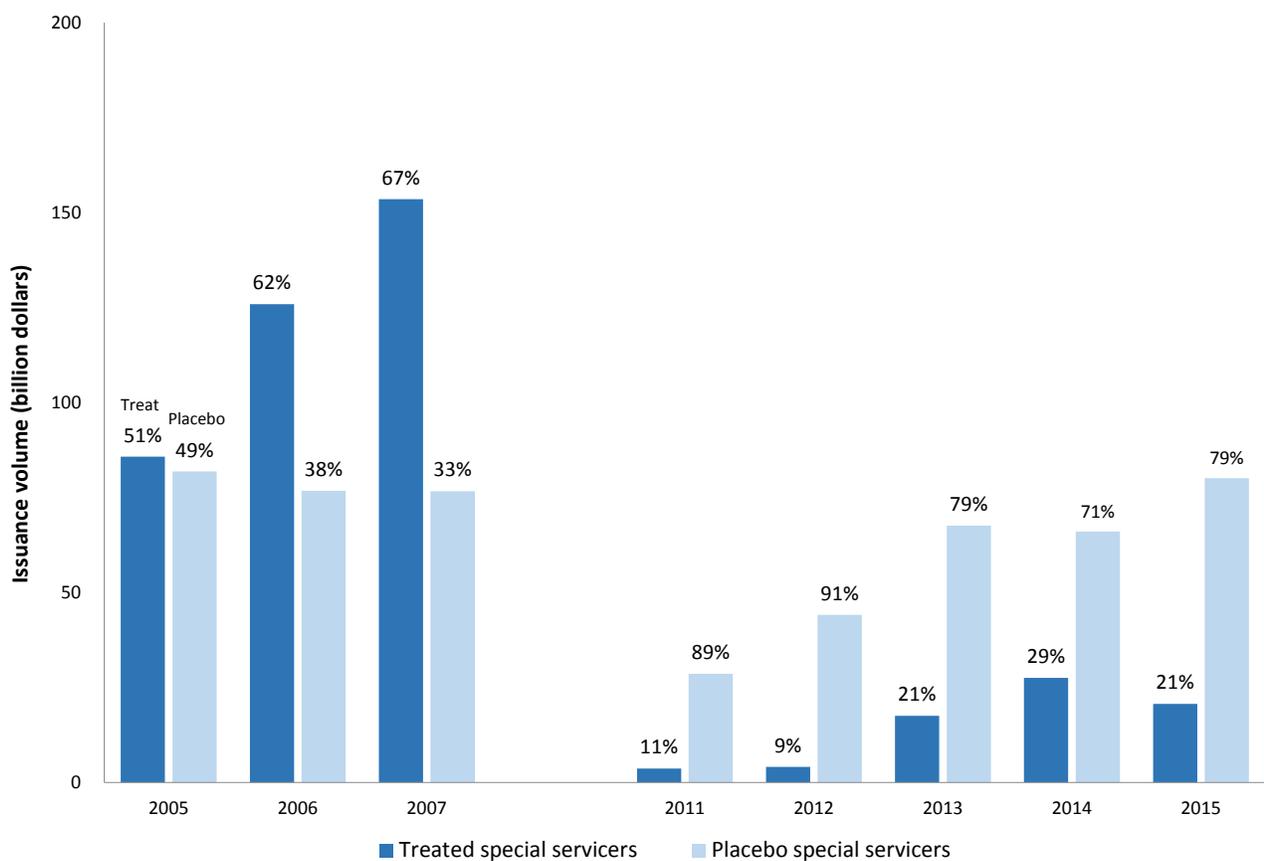
Notes: Each point reports monthly differences in the share of loans (by dollar amount) that become 60-day delinquent in month  $t$ , estimated from a servicer-month level analysis with the treatment dummy, month fixed effects, and interactions with the treatment dummy. Loans are transferred to special servicers after they become 60-day delinquent. The omitted group is month 12 (the first month where I have data to identify when a loan becomes 60-day delinquent). The dashed lines report 95% confidence intervals with robust standard errors.

**Figure 5: Unconditional trends in volume of losses (treated and placebo)**



Notes: The top panel presents trends in the monthly volume of losses for the average treated and average placebo servicer, estimated using non-parametric regressions with servicer-month level data aggregated from Bloomberg. I use a rule of thumb bandwidth and the Epanechnikov kernel. The bottom panel repeats the same figure, but highlights three areas to bound the stockpiling effect.

**Figure 6: CMBS issuance by year and market shares of special servicers**



Notes: Each bar represents the total volume of CMBS debt issued each year between 2005 and 2007 and between 2011 and 2015 for treated (darker bar) and placebo (lighter bar) special servicers, respectively. The annual issuance volumes between 2008 and 2010 (ranging from \$3 billion to \$12 billion) have been suppressed. The numbers above the bars correspond to the market shares for the treated and placebo special servicers.