# Special Servicers and Adverse Selection in Informed Intermediation: Theory and Evidence*

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## Abstract

We study conflicting incentives of the master and special servicers in handling troubled loans in a CMBS deal and how the frictions between the interests of the two servicers might be diminished if the master and special servicing rights are held by the same firm. We show that concentrating both servicing rights in one firm reduces the likelihood that a defaulted loan terminates in foreclosure. It also leads to longer time in default for underperforming loans. Furthermore, consistent with master servicers being able to bid more aggressively for a risky pool of loans when the servicing rights are concentrated, we find higher default rates for loans whose master and special servicing rights are held by the same firm.

## 1. Introduction

Demarzo (2005) argues that pooling of assets (loans) has an information destruction effect that operates to the disadvantage of the intermediary by preventing the intermediary from fully exploiting its information regarding each individual asset. To overcome the information destruction effect and to provide confidence to investors, agents are employed to monitor information about the assets and to ensure that timely performance of loan payments is maintained. These agents are known as asset servicers.

An example of asset servicing can be found in the Commercial Mortgage Backed Securities (CMBS) – securities backed by pools of mortgage loans on commercial real estate properties. CMBS are structured such that a master servicer oversees the administration of the underlying loans and the distribution of the cash flows to the tranche investors.[1] One of these functions involves the administration, monitoring and disposition of the loans. When a loan in a CMBS deal fails to perform as expected, the master servicer sends the loan to a "special servicer." The special servicer has wide latitude to foreclose on the loan or modify the loan terms in an effort to maximize the cash flows to the CMBS investors. Typically, the special servicer's activities are detailed in a Pooling and Servicing Agreement (PSA).[2]

Since the first-loss investors have the most at stake when a loan fails to perform, these investors often control the appointment of the special servicer. In fact, as Jacob and Fabozzi (2003) point out, the special servicer often holds a portion of the first-loss piece in order to properly align the incentives of the investors and the special servicer. As

[1] Often, the structure calls for sub-servicers to perform specialty functions.
[2] The PSA defines the role of the servicer as well as remedies for poor lending and/or underwriting by the loan originator. These remedies are important in providing confidence to investors particularly in the case where investors are concerned about information destruction,

such, the special servicer is not concerned with the borrower's position, but rather may undertake actions (modification, foreclosure, etc.) that maximize the position of the first-loss investor and guarantee the timely cash flow payments to the senior investor. This mechanism contrasts directly with the administration of troubled loans originated and retained by traditional lenders. As such, if a loan does fail to perform as expected, the borrower may be able to negotiate an outcome other than foreclosure.

The purpose of this paper is to examine if the default risk for a pool is correlated to whether or not the master and special servicing rights of that pool are held by the same firm. We highlight the conflicting incentives of the master and special servicers in handling troubled loans and study how the frictions between the interests of the two servicers might be diminished if the master and special servicing rights are held by the same firm. We argue that the concentration of the two servicing rights has two opposing effects in handling defaulted loans. On one hand, it creates efficiencies in handling the loans and leads to lower likelihood of foreclosures. On the other hand, servicers have an incentive to prolong the life of a loan in order to collect fees for a longer period of time, and concentration of the two servicing rights might enable the servicers to be more effective in collaborating to delay the liquidation of a troubled loan. Given the efficiencies created by the concentration of the two servicing rights, we also expect a master servicer to bid more aggressively for a risky pool of loans if it expects to be the special servicer of that pool as well. Therefore, we expect a higher default rate for loans whose master and special servicing rights are held by the same firm.

Our empirical analysis provides support for our predictions. Using more than 46,000 securitized commercial real estate loans, we find that the foreclosure probability is

smaller while the time a loan remains in default is longer when servicing rights are concentrated in one firm than when they are held by different firms. We also find a higher default rate for a loan if the two servicing rights are held by the same firm.

To our knowledge, the current study offers the first analysis of the correlation between the default probability and whether or not the two servicing rights are held by the same firm. In a closely related recent work, Gan and Mayer (2006) focus on a different aspect of the agency conflicts in managing troubled loans. They study the effectiveness of assigning the B-piece to the special servicer as an incentive mechanism. They find a smaller percentage of loans are transferred to special servicing and these loans get liquidated more quickly when the special servicer owns the B-piece. However, special servicers delay liquidation when they hold the B-piece in mortgage pools with a larger percentage of delinquent loans. This is possible due to the fact, they argue, that the downside loss of such pools can be shared with senior piece holders. Thus, they conclude that assigning the B-piece to the special servicer alleviates agency conflicts only when delinquency rates in a pool are low. Other lines of related literature study default behavior and prepayment decisions without considering the agency conflicts in the servicing industry (examples include Deng, Quigley and Sanders, 2004; Ambrose and Sanders, 2003; and Chen and Deng, 2003), and issues associated with asymmetric information and moral hazard (see Fan, Ong, and Sing, 2006). Although not specifically concerned with the interactions of the master and special servicers, Fan, Ong, and Sing (2006) develop a general model showing how the "servicer" can reduce moral hazard problems associated with securitization.[3]

[3] Although not directly related to the current study, it is worth mentioning that a number of papers have offered theoretical explanations for creating asset-backed securities under alternative information

The next section of the paper discusses the incentive structure for master and special servicers and offers theoretical arguments for a positive correlation between the default risk for a pool and whether or not the master and special servicing rights of that pool are held by the same firm. We then utilize a sample of 46,082 securitized commercial real estate loans in 363 CMBS deals to provide an empirical test of our theoretical predictions.

## 2. The Role of the Servicer in Informed Intermediation

### *Types of Servicers and Their Functions*

The servicer on a CMBS deal plays an important role. The servicers collects monthly loans payments, keeps records relating to payments, maintains escrow accounts, monitors the condition of underlying properties, prepares reports for the trustee and transfers collected funds to the trustee for payment to investors (See Figure 1).

There are three types of servicers: the subservicer, the master servicer, and the special servicer. The subservicer is typically the loan originator in a conduit deal who has decided to sell the loan but retain the servicing rights. The subservicer sends all payments and property information to the master servicer. The master servicer oversees the deal and makes sure the servicing arrangements are maintained. In addition, the master servicer must facilitate the timely payment of interest and principal to the investor. When a loan goes into default, the master servicer has the responsibility to provide for servicing advances.

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structures. Examples include DeMarzo (2005), Riddiough (1997), Glaeser and Kallal (1997), Gorton and Pennachi (1993) and Subrahmanyam (1991).

Unlike the subservicer and the master servicer, the special servicer enters when a loan typically becomes more than 60 days past due. Often, the special servicer is empowered to modify the terms of the loan such through loan extension or loan restructuring. Furthermore, the special servicer is empowered to foreclosure on the loan (and sell the underlying collateral) if that is in the best interest of the bond holders. This critical role is of great importance to the subordinated bond (tranche) owners because the timing of the loss can significantly impact the loss severity, which in turn can greatly impact subordinated bond returns. Thus, first-loss investors usually want to either control the appointment of the special servicer or perform the role themselves.

***Moral Hazard Problems in Servicing***

Having the special servicer hold the first-loss positions in a securitized structure creates a potential moral hazard problem since the special servicers may act in their own self-interest, potentially at the expenses of the other bondholders. Jacob and Fabozzi (2003) propose a series of scenarios that outline the risks and possible conflicts arising from the first-loss security holder also controlling the servicing rights. For example, in dealing with borrower default resulting from balloon risk, Jacob and Fabozzi note that the first-loss holder may prefer that the servicer extend the mortgage term rather than seek a quick foreclosure if the property value is less than the mortgage balance. However, under this scenario the senior bond holders may prefer that the servicer quickly foreclose. In effect, the first-loss holder is hoping that the borrower will be able to recover in order to refinance the loan. Furthermore, since the servicer recovers any funds extended prior to

repayment of the bond holders, a first-loss holder who also controls the servicing can take actions that may not maximize the value of the senior bond holder.[4]

Two potential factors determine the correlation between the default risk of a pool and whether or not the special servicer and master servicer of the pool are the same. One is the moral hazard factor whereby the master servicer and special servicer may treat a loan differently depending on whether or not they are the same firm. The other is the adverse selection problem whereby the willingness of a master servicer to bid for a risky pool may depend on the probability that the master servicer expects to be the special servicer for that pool as well.

To understand the moral hazard and adverse selection problems, we first need to consider the compensation structure for the master and special servicers. Master servicers are typically compensated by a percentage of the outstanding balance of the loan plus the float. Float refers to the return that the master servicer earns on the monthly payments for the period between the date the master servicer receives the payment from the borrower and the date it passes the payment on to the investors.

The master servicer in a CMBS deal supervises the regular cash flows of the loans in the pool. The master servicer manages the flow of payments and information, handles the ongoing interaction with the performing borrower, and keeps track of the reserves, insurance and tax payments. In case of delinquency, the master servicer is responsible for advancing principal and interest through the foreclosure process to the extent it deems the

[4] There are some checks and balances. Some contracts include constraints on the servicer, such as allowing a maximum of three years of extension, or only permitting extensions of one year at a time. Some contracts allow a majority vote of the certificate holders to force foreclosure or to appoint an extension advisor who can overrule the extension decision of the servicer.

advances are recoverable. The servicer can recover these advances, including the interest on these advances, from the proceeds of the sale of the property.

The Pooling and Servicing Agreement (PSA) specifies the conditions under which the master servicer forwards the underperforming loans to the special servicer. In practice, however, servicers have some discretion in deciding whether and when to transfer an underperforming loan to special servicing. The master servicer can also declare a loan in "imminent default" even though the loan might still be current. This could happen if, for instance, the master servicer discovers a significant decrease in the occupancy rate in the underlying property, in the cash flows from the property or in the collateral value of the property. The master servicer can also transfer the loan to the special servicer when the borrower is in violation of the covenants of the loan.

The special servicer's primary responsibility is to work out the loans forwarded by the master servicer. The contractual obligation of the special servicer is to maximize the interests of the investors. Clearly, the ideal solution would be for the special servicer to fix the problems with the loan and return the loan to performing status. If needed, however, the special servicer is authorized to foreclose on the property.

Special servicers are generally compensated by a percentage of the outstanding balance of the loans that they serve plus a fixed fee. Unlike the master servicer, the special servicer generates more profit if a particular loan goes into default.[5] This compensation structure could give incentives to the special servicer to prolong the

[5] The conflict of interest between the special servicer and the master servicer is exemplified in the following statements by a special servicer: "We get resistance from some master servicers for transferring the loans. This is understandable, as a master servicer has downside if it transfers the files too soon and the trust incurs special servicing fees. And there is no upside to transfer it earlier….The sooner we get our hands on a file and get in front of the borrower, the greater the recovery is going to be for the trust…We have a number of loans where K-mart is going to reject the lease, but the loan continues to perform. And the master servicer won't transfer the file. We want to be discussing the situation with the borrower – K-mart is leaving, what is your plan?" (Jones and Petosa, page 45).

workout or foreclosure process and to liquidate too few loans in order to collect more revenue in fees.[6] In order to better align the interests of the special servicer with those of the investors who own the underlying securities, special servicers sometimes hold the most junior piece of the deal, often referred to as the B-piece.

As stated earlier, moral hazard and adverse selection problems may exist with respect to the default risk of a pool and whether or not the same company performs the functions of master servicer and special servicer for that pool. Using the backward induction argument, we first consider the moral hazard problem before addressing the adverse selection issue. The reason for considering the moral hazard problem first is that the master servicer's willingness to bid for a pool and her bidding strategy will depend on her expectations about how the loans in the pool will be handled if they are transferred to the special servicer. Thus, the effort level of the special servicer as well as whether or not the same company is both the master and special servicer for the pool will impact the master servicer's bidding strategy for the pool.

## 3. Hypotheses Concerning Special Servicers

In this section of the paper, we present theoretical arguments for the possible correlation between the default risk for a pool and whether or not the master and special servicing rights of that pool are held by the same firm (or subsidiaries of the same firm). In forming the hypotheses below, we take the contract design as given. The design of an optimal contract between a principal (investors) and multiple agents (master and special servicer) is outside the scope of this paper. Examples of earlier work on incentive

[6] According to Ciochetti and Riddiough (1998), the foreclosure process takes about nine months.

compatible contracts with multiple agents include Itoh (1991) and Holstrom and Milgrom (1990).

The key moral hazard question for our study is whether or not the same company serving as both the master and special servicer has an advantage or disadvantage when dealing with underperforming loans. We argue that if the two servicers are the same, then communication flows more effectively, and as a result, the special servicer is more likely to find out about an underperforming loan earlier and have more effective recovery efforts. This leads to the following hypothesis:

> **Hypothesis 1:** If the master and special servicing rights are held by the same firm, then it is less likely for a defaulted loan to terminate in foreclosure.

The general proof of the above hypothesis relies on the fact that if the master and special servicing rights are held by the same firm, then this diminishes the frictions between the conflicting interests of the master and special servicers, and enables the firm to handle problem loans more efficiently. Since the master servicer (special servicer) has the option of not bidding for the special servicing rights (master servicing rights), then there must be some nonnegative efficiency gains in handling underperforming loans when the same firm holds both servicing rights.[7]

The compensation package of both servicers includes a percentage of the outstanding balance of the loans that they serve. As a result, the master servicer has an incentive to delay forwarding an underperforming loan to the special servicer, and the special servicer has an incentive to delay the liquidation of a troubled loan. Since the

[7] It is worth noting here that theoretical studies of optimal contracting with multiple agents by Itoh (1991), Holstrom and Milgrom (1990) and Fan, Ong Sing (2006) show that when agents can observe each other's actions, then agents colluding and cooperating with each other through side contracting can improve the principal's welfare.

concentration of the two servicing rights enables the servicers to cooperate and coordinate their actions more effectively, we expect them to be more effective in prolonging the life of an underperforming loan.

> **Hypothesis 2:** Time-in-default is longer for loans when the servicing rights are concentrated in the same firm.

As indicated above, the master servicer's interests lie in holding the loan as long as possible. Once the loan is transferred to the special servicer, the master servicer stops receiving any revenue from the loan and the special servicer starts collecting fees from the loan. It follows, therefore, that the master servicer will be less resistant to send a loan to the special servicing if she is also acting as the special servicer for the loan. We expect a similar outcome with respect to master servicer's willingness to call performing loans. If the special servicing is handled by a different company, then it will be in the interests of the master servicer to delay calling a performing loan in order to collect fees and/or gain from the float for a longer period of time. However, if the master servicer is also the special servicer, then the master servicer is also concerned with how a delay in calling a performing loan could adversely impact the recovery process. As a result, the moral hazard component of the problem suggests that we should observe a higher probability of default for loans where the master and special servicer functions are held by the same firm.

To understand the adverse selection component, it is worth noting that when servicers bid for a pool in a CMBS deal, they receive a "flip book" that discloses property types (hospitality, office, retail, etc.) and loan amounts in the pool. Most servicers do a "re-underwriting" of a sample of loans to detect if there are any problems. The servicers,

therefore, choose whether or not to bid for a pool, and how much to bid, depending on their assessment of the risk level of that pool. A potential determinant of the master servicer's bidding strategy is whether or not she also expects to obtain the special servicing rights for the pool. To illustrate the point, suppose that given the loan characteristics in a pool, each pool is either a high risk type or low risk type. The competing master servicers will all bid aggressively for the low risk type pools. This, on average, will result in equal probability for each servicer to win a low risk pool. For the high risk pools, a master servicer who also expects to be the special servicer for the pool will bid more aggressively for, and is more likely to win, high risk pools than a master servicer who does not provide special servicing or does not expect to obtain the special servicing rights for that pool. Thus, the adverse selection component of the problem reinforces the impact of the moral hazard component:

> **Hypothesis 3:** The default probability of a loan is higher if the master and special servicing rights of that loan are held by the same firm.

## 3. Data

We collected a sample of over 59,000 securitized commercial real estate loans from the Intex CMBS database. As one of the leading providers of commercial real estate mortgage information, Intex gathers data from monthly servicing company remittance reports including loan specific data such as loan-to-value ratio (LTV), original balance, current balance, gross coupon, net coupon, debt service, amortization period, payoff, age, amortization type, frequency of payments, property type, location of underlying property, yield maintenance provisions, lockout period, ARM provisions, originators, syndicators and loan status. The Intex database contains loan information for a large number of

CMBS deals and syndicators (such as DLJ, Deutsche Bank, GMAC and SASC) as well as originators (ContiFinancial, GMAC, and Confederation Life). After cleaning the data and removing observations with implausible or missing observations, our sample contains 46,082 loans in 363 deals.[8]

Table 1 provides the descriptive statistics for the loans in the sample. For example, we note that the average loan-to-value at origination was 68 percent and the average net coupon spread over the 10-year Treasury at origination was 224.6 basis points. Loans secured by multifamily and retail properties make up over half of the dataset accounting for 32.5 percent and 25.4 percent of the sample, respectively.

One of the interesting features of the Intex database is that it identifies the master and special servicer associated with each CMBS deal.[9] Thus, we are able to identify cases where the master and special servicing rights are held by the same firm based on a matching of firm names. Out of the 46,082 loans in our sample, we find that 40.8 percent (18,807) are included in CMBS deals where the master and special servicing rights were held by the same firm. Table 1 also reports the sample descriptive statistics based on whether the loans have the "same" servicer. Interestingly, we see that the average number of months where a yield maintenance penalty applies is greater for the same serivcer group (28 months) versus the different servicer group (25 months). However, loans with different servicers have longer prepayment lockout periods (60.4 months) than loans with the same servicer (42.9 months). In addition, the distribution of loans across property types is relatively similar for both servicer groups. Table 2 shows the distribution of loans

[8] We deleted observations with loan-to-value ratios less than 10 percent and greater than 150 percent, loans with balances reported as greater than $1 billion, loans with less than 2 months of performance history, and observations that did not include the name of the master servicer, special servicer or loan origination date.
[9] See Appendices (A) and (B) for a listing of the Master and Special Servicers.

by year of origination. The majority of the loans (53 percent) were originated between 1997 and 1999.

Since over 40 percent of the loans have the same firm serving as master and special servicer, we examined the loans that have differing servicer to determine how many of these loans are serviced by a firm that also performs one of the other functions. Panel A of Table 3 shows the distribution of loans based on whether the master servicer also performs special servicing functions for other loans in the dataset. For example, Panel A shows that of the 27,275 loans that have different master and special servicers, 25,673 (94.1 percent) had a master servicer that also performed special servicing function on other loans. In contrast, only 1,602 loans had a master servicer that did not also perform special servicing functions for other loans. Panel B of Table 3 reports the same analysis for special servicing firms. Here we see that 37.5 percent (10,231) of the 27,275 loans that had different servicing firms had a special servicer that also served as a master servicer on other loans. We also note that 17,044 loans had a special servicer that only performed special servicing functions for loans in the dataset.

Table 4 shows the results for the maximum likelihood estimation of the logit model for whether the master and special servicing rights are held by the same firm. The results indicate that firms holding both master and special servicing rights prefer loans in the office, retail and industrial sectors. However, the negative coefficient on Hotel indicates that hotel loans are less likely to have servicing rights concentrated in one firm. The model also controls for factors associated with differences in underwriting and loan pricing. For example, the coefficient on the net interest rate spread (Netspread) indicates servicing rights are less likely to be concentrated with the same firm for loans with higher

contract rates relative to the Treasury benchmark (higher net spreads). Furthermore, we also note that both variables capturing prepayment penalties (number of prepayment lockout months and yield maintenance penalties) show that the probability of servicing rights being held by the same firm is lower when prepayment protections are in place. These results confirm that when cash flows are more predictable (that is, have greater prepayment protection), the incentive to control both servicing functions is reduced.

## 4. Results

In section 2, we outlined the theoretical arguments regarding the relationship between servicing rights and loan risk. In this section, we empirically test these hypotheses by examining the default probabilities for CMBS loans. To reiterate, hypothesis 1 states that loans are less likely to end in foreclosure if the servicing rights are held by the same firm, conditional on the loan being in default. Hypothesis 2 predicts that, conditional on a loan being delinquent, the loan will remain longer in default before it gets foreclosed or modified.

In order to test hypotheses 1 and 2, we focus on the subset of loans that are clearly classified as being in default – that is, being at least 90-days delinquent. After cleaning the data and removing loans with obvious data recording errors, we identified 1,689 (3.7 percent) loans as being in default. Of the loans that defaulted, we note that the master and special servicing rights were held by the same firm for 583 (35 percent) loans. Table 5 shows the mean number of months in default and the t-statistics testing for differences in mean across default outcomes. Focusing first on all loans, we see that the time-in-default of 13.5 months is significantly shorter (at the one percent level) when the

servicing rights are held by the same firm than the 17.1 months for loans with different master and special servicers. Furthermore, looking across default outcomes, we find that the time in default remains consistently shorter when the servicing rights are concentrated in one firm than when they are held by different firms. For example, the mean time from default to foreclosure is 13.7 months when servicing rights are held by different firms versus 11.9 months for loans where the servicing rights are concentrated. Similarly, of those loans that defaulted and then were modified or paid off, it took fewer months (12.4 months vs. 18.5 months) for a loan to be modified or paid off if the servicing rights are held by the same firm. Thus, the basic comparison of the across default outcomes contradicts the second hypothesis.

Turning now to the probability that a loan in default will end in foreclosure, we first estimate a simple logit model of default outcome. As noted above, the possible outcomes for loans that enter default are foreclosure or modification/prepayment. We include as independent variables the loan-to-value ratio at origination, the loan interest rate spread over the 10-year Treasury (net-spread), the number of prepayment lock-out months, the number of months a yield maintenance penalty was in effect, dummy control variables for property type and origination year. We include a measure of property type concentration in the CMBS deal (herfindahl) in order to capture the potential effect that services may have in specializing in loan portfolios concentrated in particular property types. We also include the log of the number of months spent in default (logdur) to control for passage of time. Finally, the variables of interest in this model are samerservicer, a dummy variable indicating that the loan servicing rights were

concentrated in one firm, and first_loss, a dummy variable indicating that the special servicer holds the first-loss position (or b-piece) in the securitization deal.

Table 6 reports the estimated coefficients for the model of default outcome. We find that the probability of foreclosure is significantly positively related to the presence of prepayment penalties and lockouts. That is, as the number of months that a prepayment penalty or prepayment lockout increases, the probability of ending in foreclosure increases, all else being equal. This result is not surprising as prepayment penalties and lockouts effectively deter the ability of the borrower or servicer from ending the default spell through a loan modification (essentially a prepayment). Another reason for the positive correlation between the presence of prepayment penalties and the probability of foreclosure is that higher risk borrowers are more likely to select loans with a prepayment penalty (and lower interest rate) than lower risk borrowers. The reason is that higher risk borrowers are more likely to end up in foreclosure, in which case the prepayment penalty becomes irrelevant. Consistent with the findings of Ambrose and Sanders (2003), we find that the loan-to-value at origination and the interest rate spread are not significant. In addition, we also find that the length of time spent in default (logdur) is not significant.

Turning to the primary variables of interest, we find that the coefficient for sameservicer is negative and significant at the 5 percent level indicating that loans having concentrated servicing rights are less likely to terminate in foreclosure – directly supporting the first hypothesis. However, we also note that the coefficients on the first-loss dummy variable (first_loss) and the CMBS property-type concentration variable (herfindahl) are not statistically significant. Thus when servicing rights are concentrated with the same firm, the servicer appears more willing to modify loans in default.

To test hypothesis 2 that the time-to-default resolution will be longer for delinquent loans, we estimate a proportional hazard model of the time-in-default. Table 7 reports the estimation results for this model. This model focuses on the time-in-default. Combining the insights from the probit model of default outcome with this model default duration, we are able to determine whether concentration of servicing rights result in differential responses to loan defaults.

The hazard model indicates that the presence of prepayment penalties and prepayment prohibitions reduces the odds of ending the default spell. Interestingly, the positive and significant coefficient on netspread indicates that as the contract interest rate increases, the time spent in default lengthens. As a result, it appears that loans with higher interest spreads (perhaps more profitable) are likely to remain in default versus terminating quickly.

Focusing on the variable of interest, sameservicer, we find a negative and significant coefficient indicating that when the master and special servicing rights are held by the same firm, the hazard of exiting the default situation is lower. To put the estimated coefficient into economic terms, the marginal effect of having the servicing rights concentrated in the same firm reduces the odds of ending the default spell by 15 percent.[10] At first, this result appears directly counter to the univariate results reported in Table 5. However, the univariate tests do not control for other factors such as whether the special servicer holds the first-loss position. Turning to the first-loss position, we find a positive and significant coefficient indicating that when the special servicer holds the first-loss position, the time-in-default is significantly shorter. The marginal effect

[10] The marginal effect is defined as exp(β)-1. Thus, the marginal effect of sameservicer is 15 percent (exp(-0.1625)-1).

indicates that the time-in-default is highly dependent upon whether the special servicer holds the first-loss position. We see that the odds of exiting the default spell are twice as high when the special servicer holds the first-loss position compared to loans where the special servicer does not hold the first-loss position in the CMBS deal. Finally, turning to the herfindahl property-type concentration index, we find a negative and significant effect indicating that the time-in-default is longer for loans in pools that are more highly concentrated in one property type.

Together, the results from Tables 6 and 7 provide an interesting picture into the relationship between servicing rights and default outcomes. First, when servicing rights are concentrated, the probability of ending a default with foreclosure is significantly reduced – suggesting that servicing firms may seek to retain servicing fee income through loan modifications rather than terminating non-performing loans through foreclosure. Second, although the time-in-default is longer for loans when the servicing rights are concentrated, the overriding factor is whether the special servicer also holds the first-loss position in the CMBS deal. In cases where the special servicer does hold the first-loss position, loans are twice as likely to terminate the default spell on average as loans where the special servicer does not have an economic interest in the default resolution. Thus, it appears that special servicers that are faced with potential losses associated with default are significantly more likely to terminate the troubled loan than allow it to remain in default. In other words, the special servicers appear to be acting to quickly limit losses associated with default. This result is in line with that of Gan and Mayer (2006) who find that special servicers are more likely to foreclose and liquidate a loan when they own the B-piece.

In section 2, we also outlined the theoretical arguments underlying hypothesis 3, which states that we should observe a higher probability of default for loans where the master and special servicing rights are held by the same firm. Thus, in order to test this hypothesis, we estimate a competing risks hazard model for mortgage termination. Following Ambrose and Sanders (2003), our model specifies the joint distribution of two variables: the time to termination, *t*, assumed to be a continuous variable, and the method of termination, *r*, which is an integer variable taking values in the set {1,2,3,4} representing default, prepayment, maturation, or censored (still active). Furthermore, we assume a latent duration, $T_j$, ($j$=1,2,3,4) that is the time required for mortgage to terminate via *j* method. Thus, the observed duration, *t*, is the minimum of the $T_j$. The benefit of this model is that it incorporates a time dimension to the model and allows for the introduction of time-varying coefficients. As discussed in Ambrose and Sanders (2003), the conditional probability of an outcome is

$$\Pr(r \mid t, x; \theta) = \frac{h_r(t \mid x_r; \theta)}{\sum_{j=1}^{4} h_j(t \mid x; \theta)}. \qquad (1.)$$

where $x_j$ is a set of explanatory variables, $\theta_j$ are the estimated parameters, and $h_j$ is the hazard function.

The matrix $x_j$ includes a set of time-varying financial and economic characteristics as well as the static variables identified in the base model of default outcome (Table 6). We include the cumulative return to the property type from date of origination to termination (prepay, default or maturity) or end of period. As a proxy for the underlying property return, we use the CRSP/Zinman REIT property level monthly indices. We

capture overall changes in property values by creating two dummy variables to denote whether the corresponding property level index return from loan origination to month t is greater than 25 percent (large_pos_pr(t)) or less than -25 percent (large_neg_pr(t)). We then interact large_pos_pr(t) and large_neg_pr(t) with sameservicer to capture possible incentives for the servicers to selectively acquire the servicing rights *ex ante* on for properties that experienced significant property value changes. To capture the dynamics of the mortgage prepayment option value, we also include a measure of the current yield curve (defined as the 10-year Treasury bond rate minus the 1-year Treasury bond rate) as a proxy for market expectations of future interest rates. As with Ambrose and Sanders (2003), we include a measure of the interest rate volatility, *GS10_VOL*, defined as the standard deviation of the 10-year Treasury rate measured over the previous 24 months. We also incorporate general changes in the default risk premium by including the spread between AAA and Baa rated corporate bonds (*SPREAD*) and the volatility of the spread (*SPD_VOL*).[11]

In terms of underwriting conditions at loan origination, we include a set of dummy variables controlling for the loan-to-value ratio at loan origination.[12] We also include the loan contract interest rate spread at origination, defined as the net coupon less the 10-year constant maturity treasury rate. Finally, we also include dummy variables to control for property type (hotel, office, multifamily, or retail with other being the holdout) and mortgage age ($t$, $t^2$, and $t^3$) to capture the impact of mortgage seasoning on

[11] As with interest rate volatility, the credit spread volatility is measured as the standard deviation of the credit spread over the previous 24 months.

[12] For a theoretical discussion and detailed empirical analysis of loan-to-value ratio at origination and default probability, see Harrison, Noordewier and Yavas (2004). Archer, Elmer, Harrison and Ling (2002) offers empirical analysis of LTV and default for securitized multifamily mortgages.

the baseline hazard. We include the square and cubic function of mortgage age to capture any non-linearities associated with mortgage seasoning.

Table 8 shows the results from the maximum likelihood estimation of the competing risk model of mortgage termination. Turning first to the variables reflecting the loan underwriting characteristics, we see that the loan-to-value ratio has a positive impact on default and a negative impact on prepayment confirming that loans with higher LTVs at origination are more likely to default. As expected, the presence of prepayment penalties has a significant negative impact on the probability of prepayment and prepayment lock-outs appear to increase the probability of default. In addition, we see that loans having a higher interest rate spread at origination are more likely to default as well as prepay.

Turning to factors associated with the economic environment, we find loans are more likely to default and prepay during periods with upward sloping yield curves. Furthermore, during periods when the market credit risk premium (AAA_BAA_Spread) increases, the probability of prepayment is higher. Interestingly, during periods with higher interest rate volatility, we see that the probability of prepayment is higher but the probability of default is lower.

Focusing on the variable of interest, sameservicer, we see that the estimated parameter is significantly positive for the default and maturity outcomes. Thus, the positive coefficients indicate that the odds of a loan going into default are higher when the servicing functions are concentrated. For example, the odds ratio indicates that the probability of defaulting is 8.5 percent higher if the master and special servicer functions

are held by the same firm.[13] Thus, the results from our model confirm the predictions of hypothesis 3 – the default probability is higher when master and special servicing rights are held by the same firm. Interestingly, the interaction terms of samerservicer and large property price movements (large_neg_prop and large_pos_prop) are positive and significant in the prepayment outcome. This suggests that the odds of prepayment are significantly higher when property values have experienced a significant price movement.

What is interesting is that the results suggest that servicers do appear to have differential risk preferences for loans based on whether they control the master and special servicing rights. That is, when firms control both master and special servicing rights, the mortgages in the underlying pool have higher odds of prepayment and default. In contrast, loans in pools where the servicing rights are not concentrated have lower probability of early termination through prepayment or default.

With respect to the special servicer holding the first-loss position, we find that the estimated coefficient on first loss is highly significant (positive) in the prepayment equation (p-value of 1 percent). Thus, it appears that special servicers who also control the b-piece in the CMBS deal are more likely to bid on pools of riskier loans.[14] However, we do not find evidence that property concentration in the CMBS deal (herfindahl) has an impact on the odds of prepayment or default.

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[13] $e^{(.0820)}-1 = 0.085$ and $e^{(.2147)}-1 = 0.2.9.$

[14] This result supports the result reported in Gan and Mayer (2006) that the special servicer is more likely to hold the B-piece in deals with a higher expected delinquency rate. The explanation, according to Gan and Mayer (2007), is that assigning the B-piece to the special servicer is more valuable for riskier loans because these loans require greater effort level by the servicers. This suggests that CMBS underwriters have good priors about the default risk of loans at the time of preparing the contract with the special servicer and assign the B-piece to the special servicer in loans with higher expected default rate.

## 5. Conclusions

The market for commercial mortgage backed securities has grown rapidly in recent years and has become the second largest source of financing for commercial real estate. Recent turmoil in mortgage markets has made it more immanent to understand any source of inefficiencies and agency conflicts in the industry. In this paper, we examine the servicing part of the CMBS industry and highlight the conflicting incentives of the master and special servicers in handling troubled loans. In particular, we investigate how the frictions between the interests of the two servicers might be diminished if the master and special servicing rights are held by the same firm.

We show that concentrating both servicing rights in one firm reduces the likelihood that a defaulted loan terminates in foreclosure. It also leads longer time in default for underperforming loans. Furthermore, consistent with master servicers being able to bid more aggressively for a risky pool of loans when the servicing rights are concentrated, we find higher default rates for loans whose master and special servicing rights are held by the same firm.

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Figure 1: Representation of a Securitization Transaction

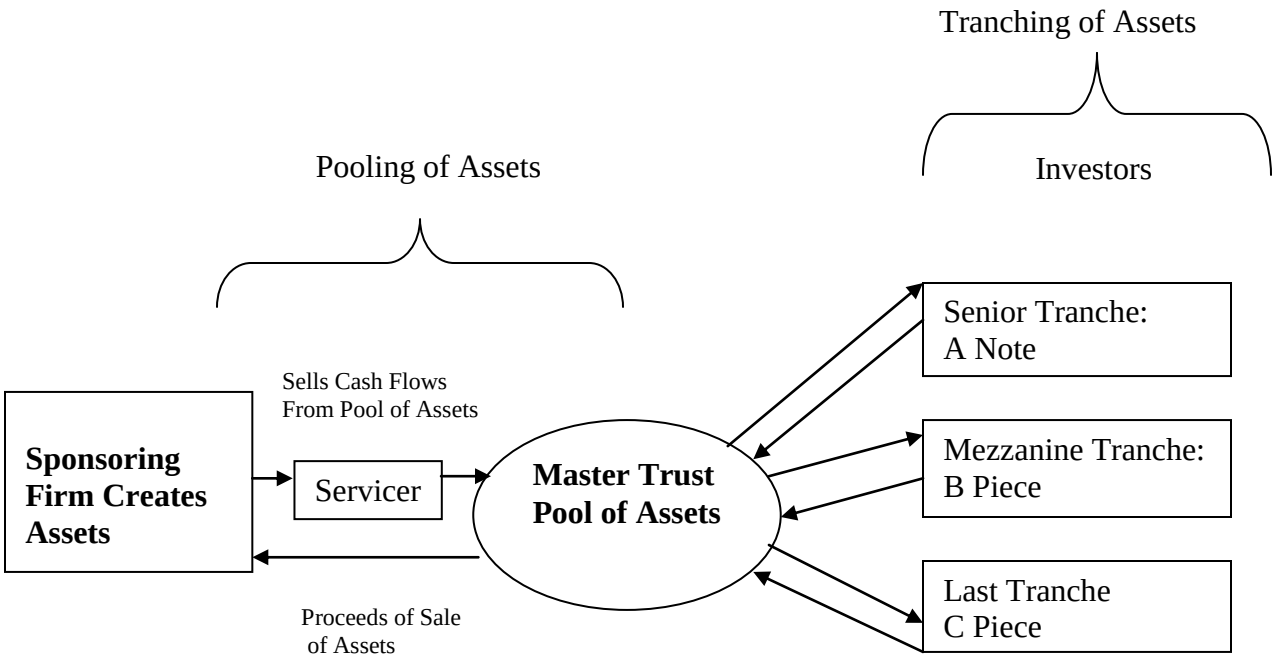

**Table 1: Descriptive Statistics of Securitized Commercial Real Estate Loans**

| | All | | Different Servicers | | Same Servicers | |
|---|---|---|---|---|---|---|
| Number | 46,082 | | 27,275 | | 18,807 | |
| | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| OrigLtv | 67.993 | 12.552 | 68.162 | 12.534 | 67.748 | 12.574 |
| GrossCpn | 8.040 | 1.050 | 8.018 | 1.075 | 8.073 | 1.012 |
| gross_spread | 2.370 | 0.793 | 2.367 | 0.811 | 2.372 | 0.766 |
| NetCpn | 7.917 | 1.006 | 7.913 | 1.036 | 7.922 | 0.961 |
| net_spread | 2.246 | 0.767 | 2.262 | 0.785 | 2.222 | 0.738 |
| LockOutMos | 53.248 | 50.302 | 60.353 | 50.292 | 42.943 | 48.502 |
| YldMaintMos | 26.391 | 43.920 | 25.111 | 41.569 | 28.247 | 47.060 |
| PpayPtsMos | 4.440 | 18.373 | 4.312 | 17.950 | 4.625 | 18.968 |
| Office | 0.143 | 0.351 | 0.141 | 0.348 | 0.147 | 0.354 |
| Hotel | 0.053 | 0.224 | 0.058 | 0.233 | 0.046 | 0.209 |
| Industrial | 0.094 | 0.291 | 0.086 | 0.280 | 0.105 | 0.306 |
| Retail | 0.254 | 0.436 | 0.262 | 0.440 | 0.243 | 0.429 |
| Multifam | 0.325 | 0.469 | 0.323 | 0.468 | 0.329 | 0.470 |

Notes: This table reports the descriptive statistics for the sample of commercial real estate loans contained in the INTEX database. The column labeled ``Different Servicers'' refers to loans where the master and special servicer are not the same firm. The column labeled ``Same Servicer'' refers to loans where the master and special servicer are the same entity. OrigLtv is the loan-to-value ratio at loan origination, netspread is the loan's coupon rate less the 10-year treasury rate at the date of origination, LockOutMos is the number of prepayment lockout months, YldMaintMos is the number of months a yield maintenance penalty is in effect. Office, Hotel, Industrial, Retail, and Multifam are dummy variables indicating whether the collateral underlying the loan is an office, hotel, industrial, retail or multifamily property.

**Table 2: Distribution of Loans by Year of Origination**

| Origination Year | Different Servicers | Same Servicers | Total |
|---|---|---|---|
| 1992 | 154 | 103 | 257 |
| 1993 | 370 | 237 | 607 |
| 1994 | 529 | 320 | 849 |
| 1995 | 1,376 | 648 | 2,024 |
| 1996 | 1,815 | 2,511 | 4,326 |
| 1997 | 4,416 | 2,449 | 6,865 |
| 1998 | 6,535 | 6,496 | 13,031 |
| 1999 | 3,401 | 1,908 | 5,309 |
| 2000 | 3,411 | 1,567 | 4,978 |
| 2001 | 3,195 | 2,071 | 5,266 |
| 2002 | 1,728 | 495 | 2,223 |
| 2003 | 990 | 269 | 1,259 |
| Total | 27,920 | 19,074 | 46,994 |

**Table 3: Analysis of Servicing Firms**

Panel A:Master Servicer also Serves as Special Servicer

| | No | Yes | Total |
|---|---|---|---|
| Master and Special Servicer are Different | 1602 | 25673 | 27275 |
| Master and Special Servicer are Same | 0 | 18807 | 18807 |
| Total | 1602 | 44480 | 46082 |

Panel B: Special Servicer also Serves as Master Servicer

| | No | Yes | Total |
|---|---|---|---|
| Master and Special Servicer are Different | 17044 | 10231 | 27275 |
| Master and Special Servicer are Same | 0 | 18807 | 18807 |
| | 17044 | 29038 | 46082 |

Note: This table shows the distribution of loans based on whether the loan servicer performs by master and special servicing functions. Panel A shows the distribution of loans based on whether its Master Servicer also serves as the Special Servicer for any loan in the dataset. Panel B reports the distribution of loans based on whether the Special servicer also serves as the Master servicer for any loan in the dataset.

**Table 4: Probability of Loan Having Same Master and Special Servicer**

| Variable | Coefficient | Std Err | P-Value | Odds Ratio |
|---|---|---|---|---|
| Intercept | -0.6623 | 0.1306 | <0.0001 | |
| OrigLtv | -0.0001 | 0.0008 | 0.9245 | 1.000 |
| netspread | -0.1028 | 0.0138 | <0.0001 | 0.902 |
| LockOutMos | -0.0126 | 0.0003 | < 0.0001 | 0.988 |
| YldMaintMos | -0.0032 | 0.0003 | < 0.0001 | 0.997 |
| Office | 0.0932 | 0.0383 | 0.015 | 1.098 |
| Hotel | -0.0705 | 0.0532 | 0.185 | 0.932 |
| Industrial | 0.1768 | 0.0425 | < 0.0001 | 1.193 |
| Retail | 0.0821 | 0.0345 | 0.0172 | 1.086 |
| Multifam | 0.0192 | 0.0333 | 0.5648 | 1.019 |
| orig1992 | 0.8071 | 0.1727 | < 0.0001 | 2.241 |
| orig1993 | 0.8409 | 0.1422 | < 0.0001 | 2.318 |
| orig1994 | 0.6776 | 0.1334 | < 0.0001 | 1.969 |
| orig1995 | 0.5749 | 0.1226 | < 0.0001 | 1.777 |
| orig1996 | 1.7207 | 0.1169 | < 0.0001 | 5.589 |
| orig1997 | 0.9272 | 0.1153 | < 0.0001 | 2.527 |
| orig1998 | 1.8579 | 0.1141 | < 0.0001 | 6.411 |
| orig1999 | 1.3905 | 0.1166 | < 0.0001 | 4.017 |
| orig2000 | 0.5417 | 0.116 | < 0.0001 | 1.719 |
| orig2001 | 0.7993 | 0.1155 | < 0.0001 | 2.224 |
| orig2002 | -0.0634 | 0.1232 | 0.6066 | 0.939 |
| -2*Log Likelihood | 57835.798 | | | |
| Likelihood Ratio Statistic | 4482.4666 | | <0.0001 | |

Note: This table reports the maximum-likelihood parameter estimates for the logit model of whether the loan master and special servicer are the same firm. The dependent variable is a dummy variable equal to 1 if the master and special servicer are the same firm and 0 otherwise. OrigLtv is the loan-to-value ratio at loan origination, netspread is the loan's coupon rate less the 10-year treasury rate at the date of origination, LockOutMos is the number of prepayment lockout months, YldMaintMos is the number of months a yield maintenance penalty is in effect. Office, Hotel, Industrial, Retail, and Multifam are dummy variables indicating whether the collateral underlying the loan is an office, hotel, industrial, retail or multifamily property. The reference category is other. Finally, origXXXX are a set a dummy variables indicating the loan's year of origination. The reference year is 2003.

**Table 5: T-test for differences in Mean Time to Default Outcome**

| | | | Default Outcome | | | | | |
|---|---|---|---|---|---|---|---|---|
| Servicer Status | All Loans | | Foreclosed | | Modified /Paid-Off | | Censored | |
| | N | Mean | N | Mean | N | Mean | N | Mean |
| Same | 583 | 13.525 | 180 | 11.894 | 122 | 12.426 | 281 | 15.046 |
| Different | 1106 | 17.142 | 438 | 13.696 | 224 | 18.482 | 444 | 19.865 |
| t-stat | | 4.71 | | 1.87 | | 3.47 | | 3.62 |
| p-value | | 0.0001 | | 0.0615 | | 0.0006 | | 0.0003 |

**Table 6: Probit Model of Default Outcome**

| Variable | Parameter Estimate | Standard Error | Chi-Square | p-value |
|---|---|---|---|---|
| Intercept | 21.2843 | 28423.2000 | 0.00 | 0.9994 |
| logdur | 0.0511 | 0.0775 | 0.43 | 0.5100 |
| sameservicer | -0.3746 | 0.1704 | 4.83 | 0.0279 |
| first_loss | 0.0337 | 0.3450 | 0.01 | 0.9222 |
| herfindahl | -0.1063 | 0.5518 | 0.04 | 0.8473 |
| OrigLtv | 0.0054 | 0.0064 | 0.71 | 0.3999 |
| net_spread | -0.0424 | 0.0733 | 0.34 | 0.5307 |
| LockOutMos | 0.0086 | 0.0018 | 23.32 | <.0001 |
| YldMaintMos | 0.0103 | 0.0021 | 23.09 | <.0001 |
| Property Type Fixed Effects | | | | |
| Origination Year Fixed Effects | | | | |
| Log-Likelihood | -563.12 | | | |

Note: This table reports the maximum-likelihood parameter estimates for the probit model of loan default outcome. The dependent variable equals 1 if the loan ended in foreclosure and equals 0 if the default ended in either a loan modification or prepayment. OrigLtv is the loan-to-value ratio at loan origination, netspread is the loan's coupon rate less the 10-year treasury rate at the date of origination, LockOutMos is the number of prepayment lockout months, YldMaintMos is the number of months a yield maintenance penalty is in effect. Sameservicer is a dummy variable indicating that the master and special servicing rights are held by the same firm. First_loss is a dummy variable indicating that the special servicer holds the first-loss piece in the CMBS deal. Herfindahl is the herfindahl index for property type concentration in the CMBS deal.

**Table 7: Proportional Hazard Analysis of Time-in-Default**

| Variable | Parameter Estimate | Standard Error | Chi-Square | p-value | Hazard Ratio |
|---|---|---|---|---|---|
| sameservicer | -0.1625 | 0.0783 | 4.30 | 0.03 | 0.85 |
| first_loss | 0.7176 | 0.1583 | 20.54 | <.0001 | 2.05 |
| herfindahl | -0.6608 | 0.2687 | 6.05 | 0.01 | 0.52 |
| OrigLtv | -0.0011 | 0.0030 | 0.12 | 0.72 | 1.00 |
| net_spread | 0.1079 | 0.0363 | 8.86 | 0.00 | 1.11 |
| LockOutMos | -0.0007 | 0.0008 | 0.87 | 0.35 | 1.00 |
| YldMaintMos | -0.0033 | 0.0009 | 12.93 | 0.00 | 1.00 |
| Property type Fixed Effects | | | | | |
| Origination Year Fixed Effects | | | | | |
| Likelihood Ratio Statistic | | | 54.3199 | <.0001 | |

**Table 8: Competing Risk Analysis of the Time to Default, Prepayment or Loan Maturity**

| | Default | | Prepay | | Maturity | |
|---|---|---|---|---|---|---|
| | Parameter | Chi-Sq | Parameter | Chi-Sq | Parameter | Chi-Sq |
| Intercept | -8.10660 | 73.43*** | -432.30000 | 3745.06*** | -7.85800 | 106.47*** |
| Month (t) | 0.12910 | 212.61*** | -0.14270 | 43.80*** | 0.03520 | 18.24*** |
| Month ($t^2$) | -0.00205 | 126.95*** | 0.00251 | 53.30*** | -0.00015 | 0.87 |
| Month ($t^3$) | 0.00001 | 83.31*** | -0.00001 | 27.25*** | 0.00000 | 0.13 |
| sameservicer | 0.09550 | 5.24** | 0.09500 | 1.60 | 0.52850 | 11.59*** |
| first_loss | 0.07830 | 2.13 | 0.12710 | 8.14*** | 0.04200 | 0.36 |
| herfindahl | -0.18920 | 1.14 | -0.05340 | 0.21 | -1.62190 | 111.28*** |
| OrigLtv | 0.01140 | 36.03*** | -0.01210 | 70.76*** | -0.00191 | 1.22 |
| net_spread | 0.41980 | 307.84*** | 0.39610 | 347.95*** | 0.12730 | 26.49*** |
| LockOutMos | 0.00146 | 8.91*** | -0.03500 | 2096.67*** | -0.03490 | 487.05*** |
| YldMaintMos | -0.00003 | 0.00 | -0.01810 | 1343.85*** | -0.02720 | 537.60*** |
| log_yld_curve | 0.21840 | 14.41*** | 0.76540 | 7.42*** | 0.25150 | 12.04*** |
| AAA_BAA_Spread | 0.14740 | 0.67 | 91.78140 | 2974.40*** | -0.69920 | 9.60*** |
| Spread_Vol | -1.60210 | 7.87*** | 572.10000 | 3339.29*** | -0.46990 | 0.50 |
| GS10_vol | -0.82440 | 7.78*** | 377.70000 | 3747.76*** | -0.57920 | 3.68** |
| Samerservicer*large_neg_prop | -0.01900 | 0.20 | 0.21170 | 7.14*** | -0.20030 | 1.64 |
| Samerservicer*large_pos_prop | -0.04950 | 3.65 | 0.11710 | 14.52*** | -0.09050 | 7.79*** |
| Office | 0.12100 | 5.37** | -0.03020 | 0.7 | 0.30470 | 39.33*** |
| Hotel | -0.69570 | 261.05*** | -0.04050 | 0.53 | 0.29650 | 9.81*** |
| Industrial | 0.11600 | 4.08** | 0.10500 | 7.14*** | 0.43040 | 66.47*** |
| Retail | -0.07720 | 3.52* | 0.07050 | 4.46** | 0.27020 | 34.96*** |
| Multifam | 0.06620 | 2.62 | -0.40210 | 188.20*** | 0.15100 | 16.84*** |
| Yearly Fixed Effects | | | | | | |
| Likelihood Ratio | 69124.55*** | | | | | |

Note: This table reports the maximum-likelihood estimates of the Competing Risks Hazard Model of the time from loan origination to default, prepayment, or loan maturity. Month represents the loan age in months and specified as a third order polynomial to allow for nonparametric variation in the hazards. Sameservicer is a dummy variable indicating that the master and special servicing functions are held by the same firms (and 0 otherwise). First_loss is a dummy variable indicating that the special servicer also holds the first-loss position (or B-piece) in the CMBS deal. Herfindahl is the herfindahl index measuring the property type diversification in the CMBS deal. Net_spread is the loan's coupon rate less the 10-year treasury rate at the date of origination. LockOutMos is the number of prepayment lockout months, YldMaintMos is the number of months a yield maintenance penalty is in effect. Log_Yld_curve(t) is the log of the slope of the Treasury yield curve at month t (10-year constant maturity Treasury yield less the 1-year constant maturity Treasury yield). AAA_BAA_spread is the credit spread. Spread_vol is the volatility in the credit spread and GS10_vol is the volatility in the 10-year Constant Maturity Treasury Bond yield. Large_neg_pr(t) is a dummy variable taking the value of 1 if the corresponding cumulative property index return from loan origination to month t is less than -0.5 and 0 otherwise. Large_pos_pr(t) is a dummy variable taking the value of 1 if the corresponding cumulative property index return from loan origination to month t is greater than 0.5 and 0 otherwise. The corresponding property index return is the return on the appropriate CRSP/Zinman REIT property type index. OrigLtv is the loan-to-value ratio at loan origination Office, Hotel, Industrial, Retail, and Multifam are dummy variables indicating whether the collateral underlying the loan is an office, hotel, industrial, retail or multifamily property. The reference category is other. Yearly fixed effects are included.

**Appendix A: Master Servicing Firms**

ALLIED CAPITAL CORPORATION
AMRESCO SERVICES
BANC ONE MORTGAGE CAPITAL MARKETS
BANK OF AMERICA
BANK UNITED OF TEXAS FSB
BANKERS TRUST COMPANY
BNY ASSET SOLUTIONS
CAPMARK SERVICES
CAPSTONE REALTY ADVISORS
CONNING ASSET MANAGEMENT COMPANY
CRIIMI MAE SERVICES
DYNEX COMMERCIAL
FIRST UNION NATIONAL BANK
GE CAPITAL LOAN SERVICES
GEMSA LOAN SERVICES
GESPA CDPQ
GMAC COMMERCIAL MORTGAGE CORP
HELLER FINANCIAL
HUDSON ADVISORS (ORIGINALLY BRAZOS ADVISORS)
KEY COMMERCIAL MORTGAGE
KEYCORP REAL ESTATE CAPITAL MARKETS
LUTHERAN BROTHERHOOD
MIDLAND LOAN SERVICES (ORIGINALLY BOATMENS NATIONAL MORTGAGE)
ORIX CAPITAL MARKETS
PACIFIC LIFE INSURANCE COMPANY
PMLS
PROTECTIVE LIFE INSURANCE COMPANY
PRUDENTIAL ASSET RESOURCES / WELLS FARGO BANK
SOUTHTRUST CAPITAL FUNDING
STARWOOD ASSET SERVICES
SUN LIFE ASSURANCE
WACHOVIA BANK
WASHINGTON MUTUAL BANK
WELLS FARGO BANK

**Appendix B: Special Servicing Firms**

AETNA LIFE INSURANCE
ALLIED CAPITAL CORPORATION
AMRESCO MANAGEMENT
ARCAP SPECIAL SERVICING
ARCHON GROUP
BANC ONE MORTGAGE CAPITAL MARKETS
BANK OF AMERICA
BEI MANAGEMENT
BNY ASSET SOLUTIONS
CAPMARK SERVICES
CIGNA INVESTMENTS
CLARION PARTNERS
CONNING ASSET MANAGEMENT COMPANY
CRICO MORTGAGE COMPANY
CRIIMI MAE
DYNEX COMMERCIAL
FIRST UNION NATIONAL BANK
FLEET REAL ESTATE CAPITAL
GE CAPITAL REALTY GROUP
GESPA CDPQ
GMAC COMMERCIAL MORTGAGE CORPORATION
HANFORD/HEALY ASSET MANAGEMENT COMPANY
HATFIELD PHILIPS
HUDSON ADVISORS CANADA INC.
JE ROBERT COMPANY
KEY COMMERCIAL MORTGAGE
KEYCORP REAL ESTATE CAPITAL MARKETS
LAURENTIAN BANK OF CANADA
LEND LEASE ASSET MANAGEMENT
LENNAR PARTNERS
LTC PROPERTIES
LUTHERAN BROTHERHOOD
MIDLAND LOAN SERVICES
NATIONAL HEALTH INVESTORS
OCWEN FEDERAL BANK / JE ROBERT COMPANY
ORIX REAL ESTATE CAPITAL MARKETS
PACIFIC LIFE INSURANCE COMPANY
PPM FINANCE
PRINCIPAL CAPITAL MANAGEMENT
PROTECTIVE LIFE INSURANCE COMPANY
PRUDENTIAL ASSET RESOURCES / ARCAP SPECIAL SERVICING
SL GREEN FUNDING LLC
SOUTHTRUST CAPITAL FUNDING
SUN LIFE ASSURANCE
WACHOVIA BANK
WASHINGTON MUTUAL BANK
WELLS FARGO BANK