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Measuring Loss-Given-Default for Structured Finance Securities: An Update

Summary

This *Special Comment* updates Moody's methodologies on measuring loss-given-default (LGD) for defaulted structured finance securities and describes the various methods used to estimate the final LGD for securities that still have not reached a final resolution.

The highlights of this study include:

- LGD for resolved defaults (those that have zero outstanding balance at the end of the study period) continued to be higher than the expected LGD's for unresolved defaults (those with positive balances outstanding at the end of the study period).
- In general, principal write-downs are a much larger source of losses than missed interest payments for defaulted structured finance securities. However, missed interest payments tend to be more important for unresolved defaults as many are experiencing interest shortfalls only.
- Estimated final LGD for defaulted structured finance securities average 50.9% as a percentage of the tranche's original balance and 71.8% as a percentage of the default date balance. LGD also vary by sector, with those of US RMBS, HEL and CMBS being lower than those of US ABS or global CDOs.
- Factors that contributed to the variation among the sectors include differences in amortization rates and typical deal structures and the timing of the credit cycle for each sector during the study period.
- LGD is a decreasing function of tranche size and time to default, and is lower on securities rated investment-grade at origination than on those rated speculative-grade.

Figure 1 – Estimated Final LGD (% original balance) for Defaulted Structured Finance Securities by Sector, 1993-2006 H1

	All Ratings		Investment-Grade at Origination		Speculative-Grade at Origination	
	Count	Mean	Count	Mean	Count	Mean
All SF	734	50.9%	475	47.1%	259	57.9%
US ABS excl HEL	254	61.4%	193	57.7%	61	73.1%
US CMBS	26	48.9%	8	20.0%	18	61.8%
US RMBS/HEL	263	32.5%	154	26.2%	109	41.5%
Global CDOs	191	62.4%	120	58.5%	71	69.0%



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Introduction

Moody's structured finance ratings address the expected loss of the security, which can be expressed as the product of the probability of default of the security and the loss given default (LGD). Both components are critical to analyzing the credit risk of a structured finance security. Moody's first presented a formal definition of LGD for defaulted structured finance securities in a Special Comment published in April 2004¹ and combined LGD data with default rates to produce structured finance loss rates in a September 2004 Special Comment.² Structured finance default, loss severity, and cumulative loss rates are now updated regularly in our annual structured finance default and loss study.³

This Special Comment is an update on how Moody's measures LGD for defaulted structured finance securities. Final loss severity rates are only known for securities with zero outstanding balances, signifying that losses and payments to the tranche have been completely resolved.⁴ We call such tranches resolved defaulted tranches. For unresolved defaulted tranches, which still have some principal outstanding, loss severity to date is known, but the final LGD is unknown because it is still possible for the security to experience more losses and/or receive future payments. In the corporate sector, the bid price of the security 30 days post-default is used to calculate the LGD, but for structured securities, this information is generally not available.

While it is instructive to examine final LGD rates for the universe of resolved defaults, it is unwise to assume that average severity rates calculated from the resolved defaults are representative of the entire sample. The very fact that a defaulted security has or has not yet been resolved imparts some information about the speed and severity of losses to the tranche and, in fact, we find that the average LGD of resolved defaults overestimate the expected loss severity rates of the unresolved defaults.

Therefore, it is essential to develop reasonable methods of projecting final LGD for unresolved defaulted securities. We have used different estimation methods in different sectors, reflecting both differences in data availability by sector and changes in our thinking over time. We present here for the first time, a new methodology for defaulted MH ABS that we think is promising and may be applicable to other sectors as well, going forward.

The remainder of the paper is organized as follows. First, we discuss the loss data to date for both resolved and unresolved defaults. Second, we give a general overview of the methods used to project final LGD for unresolved defaults. Further details of the specific methods can be found in the Appendices. Finally, we analyze estimated final loss severity rates for the entire sample of defaults overall and broken down by sector.

Realized Loss Severity to Date for Defaulted SF Securities

Definition of LGD

Moody's defines loss given default as the sum of the discounted present values of the periodic interest shortfalls and principal losses experienced by a defaulted tranche. The coupon rate of the tranche is used as the discount rate. The formula for LGD is given in Figure 2.

Figure 2 – Formula for LGD

$$LGD_{k,t} = \frac{\sum_{s=k}^t \frac{IS_s + LP_s}{(1 + c_s)^{s-k+1}}}{B_k}$$

where $LGD_{k,t}$ denotes the loss severity rate up to time t using time k as the reference date, IS_s and LP_s denote the net interest shortfall and principal loss at time s , c_s is the discount rate for period s , and B_k is the outstanding principal balance at the reference date k . There are usually three reference dates of interest: the origination date, the default date, and a cohort formation date.

1. See "Measuring Loss Severity Rates of Defaulted Residential Mortgage-Backed Securities: A Methodology," Moody's Special Comment, April 2004.

2. See "Default & Loss Rates of Structured Finance Securities: 1993-2003," Moody's Special Comment, September 2004.

3. The latest study is "Default & Loss Rates of Structured Finance Securities: 1993-2005," Moody's Special Comment, April 2006.

4. In fact payments can be made to the tranche even after the balance reaches zero, but this is uncommon.

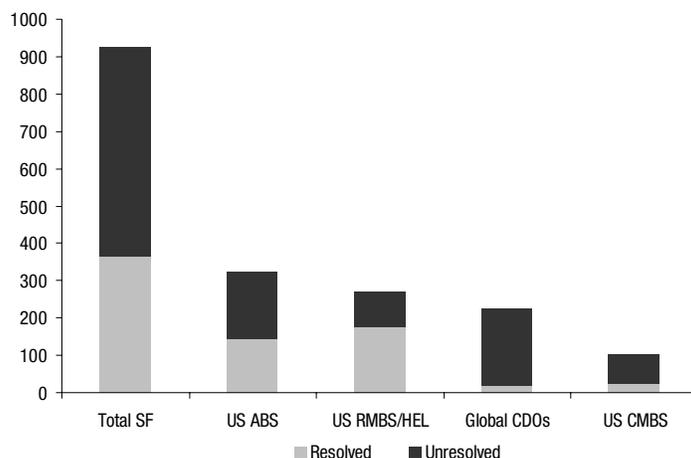
LGD rates presented in this report use either the time of origination or default as the reference date. The difference between the two numbers is due to: (1) dividing by the original balance rather than the default balance, and (2) discounting to the closing date rather than the default date. Both these factors cause the LGD by original balance to be smaller than the LGD by default balance. Which measure is more relevant depends on whether one is more interested in evaluating the loss at issuance or near default.

Overall Data Sample

Moody's has identified 1145 materially impaired tranches in the global structured finance market from 1993 through the first half of 2006.⁵ Of those 1145 impaired securities, 997 have experienced uncured payments defaults, while 148 were classified as impaired solely based on the fact that they were downgraded to Ca or C. Of the 997 uncured payment defaults, we have up to date loss information for 925 of them. The 72 defaulted tranches for which we have incomplete information consist mostly of ABS backed by healthcare receivables, early vintage subprime auto ABS, and securities from synthetic CDOs.

Figure 3 shows the breakdown of the structured finance payments defaults for which we have complete loss data to date by sector and resolution status. Note that US ABS (excluding HEL)⁶ makes up the largest proportion of total payment defaults at 35.0%, followed by US RMBS/HEL (29.2%) and Global CDOs (24.5%). Only 11.2% of the total payment defaults occurred among US CMBS.

Figure 3 – Count of Structured Finance Payment Defaults (with loss data) by Sector



39.5% of all payment defaults have been resolved, but the proportion of resolved versus unresolved tranches is very different across sectors. Almost two-thirds of US RMBS/HEL defaults and close to half of US ABS defaults have been resolved, but only a quarter of US CMBS and less than 8% of global CDOs have been resolved.

Data for Resolved Defaults

Figure 4 summarizes the characteristics and final LGD for the 365 resolved defaults from 217 deals. The average final loss severity was 50.5% as a percentage of original balance and 71.0% as a percentage of the default date balance. The median LGD rates were much higher, particularly for loss as a percentage of default balance, indicating that the LGD distribution is skewed to the left. Most of the final loss was due to principal writedowns rather than interest shortfalls since the average amount of loss from missed interest payments was less than 4% and the median amount was zero.

5. *Pari-passu tranches are collapsed into one observation in the count of material impairments. For a full description of how the sample of material impairments and payment defaults is constructed, see "Default & Loss Rates of Structured Finance Securities: 1993-2005," Moody's Special Comment, April 2006.*

6. *In our default and loss studies and transition studies, HEL is normally considered to be part of the ABS sector. However, in this report, we merge RMBS and HEL into one category and present statistics for ABS excluding HEL.*

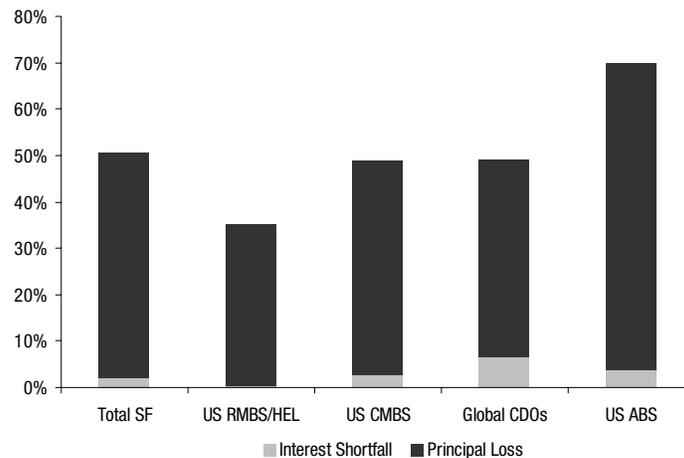
Figure 4 – Characteristics of Resolved SF Defaults			
	Mean	Median	Standard Deviation
Number of Tranches	365	365	
Number of Deals	217	217	
Final LGD (% original bal)	50.5%	62.3%	29.3%
Final LGD (% default bal)	71.0%	92.3%	34.7%
LGD from interest shortfall (% original bal)	2.1%	0.0%	4.5%
LGD from interest shortfall (% default bal)	3.0%	0.0%	6.5%
Nominal principal loss (% original bal)	67.9%	91.2%	38.3%
Balance at time of default (% original bal)	88.9%	98.7%	21.5%
Tranche size (% deal balance at origination)	7.3%	4.2%	14.8%
Time from Origination to Default	44.1	40.0	19.6
Time from Default to Resolution	27.2	19.0	25.3
Rating at Origination	Baa3	Baa3	3.4
Rating at Default	B2	B3	3.8

At the time of default, the outstanding balance for most tranches was close to the original balance as can be seen by the median default balance of 98.7%. This implies that the large difference in LGD by original balance and default balance was due to the effect of discounting rather than a difference in the reference balance.

The average rating at origination for the resolved defaults was Baa3, and the average rating at default was B2. It took on average 44 months for the securities to default and 27 months for the tranches to be completely written down.

Figure 5 shows the final loss severity rates of the resolved defaults by sector and splits LGD into its two components: principal losses and interest shortfalls. Within the resolved sample, LGD for US ABS was much higher than average while that of US RMBS/HEL was much lower than average. For all sectors, interest shortfalls made a much smaller contribution to total losses than principal losses.

Figure 5 – Final LGD (% original balance) for Resolved Defaults by Sector



Data for Unresolved Defaults

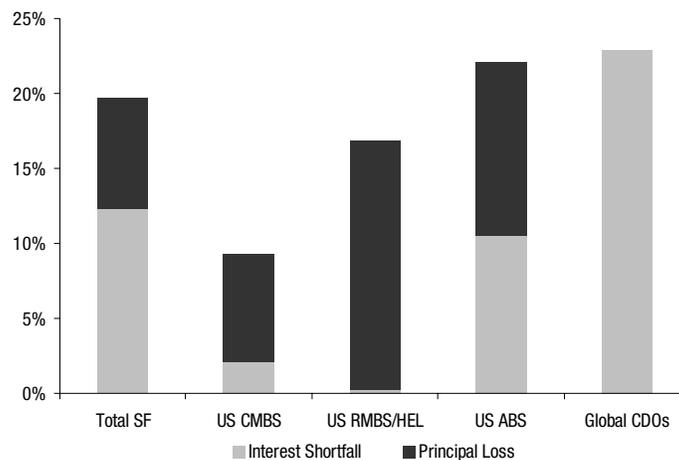
Figure 6 summarizes the characteristics and LGD to date for the 560 unresolved structured finance defaults from 399 deals. Average loss severity to date was 19.7% by original balance and 28.0% by default date balance. In contrast to the resolved defaults, interest shortfalls contributed much more to total losses due to the fact that these tranches are spending a much longer time in default – a median amount of 32 months to date compared to 19 months for resolved defaults - and thus are accruing larger amounts of interest shortfall.

Figure 6 – Characteristics of Unresolved SF Defaults			
	Mean	Median	Standard Deviation
Number of Tranches	560	560	
Number of Deals	399	399	
LGD to date (% original bal)	19.7%	15.0%	17.2%
LGD to date (% default bal)	28.0%	22.0%	22.7%
LGD from interest shortfall (% original bal)	12.2%	5.4%	15.1%
LGD from interest shortfall (% default bal)	16.5%	8.3%	19.6%
Balance at time of default (% original bal)	93.6%	100.0%	17.0%
Remaining balance (% original bal)	89.6%	100.0%	43.0%
Maximum LGD (% original bal)	63.5%	67.7%	18.7%
Maximum LGD (% default bal)	91.9%	98.0%	14.8%
Tranche size (% deal balance at origination)	6.3%	4.0%	10.4%
Time from Origination to Default	51.1	47.0	24.3
Time from Default to date	33.3	32.0	22.4
Rating at Origination	Baa3	Baa2	3.5
Rating at Default	B2	B2	4.4

On average, as of the end of the study period, the tranches still had a sizeable remaining balance of 89.6%, and thus, loss to date would be a gross underestimate of final loss severity. In the worst-case scenario, if all unresolved securities lost their entire principal balance in the next period, the average final LGD would be 63.5% as a percentage of original balance and 91.9% as a percentage of default balance.

As can be seen in Figure 7, loss severity to date and the contribution of interest shortfalls to total losses for the unresolved defaults vary by sector. For global CDOs, all the unresolved defaults consist of PIKing tranches so all losses are attributed to interest shortfalls. On the other extreme, missed interest payments are negligible for defaulted unresolved US RMBS/HEL.

Figure 7 – LGD to date (% original balance) for Unresolved Defaults by Sector



Contrasting Resolved and Unresolved Defaults

One of the simplest ways to report LGD statistics is to use only data for the resolved sample. This implicitly assumes that the unresolved sample will behave similarly to the resolved defaults, i.e. there is no selection bias in examining only the resolved segment of the entire default population. However, there are many reasons to believe that there are differences between defaults that have already been resolved and defaults that have not.

Figure 8 displays some characteristics of defaulted securities from US RMBS/HEL and US MH, two sectors which have significant populations of both resolved and unresolved defaults. Note that the average balance at default is slightly lower for the unresolved defaults relative to the resolved defaults, indicating that the unresolved sample received more principal payments prior to default than the resolved sample. In addition the time from origination to default was much longer for the unresolved sample and ratings at origination were on average a notch higher for unresolved defaults.

Figure 8 –Average Characteristics of Resolved and Unresolved US RMBS/HEL and MH				
	US RMBS/HEL		US MH	
	Resolved	Unresolved	Resolved	Unresolved
Default balance	81.6%	79.4%	98.9%	98.7%
Months to default	45.1	54.4	44.1	68.8
Original rating	Ba1	Baa3	Baa2	Baa1

All these factors indicate that the unresolved defaulted tranches are likely of somewhat better credit quality than the resolved defaults. In particular, the resolved sample consists mostly of the junior tranches of the deal which have the lowest priority claim to principal payments, are the first to default, and are lower-rated. In contrast, the unresolved sample contains more mezzanine and senior tranches that have a higher claim to any payments, often default only after the junior tranches have been completely written down, and have higher ratings at origination. Therefore, it is reasonable to expect that the unresolved defaulted securities will have lower loss severity rates than the resolved securities due to their superior position in the deal waterfall.

Projecting Final Loss Severity for Defaulted SF Securities

A Review of LGD Estimation Methods

We now turn to the topic of estimating final loss severity rates for defaulted securities that have not yet been resolved. A general overview of the methods employed is given here and the details are left to the Appendices.

Moody's first proposal for estimating final loss severity rates focused on defaulted structured finance securities backed by prime and subprime residential mortgages, which was, at the time, the sector with the largest sample of resolved defaults.⁷ The LGD model for RMBS and HEL used only tranche-level information, such as tranche size, time to default, and the speed of loss accumulation to date, to predict future losses for the tranche. The advantage of this method is its simplicity. We need only gather information about the specific tranche to produce an estimate. However, this method requires a sufficiently large sample of resolved defaults to determine how different tranche-level characteristics corresponded to different levels of final loss severity.

In addition, there needs to be a sufficiently large range of characteristics among the resolved sample and sufficiently large variance in their final loss severity rates to be able to distinguish which characteristics are correlated with what levels of final LGD. For example, if the sample of resolved defaults contains only small subordinate tranches that experienced close to 100% severity, then this will probably not be helpful in estimating the LGD of a larger senior tranche.

Moreover, it is difficult, if not impossible, to capture the relationship of the tranches within a deal through a tranche-level model. A desirable feature of any LGD estimation method is that it produces a final LGD estimate of a subordinate tranche that is higher than the LGD estimate of a more senior tranche in the same deal. While it is likely that a tranche-level model would capture this difference through some tranche characteristics, it is not guaranteed since the model does not recognize or incorporate the relationship between the two securities.

7. See "Measuring Loss Severity Rates of Defaulted Residential Mortgage-Backed Securities: A Methodology," Moody's Special Comment, April 2004.

In a subsequent report, Moody's proposed a method to project final LGD rates for defaulted CDO securities.⁸ Rather than focusing on the characteristics of the tranche, the model for CDOs estimated pool losses based on the weighted average rating factor of the portfolio and an assumed recovery rate. These losses were then allocated to the tranches in the deal based on the current deal capital structure.

An LGD estimation method that first models the losses of the underlying assets and then propagates those losses through the deal waterfall resolves many of the issues that arise in the tranche-level model. Because this method focuses on the pools rather than the tranches, it requires only a sufficiently large data set of pool performance, which is much more likely to be available than a large sample of resolved defaulted securities. This approach also explicitly takes into account the deal waterfall when assigning losses, so final LGD estimates for tranches in the same deal should be consistent. Another advantage of this method is that it is a familiar exercise for most structured finance analysts because it is the usual process used for evaluating the risk of a new transaction at issuance.

The main drawback of this approach is that it can be complex to implement. First, it requires much more information than a tranche-level model, including performance data for multiple pool variables, information on all the tranches in the deal, and some knowledge of the deal waterfall structure. Second, there are many more steps involved before an estimate of the final LGD of the tranche can be obtained, such as modeling and forecasting multiple pool variables, setting up the deal structure, and assigning the correct amount of payment and losses to each security in the deal.

However, our goal is to create a general methodology to estimate the final loss severity rate of defaulted securities that can be refined for specific asset types. With this in mind, when we set about constructing a LGD estimation method for defaulted ABS backed by manufactured housing loans (by far, the largest contributor of defaults among US ABS), we concentrated on forecasting the losses for the underlying pools. The highlights of the model are that it forecasts both the pool principal payment rate and net loss rate rather than focusing on cumulative loss alone, and provides a period by period estimate of pool losses, interest, and principal.⁹ The interest and principal payments and pool losses are then assigned to the tranches per period to calculate final loss severity for the tranche. We believe that the general approach and some of the techniques used to estimate LGD for MH ABS can be generally applied and we plan to re-estimate a model for predicting final loss severity for RMBS/HEL using a similar framework.

In the following section we examine the results from applying the various estimation methods to the sample of unresolved defaults.

Estimated LGD for Unresolved Defaults

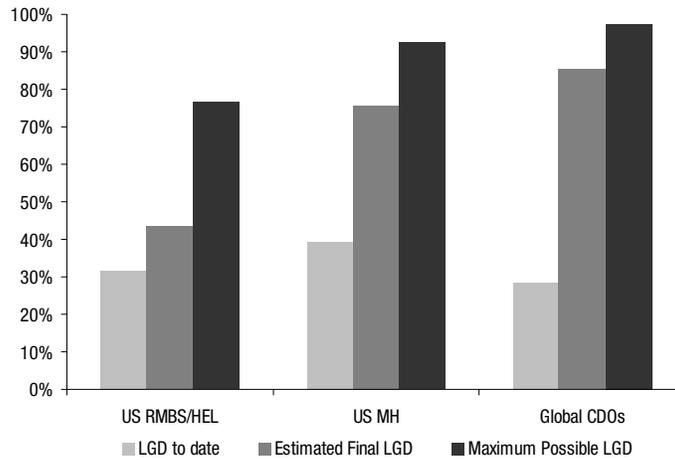
Figure 9 exhibits the average estimated final LGD derived for unresolved defaulted securities within the US RMBS/HEL, US MH, and global CDO sectors and contrasts these values with the average LGD to date and maximum loss possible for each sector. The LGD to date and maximum possible LGD serve as the lower and upper bound of the estimate and any LGD estimation method is essentially choosing a value for the tranche between these two bounds.¹⁰ Note that the estimated final loss severity rate for US MH and global CDOs is much closer to the maximum severity than the loss to date, while the opposite is true for US RMBS/HEL.

8. See "Default & Loss Rates of U.S. CDOs: 1993-2003," Moody's Special Comment, March 2005.

9. See Appendix III for a detailed description of the model.

10. This is not entirely accurate since losses can be repaid and thus, final loss severity can be less than loss severity to date, but usually this is not the case.

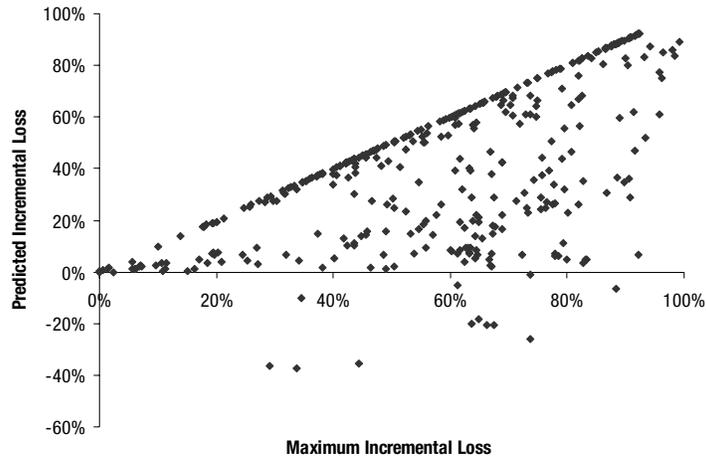
**Figure 9 –LGD (% default balance)
for Unresolved SF Defaults**



Note: Excludes securities that are projected to be cured.

Given the above graph, it is reasonable to ask whether it is worth the trouble to produce a refined estimate of the final LGD using sophisticated models or whether a simple rule of thumb such as estimating final LGD as 80% of the maximum is sufficient. In fact, there is a large amount of variance in the estimates that a simple rule would not capture. Figure 10 plots the incremental loss that the tranche is projected to incur against the maximum incremental loss that the tranche can experience, both as a percentage of the default date balance.

Figure 10 – Maximum Incremental Loss versus Projected Incremental Loss for Unresolved SF Defaults

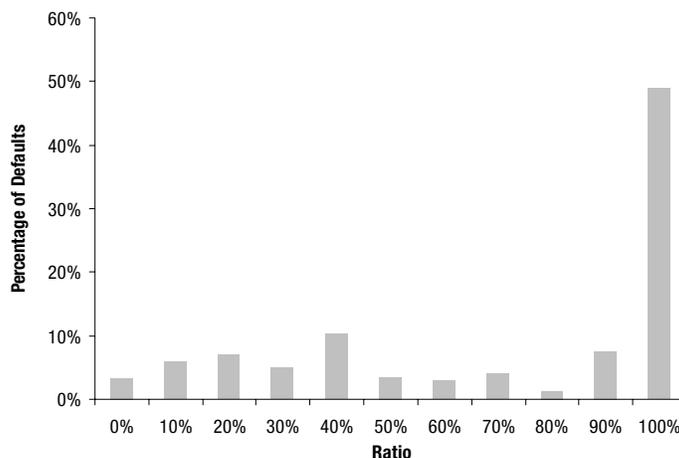


Note: Excludes securities that are projected to be cured.

There are two groupings of data points in Figure 10: there is a very clear linear scatter of points around the 45 degree line and there is a random cloud of points under that line that do not show any clearly discernible pattern. The line represents securities that are projected to lose close to the maximum amount possible and the random scatter of points represents those that lose much less than the maximum. There are also a number of data points that are projected to have negative incremental loss, i.e. be repaid some portion of the losses that they have experienced to date. Clearly, we would want to distinguish between the defaults near the 45 degree line that are expected to lose almost everything and the others.

Another way to view this relationship is through a histogram of the ratio of projected incremental loss to the maximum loss. As can be seen in Figure 11, 56.6% of the unresolved defaults are expected to lose more than 90% of the maximum possible, indicating that almost the entire remaining balance will be written down. However, 35% of these defaults are expected to lose less than 50% of the maximum indicating substantial recoveries. It would be difficult for a simple rule of thumb to capture these two extremes.

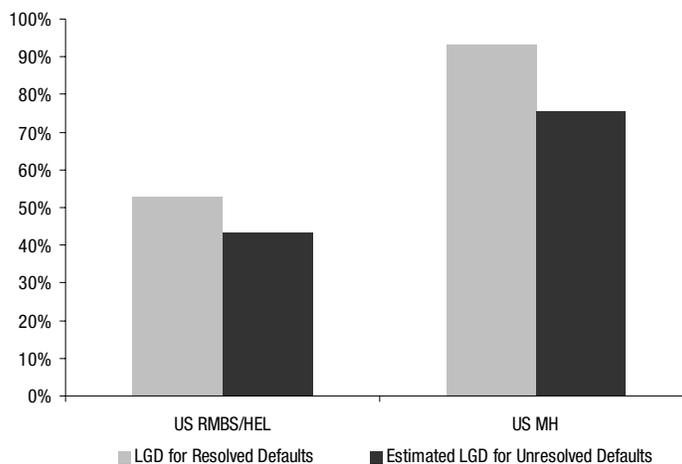
Figure 11 – Ratio of Projected Incremental Loss to Maximum Incremental Loss for Unresolved SF Defaults



Note: Excludes securities that are projected to be cured.

Finally, we consider whether there is, as we suspected, selection bias in the resolved versus the unresolved sample. Figure 12 graphs the average LGD of the resolved and unresolved samples for the two sectors for which we have a large sample size in each category. The average estimated final LGD for the unresolved defaults is indeed lower than that of the resolved defaults by around 20% for both US RMBS/HEL and MH.¹¹

Figure 12 – LGD for Resolved versus Unresolved Defaults in US RMBS/HEL and MH



Note: Excludes securities that are projected to be cured.

11. This comparison does not control for the original rating of the defaulted tranche. When we compare LGD for resolved and unresolved defaults in the same original rating category, the same general conclusion still holds, although LGD rates for the unresolved defaults are not universally lower than those of the resolved defaults for every rating bucket.

Estimated Final Loss Severity for the Combined Sample of Defaulted SF Securities

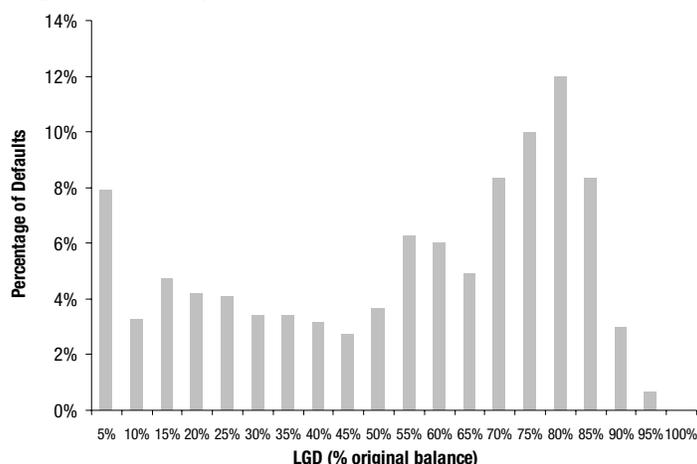
LGD for All Defaults Combined

In this section, we analyze the LGD data for the entire sample of defaulted structured finance securities, merging the actual final loss severity rates for the resolved defaults with the estimated final LGD for the unresolved defaults.¹² Figure 13 summarizes the characteristics of the entire sample.¹³ The average final LGD is 50.9% as a share of original balance and 71.8% as a share of the default balance. As was the case for the resolved defaults, the median LGD's are higher than the averages at 57.1% by original balance and 89.1% by default balance, indicating a left-skewed distribution.

	Mean	Median	Standard Deviation
Number of Tranches	734	734	
Number of Deals	435	435	
Final LGD (% original bal)	50.9%	57.1%	27.1%
Final LGD (% default bal)	71.8%	89.1%	32.3%
Balance at time of default (% original bal)	91.6%	100.0%	19.0%
Tranche size (% deal balance at origination)	6.6%	4.2%	11.5%
Time from Origination to Default	47.0	42.0	22.6
Rating at Origination	Baa3	Baa3	3.2
Rating at Default	B2	B2	4.2

This is confirmed by actually plotting the distribution of the final loss severity rates (Figures 14 and 15). The LGD distribution by original balance does not have the traditional bell shape, but instead has a hump around the 80% mark and another little peak around 5%. 34% of the total defaults are expected to experience severity rates in excess of 70% by original balance, but 16% are expected to reach less than 15% LGD. The distribution of LGD by default balance is much more skewed with a large peak in the 95%-100% bucket and a long left tail. When calculating loss severity rates with respect to the default date, 48% of total defaults are expected to have greater than 90% LGD and 35% are expected to have greater than 95% LGD.

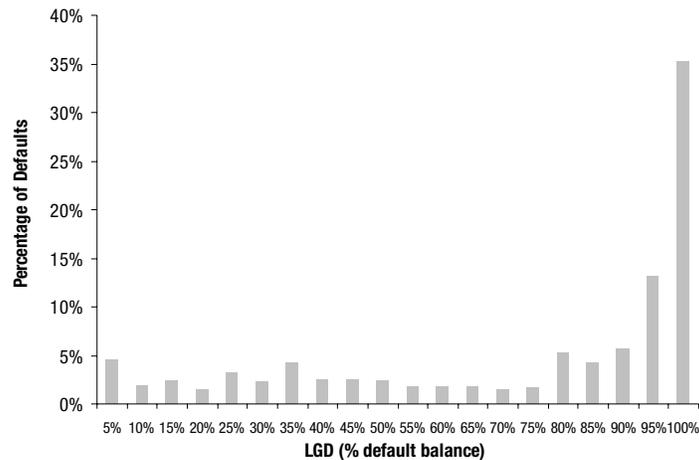
Figure 14 – Distribution of Estimated Final LGD (% original balance) for the Combined Sample of SF Defaults



12. Note that the combined sample of structured finance defaults analyzed in this section includes only defaults for which we either have a realized final LGD or an estimated final LGD. Hence, unresolved defaults for which we do not have a formal LGD estimation method are excluded. The sample size of the combined defaults is 734, around 80% of the entire sample of 925 uncured payment defaults with loss information.

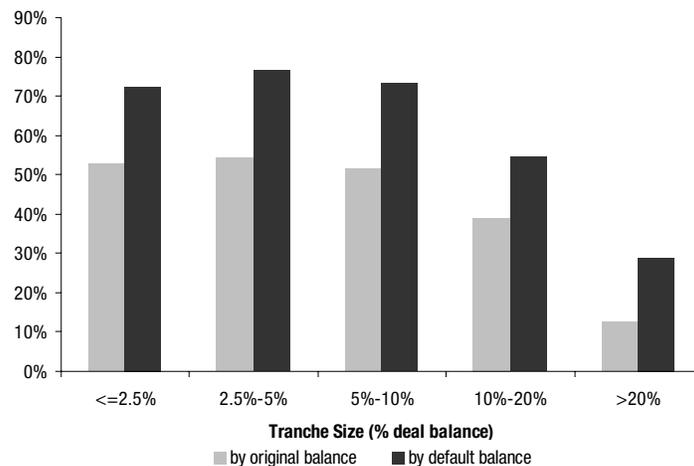
13. The sample excludes unresolved defaulted securities whose estimated final LGD is zero, i.e. defaults that are predicted to be cured. Including these securities would, of course, result in lower average loss severity rates.

Figure 15 – Distribution of Estimated Final LGD (% default balance) for the Combined Sample of SF Defaults



It is interesting to study which tranche characteristics are correlated with LGD. There is a clear negative relationship between LGD and tranche size (Figure 16). The average LGD for tranches that are less than 2.5% of the total deal balance is 53% by original balance versus 13% for those that are more than 20% of the total deal balance. There are two reasons why LGD should decrease as tranche size increases. First, all else being equal, the same dollar amount of loss on the underlying assets will have a much larger effect on a smaller tranche than a larger tranche. Second, the junior tranches in a deal tend to be a much smaller percentage of the total deal balance than the senior tranches and junior tranches are expected to experience higher loss severities due to their subordinate position in the deal waterfall.

Figure 16 –Estimated Final LGD for the Combined Sample of SF Defaults by Tranche Size



Negative correlation also exists between LGD and the amount of time from origination to default. Tranches that defaulted within three years of issuance averaged 66% LGD by original balance compared to 31% for tranches that defaulted more than six years after issuance. This result is not surprising when loss severity is calculated with respect to the origination date because of the effect of discounting. Even if the tranche loses its entire principal balance at default, the loss as of origination will be muted because of the length of time between the closing and default dates. In addition, the longer it takes for the tranche to default, the more time it has to receive any principal payments. However, there is a clear negative relationship even when LGD is calculated with respect to the default date. Again the time to default is probably an indication of where the security lies in the deal waterfall since the subordinated securities in the deal, which are in the first loss position, will default earlier.

Figure 17 –Estimated Final LGD for the Combined Sample of SF Defaults by Time to Default

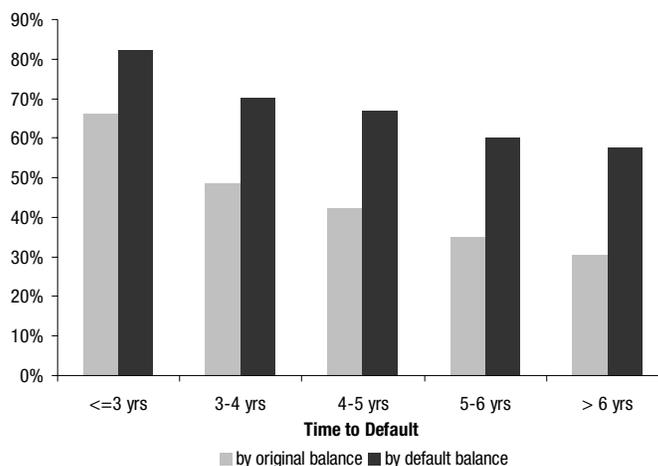


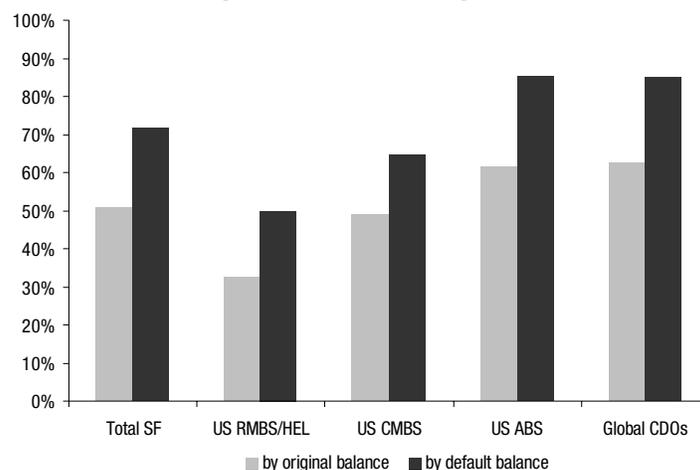
Figure 18 displays the estimated final LGD as a percentage of the original balance by rating at origination. LGD is only weakly correlated with the original ratings of the tranche. The average loss severity rate of tranches that were rated in the speculative-grade categories are all higher than the LGD of the investment-grade tranches, but the difference is not very large and within the investment-grade categories, LGD is not well-ordered by rating.

Original Rating	Count	Mean	Median	Standard Deviation
Aaa	8	2.7%	3.0%	0.9%
Aa	45	45.6%	56.0%	23.8%
A	65	50.7%	62.1%	26.5%
Baa	357	47.6%	51.9%	26.6%
Ba	161	55.6%	66.1%	27.9%
B	96	61.4%	69.4%	23.8%
Caa	2	77.3%	77.3%	8.9%
Investment Grade	475	47.1%	53.1%	26.8%
Speculative Grade	259	57.9%	68.3%	26.5%
All Ratings	734	50.9%	57.1%	27.1%

LGD for All Defaults by Sector

Loss severity rates vary greatly by sector with the largest difference observed between mortgage-backed securities and non-mortgage-backed structured finance securities (Figure 19). The average estimated final LGD by default balance is 49.7% and 64.6% for US RMBS/HEL and US CMBS respectively, compared to 85.3% and 85.0% for US ABS and global CDOs.

Figure 19 –Estimated Final LGD for the Combined Sample of SF Defaults by Sector



There are several reasons for the differences in severity rates between the various sectors of structured finance. The amortization rates for tranches backed by residential mortgages tends to be faster than that of the other sectors leading to lower severity by original balance. For example, the average balance at default for US RMBS/HEL was 80.9% versus 98.5% for US ABS and 97.4% for global CDOs. In other words, while some mortgage-backed securities received some principal payments prior to default, it was rare for ABS and/or CDO tranches to be repaid any principal before becoming impaired.

Differences in the typical structure of deals in different sectors also cause differences in LGD. Interest subordination was common among many of the defaulted MH securities and among CDOs, the vast majority of tranches entered default through PIKING. Therefore, these defaulted tranches are shut out of any payments, even interest payments, when the deal is performing poorly. In contrast, as we saw earlier, interest shortfalls are a much smaller component of total losses for US RMBS/HEL and so most defaulted securities in this sector received interest payments even while being written down, which served to mitigate losses.

The timing of the credit cycle for the various sectors during the study period also influenced the severity of losses. In particular, for most of the study period, the US housing market was robust leading to strong performance for mortgage-backed securities, both residential and commercial. In contrast, the manufactured housing sector and high-yield CBOs experienced an extreme downturn during this time period.¹⁴ In the combined sample of defaulted structured finance securities with realized or estimated final severity rates, MH ABS made up 89% of total ABS defaults and high-yield CBOs made up 71% of total CDO defaults. The extremely poor performance of the underlying pools in these two sectors led to high severity rates for US ABS and global CDOs.

Similar to the overall structured finance universe, loss severity rates within each sector are lower for securities that carried an investment-grade rating at issuance than those that carried a speculative-grade rating (Figure 20). The difference in the average LGD rates for speculative-grade and investment-grade defaulted securities ranges from 10-15% for US ABS, US RMBS/HEL, and global CDOs and widens to over 40% for US CBMS.

14. The woes of the manufactured housing sector and high-yield CBOs have been discussed in many prior Moody's publications so we omit a detailed discussion here. For MH, see for example, "2001 Review and 2002 Outlook: Manufactured Housing MoHo Meltdown," Moody's Structured Finance Special Report, January 24, 2002, "2002 Review and 2003 Outlook: Manufactured Housing – Will MoHo Regain Its Mojo?," Moody's Structured Finance Special Report, January 24, 2003, and "Structured Finance Rating Transitions: 1983-2004," Moody's Special Comment, February 2005. For high-yield CBOs, see "U.S. High-Yield CBOs: Analyzing the Performance of a Beleaguered CDO Category," Moody's Structured Finance Special Report, January 21, 2003 and "Default & Loss Rates of U.S. CDOs: 1993-2003," Moody's Special Comment, March 2005.

Figure 20 – Estimated Final LGD for the Combined Sample of SF Defaults by Sector and Rating

		US ABS	US CMBS	US RMBS/HEL	Global CDOs
All Ratings					
Count		254	26	263	191
Mean LGD (% original bal)		61.4%	48.9%	32.5%	62.4%
Median LGD (% original bal)		65.3%	69.1%	26.5%	70.9%
IG-rated at origination					
Count		193	8	154	120
Mean LGD (% original bal)		57.7%	20.0%	26.2%	58.5%
Median LGD (% original bal)		60.9%	5.7%	20.0%	68.8%
SG-rated at origination					
Count		61	18	109	71
Mean LGD (% original bal)		73.1%	61.8%	41.5%	69.0%
Median LGD (% original bal)		80.4%	76.1%	39.8%	71.9%

However, perfect rank-ordering by broad rating category does not exist for all asset types. For US RMBS/HEL and CMBS, loss severity rates increase monotonically as the original rating decreases (Figure 21a). However, among defaulted US ABS and global CDO tranches, LGD rates are not rank-ordered by original rating and there is much less differentiation between the severity rates across rating categories.

Figure 21 – Estimated Final LGD (% original balance) for the Combined Sample of SF Defaults by Sector and Broad Rating at Origination

Figure 21a – LGD for US RMBS/HEL and US CMBS

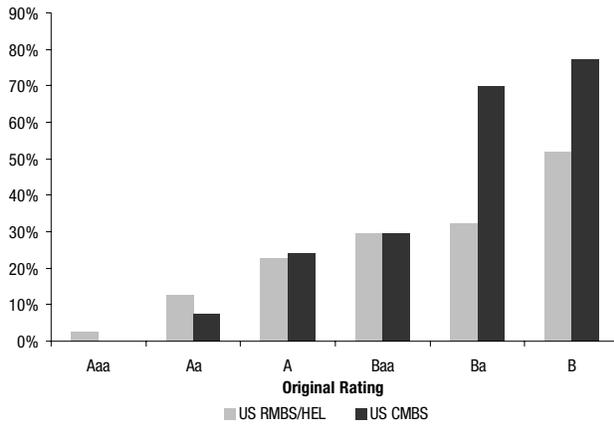
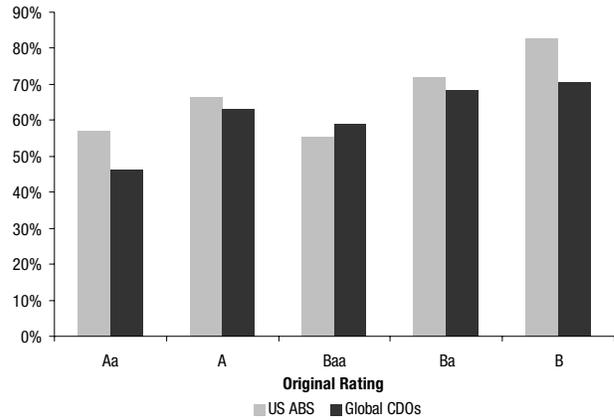


Figure 21b – LGD for US ABS and Global CDOs



Appendix I: Estimating LGD for Defaulted RMBS/HEL Securities¹⁵

The data set used to estimate the RMBS/HEL LGD model consisted of 272 tranches that had experienced uncured payment defaults and their payment and loss information up to the end of 2005. Non-standard RMBS and HEL securities including deals backed by home improvement loans and resecuritized RMBS were excluded because their behavior differed from that of standard residential mortgage-backed securities.

The final LGD estimate is derived from a combination of the results from a static model and a dynamic model.

Static Model

In the static model, the final LGD of the defaulted tranche as a share of the default date balance is estimated based on fixed characteristics of the security. The dependent variable $\log(LGD/(1-LGD))$ is estimated in an ordinary least-squares regression with the following independent variables¹⁶:

- time to default (measured in months from origination);
- the square of the time to default;
- tranche size, which is defined as the original balance of the tranche as a share of the total original balance of deal; and
- an origination year dummy, which equals 1 if the tranche was originated in or after 1998 and 0 otherwise.

In aggregate, the time to default has a negative relationship with final LGD, i.e. the longer the time to default, the smaller the LGD. The same relationship holds for the tranche size. The coefficient for the origination year dummy is significantly negative, meaning that LGD rates for tranches from post-1997 vintages were lower than those from pre-1998 vintages.

The regression produces a final LGD estimate for the tranche given these tranche characteristics. We can then subtract the loss to date of the security to produce an estimate of the remaining loss, $RL_t^i(\text{static})$ for tranche i at time t .

Dynamic Model

The dynamic model seeks to estimate the remaining losses of the tranche based on how quickly the tranche has accumulated losses so far. Specifically, we assume that

Figure 22 – Dynamic Loss Prediction Model

$$\frac{RL_t^i}{B_t^i} = \beta \cdot \frac{L_t^i}{B_D^i - B_t^i}$$

where RL_t^i is the dollar amount of remaining losses for tranche i at time t , B_t^i is the outstanding principal balance of tranche i at time t , L_t^i is the cumulative loss to the tranche at time t , B_D^i is the outstanding principal balance as of the default date, and β is a parameter to be estimated.

The intuition behind the dynamic model is that the future loss rate can be predicted as a multiple of the loss rate to date. The variable on the right hand side of Figure 22 expresses cumulative loss to date as a percentage of the reduction in principal since the default date. For example, if the change in the principal balance outstanding between the time of default and now is \$20, split between \$8 of loss and \$12 of principal repaid, then the loss rate to date is 8/20=40%. We would then predict the future loss rate to be a multiple of 40%, where β controls the speed of future loss accumulation.

If $\beta=1$ then a constant loss rate is assumed, e.g. the remaining loss rate would also be 40% in the above example. However, it turns out that β is much smaller than one, i.e. the loss rate slows down over time, and is estimated in the latest update to be 0.30.¹⁷

15. For further details on the methodology, see "Measuring Loss Severity Rates of Defaulted Residential Mortgage-Backed Securities: A Methodology," Moody's Special Comment, April 2004 and "Default & Loss Rates of Structured Finance Securities 1993-2004," Moody's Special Comment, July 2005.

16. The default date balance of the tranche was also used in the original specification of the static model, but was found to be insignificant in the latest update and dropped.

Blended Model

The dynamic model is more appealing than the static model in that it takes into account the actual behavior of the tranche post-default rather than simply using factors that are fixed at the time of default. However, if the default was relatively recent then the loss rate to date of the tranche may be very volatile and not sufficiently informative to yield a reliable prediction of future losses. Therefore, the static and dynamic estimates are combined into a blended estimate using the following equation:

Figure 23a – Blended Loss Prediction Model

$$\frac{RL_t^i(\textit{blended})}{B_t^i} = \alpha(t) \cdot \frac{RL_t^i(\textit{dynamic})}{B_t^i} + (1 - \alpha(t)) \cdot \frac{RL_t^i(\textit{static})}{B_t^i}$$

where $\alpha(t)$ determines the weight that is placed on the dynamic estimate of remaining loss versus the static estimate. The weight is described by:

Figure 23b – Specification of weight in Blended Model

$$\alpha(t) = \begin{cases} 0.08(t - D), & \text{if } t - D \leq 12 \\ 1, & \text{if } t - D > 12 \end{cases}$$

The equation in Figure 23b indicates that initially after default, most of the weight is placed on the static estimate, but this decreases as time passes until a year after default, only the dynamic estimate is used.

17. The parameter β is estimated using the generalized method of moments due to the presence of heteroskedasticity and autocorrelation in the data.

Appendix II: Estimating LGD for Defaulted CDO Securities¹⁸

The LGD projection model for defaulted CDO securities uses the weighted average rating of the underlying portfolio to estimate portfolio losses which are then propagated to the tranches in the deal. Note that this model does not apply to synthetic CDOs. The steps in the projection are:

- Apply default rates based on the weighted average rating factor (WARF) and the weighted average maturity (WAM) of the portfolio to the remaining par value of the performing asset pool, and then calculate expected losses of the pool under a recovery rate assumption. Defaulted securities are liquidated at an estimated recovery rate value.
- Estimate the excess spread in the deal based on current interest coverage ratios (I/C ratios) and an assumption of the cost of funds. A dampening factor is applied to any excess interest in the deal.
- Using the estimates of loss and excess spread obtained in the previous steps, derive adjusted overcollateralization ratios (O/C ratios) for each defaulted tranche.
- Use the adjusted O/C ratio to estimate the loss for the tranche.

This method takes advantage of the fact that the WARF of the pool provides a convenient and ready assessment of the credit quality and future losses of the pool. It requires knowledge of the current WARF, WAM, and performing balance of the pool and the current I/C and O/C ratios of each tranche in the deal.

¹⁸ For further details on the methodology, see "Default & Loss Rates of U.S. CDOs: 1993-2003," Moody's Special Comment, March 2005.

Appendix III: Estimating LGD for Defaulted MH Securities

In order to estimate the final LGD of defaulted MH securities, we predict the cumulative loss of the underlying asset pool and then propagate losses to the tranches of the deal. Unlike the case of CDOs, there is no “rating” on the MH pools that can provide a convenient pool loss forecast and therefore, we must turn to historical pool performance data to predict future performance. We find that that using both information about pool principal payment rates and loss rates gives us better estimates than using data on loss alone.

The rest of the section is organized as follows: we begin with a description of the pool data set, outline the general principles of the model, describe some issues that arose during the estimation, and finally discuss the results of the estimation.

Description of the Pool Data Set

There were 113 MH pools in the data set, all of which backed deals that contained at least one defaulted tranche.¹⁹ Pool data was updated through June 2006. Figure 24 breaks down the pool data set by issuer/originator and by vintage.

Figure 24 – Characteristics of MH Pool Data Set

Figure 24a – By Issuer/Originator

Issuer/Originator	Count	Percentage
Access	2	1.8%
Associates	1	0.9%
BankAmerica	6	5.3%
Bombardier	6	5.3%
Conseco/Green Tree	57	50.4%
Greenpoint	3	2.7%
IndyMac	2	1.8%
Lehman	2	1.8%
MERIT	2	1.8%
Oakwood	20	17.7%
Origen	1	0.9%
Signal	4	3.5%
UCFC	7	6.2%
Total	113	100.0%

Figure 24b – By Vintage

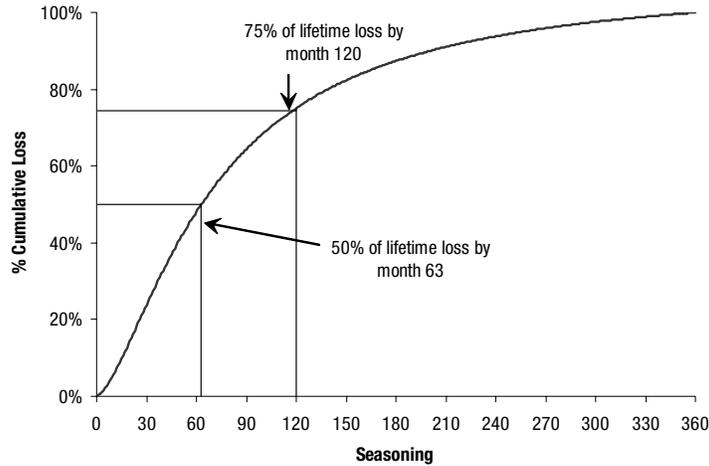
Vintage	Count	Percentage
1992	1	0.9%
1993	4	3.5%
1994	8	7.1%
1995	12	10.6%
1996	14	12.4%
1997	18	15.9%
1998	17	15.0%
1999	11	9.7%
2000	10	8.8%
2001	11	9.7%
2002	7	6.2%
Total	113	100.0%

Using Both Loss and Principal Payment Information

One of the popular methods used to predict cumulative pool losses is to project the final loss based on a baseline cumulative loss timing curve. The baseline timing curve specifies what percentage of the lifetime loss a pool is expected to experience at different points in seasoning. For example, in the loss timing curve in Figure 25, 50% of the lifetime losses are incurred by the pool by month 63 and 75% by month 120. Therefore, in this example, if a pool had experienced 10% loss to date at month 63, then its final loss would be predicted to be 20%.

¹⁹ It is an open question whether pools backing performing deals behave similarly to pools backing non-performing deals in terms of the timing of losses and principal payments.

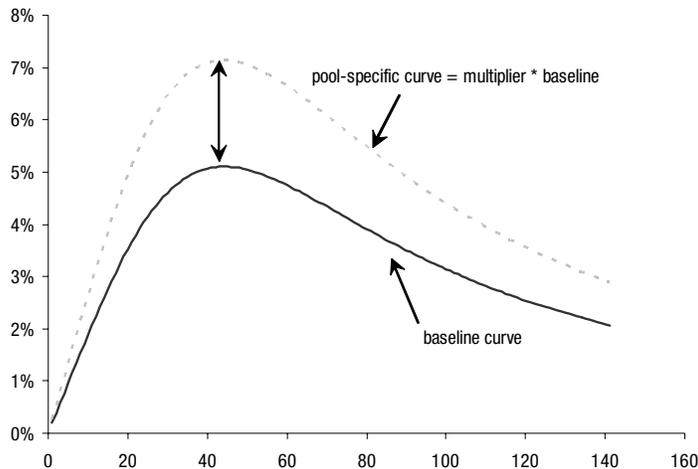
Figure 25 – Example of Cumulative Loss Timing Curve



The large flaw in this methodology is that any information about principal repaid to the pool is ignored. In the previous example, we might have different views about the final loss of the pool that had experienced 10% loss by month 63 if we knew that 85% of the balance remained at that point in time versus 30% of the balance remaining. In particular, it is possible under this framework to produce nonsensical results, i.e. predict future losses that exceed the maximum amount possible.

Therefore, in order to use more comprehensive information available for the pool and produce consistent loss estimates, both losses and principal payments should be modeled. Specifically, we focus on modeling the net loss rate and principal payment rate, both as a percentage of the current balance, for each pool. We make the following two assumptions for both variables. First, we assume that there is a general baseline curve for all pools. Second, we assume that the curve for each individual pool can be described as a simple multiple of the baseline. Figure 26 illustrates these assumptions.

Figure 26 – Model Assumption for Loss and Payment Rate



These two model assumptions signify that losses and principal payments for each pool are expected to follow the same general shape by seasoning, but have varying magnitudes. For example, loss rates for all pools may rise and peak around month 50 and then decline, but some pools will have much higher levels of losses than others.

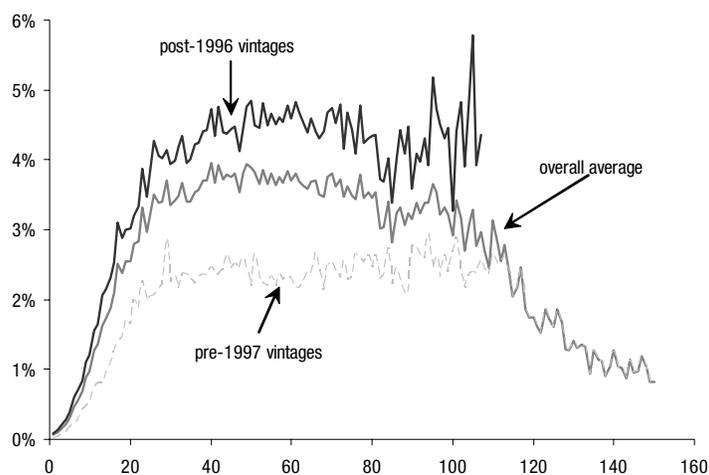
Issues that Arise during the Estimation

There are several issues that arise during the estimation of the baseline curve and pool multiplier. Some issues are common to all asset types and some are specific to mortgage collateral and/or manufactured housing.

The most straightforward way to create the baseline curve is to calculate a simple average of the set of pools at each point in seasoning. However, note that most likely the data set will be unbalanced – each pool series will have different lengths due to the different ages of the pools – and as a result, the average at different points in seasoning will be derived from different universes of pools.

It is unwise to ignore this effect because it is quite likely that different pool vintages will have different loss levels and therefore, it will be difficult to distinguish what changes in the curve occur due to seasoning and which changes are caused by the shifting universe of pools. For MH specifically, we found that earlier vintage pools generally had lower losses than later vintage pools (Figure 27). For example, at month 40, the average net loss rate for the pre-1997 vintages was approximately 2.5% versus 4.7% for the post-1996 vintages. There was a steep decline in the overall average net loss rate after month 110, but since only the pre-1997 vintages contributed to this average, the decline would likely not be as dramatic if the average included data for the post-1996 vintages.

Figure 27 – Illustration of Steep Decline in Average Net Loss Rate Due to Unbalanced Data

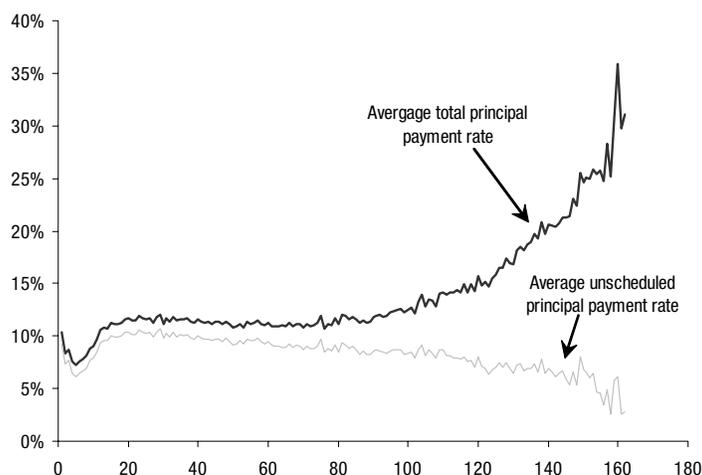


To solve this problem, we extrapolated the data for the less seasoned pools using the average percentage change of the remaining pools. The implicit assumption, again, is that the less seasoned pools will follow the same basic shape as the more seasoned pools.

A second fundamental question to be answered is how to derive the pool-specific multiplier given the baseline curve. We wanted the multiplier to incorporate all the data to date for the pool, but also emphasize the more recent observation over the earlier observations. Therefore, the multiplier was calculated by performing a weighted least-squares regression of the pool data on the baseline. The most recent data point was assigned the largest weight, which then declined linearly to the first data point.

Another issue we encountered, which likely exists for all mortgage collateral, is the fact that the principal payment rate will vary for pools with different weighted average maturities and coupons. In order to account for this, we split principal payments into scheduled and unscheduled payments. The scheduled portion is approximated as if the pool behaved as one large mortgage using the original weighted average maturity and weighted average coupon of the pool as the terms of the mortgage. Because the pool is made up of individual loans with different maturities and coupons, treating the pool as one loan will only be an approximation and not an exact answer, but it should be a satisfactory estimate if the distribution of maturities in the pool is not too wide. The unscheduled portion of the principal payment rate is then modeled using the assumption of a general baseline curve and pool-specific multiplier. Figure 28 graphs the overall average pool principal payment rate and the average unscheduled portion of the payment rate derived by subtracting the approximate scheduled payments.

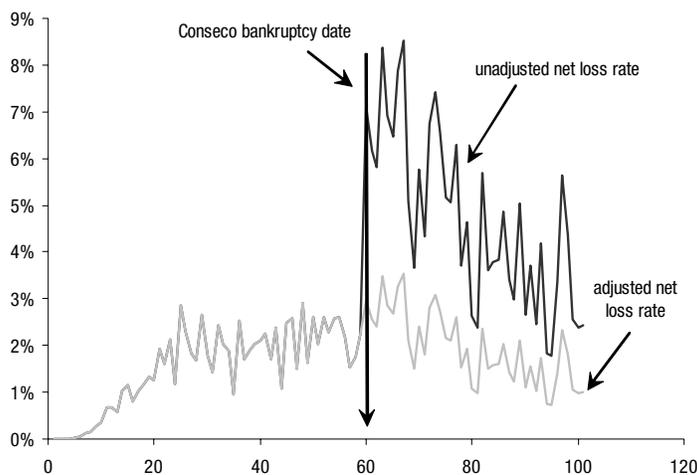
Figure 28 – Annualized Pool Principal Payment Rate



Another issue arose when we examined the data for the manufactured housing pools issued by Conseco/Green Tree and Oakwood. Around the time of bankruptcy for the issuers, there were huge jumps in the pool net loss rates (Figure 29). Prior to bankruptcy, Conseco announced changes in its business practices, such as suspending all manufactured housing financing and assumption programs and discontinuing its loan assumption program on seriously delinquent loans, which resulted in much higher default frequencies and lower recover rates for the pools.²⁰ Oakwood made similar adjustments to its servicing procedures prior to bankruptcy.²¹

Since these two issuers make up a substantial portion of the sample, it is difficult to ignore this phenomenon. Rather than mixing data with discontinuous jumps at different points in seasoning, the data from these two issuers was adjusted for the bankruptcy jump. We assumed that there was a permanent increase in losses after the event date and adjusted loss rates after this point as if there was no such increase.²² This issue was specific to only two originators in the MH sample, but could possibly arise in other asset types where collateral performance is closely linked to the fortunes of the originator/servicer.

Figure 29 – Example of the Jump in Net Loss Rates Experienced by a Conseco Pool Post-Bankruptcy



20. See Moody's press release, "Moody's downgrades ratings of 118 class and confirms 14 classes of Conseco Finance's manufactured housing certificates," December 3, 2002.

21. See Moody's press release, "Moody's downgrades 70 and confirms 18 senior, mezzanine and subordinate classes of Oakwood Homes' manufactured housing certificates," January 17, 2003.

22. More specifically, net loss rates after the event date were divided by an adjustment factor. The adjustment factor is calculated as the average ratio of the 6-month average net loss rate after the event date to the 6-month average before the event date. Separate adjustment factors were derived for Conseco/Green Tree and Oakwood.

Results from the Pool Estimation

Using the methods described in the previous sections, we derived an empirical baseline curve of the annualized net loss rate and unscheduled principal payment rate. A smooth function²³ was then fitted to these curves so that loss and principal payment rates could be forecast past the last point in seasoning of the data sample. Figures 30 and 31 display the empirical averages and the smoothed baseline curves.

Figure 30 – Baseline Annualized Pool Net Loss Rate

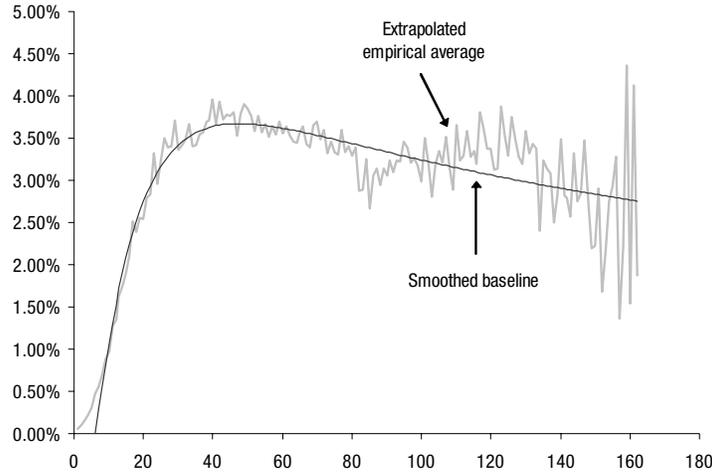
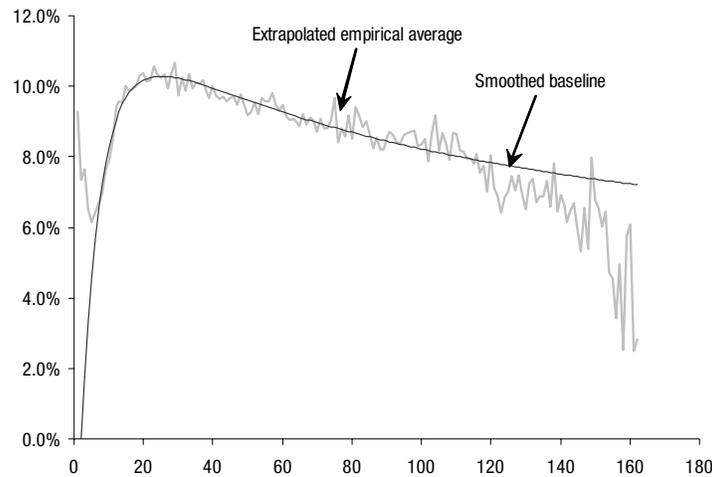


Figure 31 – Baseline Annualized Pool Unscheduled Principal Payment Rate



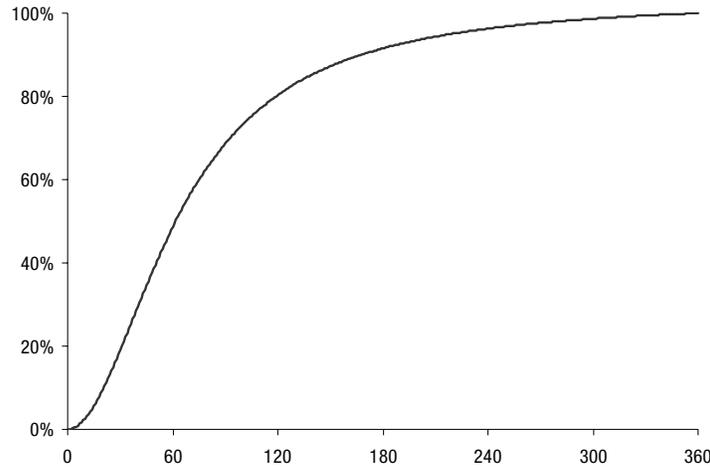
Note: In fitting the smooth function, the first six months of data were dropped and each observation was weighted by the actual number of pools backing the data point.

The baseline curve for the net loss rate indicates that the peak in losses occurs at around 41 months and loss rates decrease very slowly. For unscheduled principal payments, the peak occurs earlier at around 23 months and decrease more rapidly.

With the aim of testing the performance of the proposed model using both loss and principal payment rates against the cumulative loss timing curve, we also derived a baseline loss timing curve by fitting a smooth function to the available cumulative loss data (Figure 32). Note that 25% of the cumulative loss is expected to accrue by month 36 and 50% by month 62.

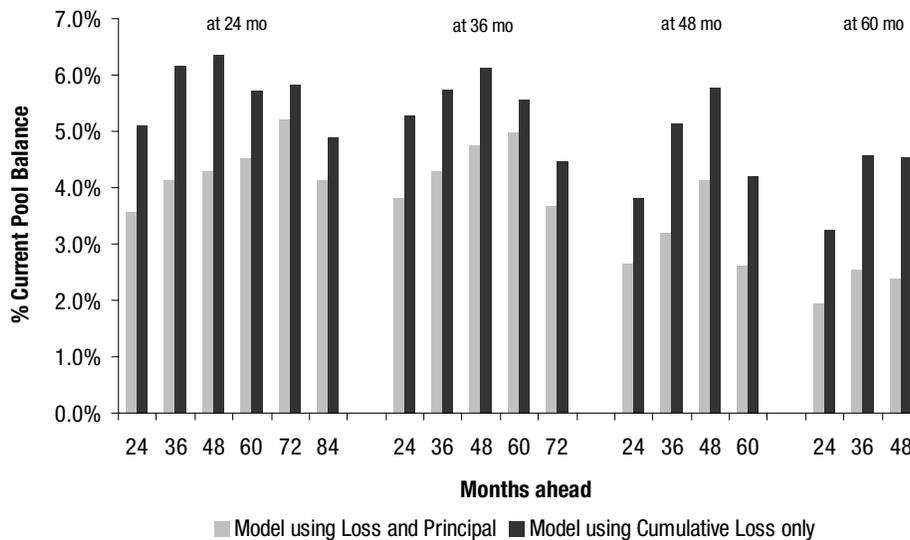
23. The smooth function takes the form $f(t)=a[(t-c)/b]/[1+((t-c)/b)^k]$, where t is time and $a, b, c,$ and k are all parameters to be estimated. The function is only defined for $t \geq c,$ and for $a, b > 0$ and $k > 1$ has a general hump-shape that declines to zero as t increases to infinity.

Figure 32 – Baseline Cumulative Loss Timing Curve



In order to compare the two models, we analyzed the difference between the losses forecasted by each method and the actual loss. Since none of the pools in the sample have been completely resolved, we did not have final cumulative loss information for any of the pools and could not compare final loss forecasts with actual final loss. Instead, we compared projected and realized loss accumulated over a fixed window of time. Specifically, at a fixed point in seasoning, pool data to date and the baseline curves were used to derive the multipliers for the pool. With these multipliers, we produced a forecast of future loss over a fixed window of time. For the loss timing curve method, the loss to date at the fixed point in seasoning was used to project cumulative loss over the window. Finally, for both models, we examined the actual loss versus the forecasted loss and calculated the square root of the mean of the squared errors over all pools.

Figure 33 – Comparison of RMSE for the Model using Loss and Principal versus the Model using Cumulative Loss only



Note that different bar groupings represent different universes of pools because the pool must have aged sufficiently to be included in the calculation.

Figure 33 shows that the proposed model using both loss and principal information does better in predicting losses than the cumulative loss timing method for all starting points and all windows. The difference in accuracy between the pool losses forecasted by the two methods will be magnified when applied to the tranches because the tranche balance is usually only a small percentage of the pool balance.

In summary, the steps to forecast LGD for the defaulted MH tranche are:

- Use the baseline curves for net loss rate and unscheduled principal payment rate and pool data to date to derive the pool-specific multipliers through a weighted least-squares regression.
- Use the original weighted average maturity and weighted average coupon of the pool to project the pool scheduled payment rate.
- Project future periodic losses and principal payments for the pool given the baseline curves, pool-specific multipliers, and projected scheduled payment rate. This will give us an estimate of pool principal, loss, and interest per period until maturity.²⁴
- For each period, distribute interest and principal to the tranches in the deal assuming a simple waterfall and assign losses to the tranches based on their position in the deal.
- Discount tranche losses to the present and sum them to calculate LGD.

We emphasize that this procedure results in a point estimate of LGD because only one pool loss scenario is produced and run through the deal waterfall. While this may be appropriate for defaulted tranches where pool losses are already high and less variable, it is not appropriate for tranches not in default. Using a single scenario for non-defaulted tranches would frequently result in zero LGD estimates. For non-defaulted securities, one would need to modify the pool loss distribution to account for how pool performance may have deteriorated to the point where a default would occur, and run a distribution of losses, rather than one loss path, through the waterfall.

24. The weighted average coupon is used to approximate interest payments and the weighted average maturity is used to approximate final maturity.

Glossary

PAYMENT DEFAULT

Structured finance securities are defined as being in payment default if they have suffered:

- an interest shortfall, or
- a principal writedown.

Moody's identifies interest shortfalls and principal writedowns for structured finance securities by reviewing all of Moody's performance data reports, both in electronic and physical form. Prepayment-related interest shortfalls are not considered to be payment defaults, but PIKing tranches are. Only explicit principal writedowns are included as payment defaults as reported by servicers or trustees. Implicit principal losses or undercollateralizations are not included.

RESOLVED AND UNRESOLVED PAYMENT DEFAULTS

Securities that have sustained payment defaults are called "resolved defaults" if their principal balance has been reduced to zero. They are called "unresolved defaults" if they have a positive principal balance outstanding as of the end of the study period. In prior studies, these were referred to as "matured" and "non-matured" defaults.

CURED AND UNCURED PAYMENT DEFAULTS

A payment default is considered cured if all outstanding shortfalls and losses were repaid in full as of the end of the study period. A payment default is uncured if outstanding losses still exist for the tranche as of the end of the study period.

MATERIAL IMPAIRMENT

Structured finance securities are defined as being in material impairment if they have:

- sustained a payment default that remained uncured, or
- been downgraded to Ca or C.

The impairment status of a security may change as it goes from being cured (i.e. all outstanding shortfalls and losses were repaid in full) to uncured (i.e. positive interest shortfalls or principal losses outstanding), or vice versa. If a security rated Ca or C but not in payment default is upgraded, then it is no longer considered to be in material impairment. A security rated Ca or C that is not upgraded is still in material impairment even if it experienced a payment default that was cured. Finally, securities with very minor shortfalls or losses are excluded.

LOSS-GIVEN-DEFAULT (LGD) OR LOSS SEVERITY RATE

Loss-given-default, also known as LGD or loss severity rate, is the total amount of lifetime losses of a tranche as a share of the tranche's principal balance on a certain reference date. The losses in each payment period are discounted by a discount rate, which is typically the stated coupon rate on the tranche. There are three types of principal balances used in the calculation of LGD: the principal balance at origination, at the time of impairment, and at a cohort formation date. Depending on the reference principal balance (and the reference date), the calculated LGD can be significantly different due to principal amortization and discounting.

Final LGD on resolved payment defaults are typically known, but need to be estimated for unresolved payment defaults or impaired securities with incomplete loss data.

TRANCHE SIZE

Tranche size is measured as the tranche principal balance at origination as a percentage of the total deal balance at origination.

ABS

ABS stand for asset-backed securities. This structured finance sector includes securities backed by both traditional asset types such as auto loans, credit card receivables, student loans, and manufactured housing loans, and non-traditional asset types such as mutual fund fees, tax liens, tobacco settlement payments, and intellectual property. In this report, ABS excludes securities backed by home equity loans (HEL).

HEL

The home equity loan or HEL sector include securities back by subprime (B&C) mortgage loans, home improvement loans, high loan-to-value (high LTV) loans, home equity lines of credit (HELOCs), and closed-end second-lien loans, as well as net interest margin (NIM) securitizations. It does not include securities backed by Alt-A mortgages, which are included in the RMBS sector. In this report, HEL is aggregated with the RMBS sector.

CDOS

CDOs stand for collateralized debt obligations. Derivative securities such as structured notes and repackaged securities are not considered to be part of this sector.

CMBS

CMBS stand for commercial mortgage-backed securities.

RMBS

RMBS stand for residential mortgage-backed securities. The large majority of these securities are backed by first-lien prime mortgages, but some are backed by Alt-A mortgages. In some older vintage RMBS transactions, subprime mortgages may also be included in the collateral. In this report, RMBS is aggregated with the HEL sector.

U.S. STRUCTURED FINANCE SECURITIES

U.S. structured finance securities are denominated in U.S. dollars and issued in the U.S. market.

Related Research

Special Comments:

[Default & Loss Rates of Structured Finance Securities: 1993-2005, April 2006 \(97234\)](#)

[Default & Loss Rates of Structured Finance Securities: 1993-2004, July 2005 \(93653\)](#)

[Default & Loss Rates of U.S. CDOs: 1993-2003, March 2005 \(91692\)](#)

[Default & Loss Rates of Structured Finance Securities: 2004 First Half Update, December 2004 \(90843\)](#)

[Default & Loss Rates of Structured Finance Securities: 1993-2003, September 2004 \(88692\)](#)

[Measuring Loss Severity Rates of Defaulted Residential Mortgage Backed Securities: A Methodology, April 2004 \(86769\)](#)

[Payment Defaults and Material Impairments of U.S. Structured Finance Securities: 1993-2002, December 2003 \(80247\)](#)

[Structured Finance Rating Transitions: 1983-2006 H1, August 2006 \(98577\)](#)

[Structured Finance Rating Transitions: 1983-2005, February 2006 \(96533\)](#)

[Structured Finance Rating Transitions: 1983-2004, February 2005 \(91392\)](#)

[Structured Finance Rating Transitions: 1983-2003, February 2004 \(81239\)](#)

[Structured Finance Rating Transitions: 1983-2002, January 2003 \(77291\)](#)

[European Structured Finance Rating Transitions: 1988-2005, February 2006 \(96706\)](#)

[The Performance of Structured Finance Ratings: Mid-Year 2006 Report, September 2006 \(99034\)](#)

[The Performance of Structured Finance Ratings: Full-Year 2005 Report, May 2006 \(97346\)](#)

[The Performance of Structured Finance Ratings: Mid-Year 2005 Report, September 2005 \(94463\)](#)

[Deal Sponsor and Credit Risk of U.S. ABS and MBS Securities, December 2006 \(100872\)](#)

[The Relationship between Par Coupon Spreads and Credit Ratings in US Structured Finance, December 2005 \(95494\)](#)

[Structured Finance Watchlist Resolutions: 1992-2003, June 2004 \(87305\)](#)

[Guide to Moody's Default Research: December 2006 Update, December 2006 \(98967\)](#)

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

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Report Number: 101284

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