

## Special Comment

# Moody's Global Insurance

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## Financial Guarantors' Subprime Risks: From RMBS to ABS CDOs

### Summary Opinion

Stress in the subprime mortgage market as a result of poor performance in recent-vintage mortgage loans is affecting structured finance transactions insured by the financial guaranty companies rated by Moody's. These structured transactions include subprime residential mortgage backed securities (RMBS), whether first mortgages or closed-end seconds, and structured securities collateralized by asset backed securities (ABS CDOs) containing mortgage exposure.

Moody's believes that the risks presented by the direct insurance of subprime RMBS transactions should be reasonably well-contained as the credit enhancement levels (the cumulative losses assumed by third parties before the guarantors have to pay claims) are generally well in excess of our current estimates of the ultimate cumulative losses these transaction will suffer. These manageable exposures reflect the guarantors' more conservative underwriting of 2006-7 vintage subprime loans, with most of the transactions insured during this period having initial underlying ratings in the Aaa range. While some guarantors may experience credit deterioration within certain insured RMBS transactions and could even suffer actual losses, the resulting impact should not meaningfully affect their financial health.

Evaluating the impact of subprime mortgage stress on the guarantors' exposures to ABS CDOs is more complex, as such transactions can invest in various tranches of subprime securitizations and/or in other ABS CDOs that may also invest in subprime mortgage tranches. The guarantors have typically participated in this market by providing credit default swap protection on the most senior layers of the securities' capital structures, usually attaching above a Aaa tranche<sup>1</sup>.

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<sup>1</sup> While most of the guarantors' CDO exposure is in credit default swap (CDS) form, they avoid exposure to margin collateralization requirements that are customary for such agreements.



## Financial Guarantors' Subprime Risks: From RMBS to ABS CDOs

So far, these senior-most tranches insured by the guarantors have suffered minimal deterioration as reflected by limited underlying rating movement. However, ABS CDOs with concentrations in recent vintage RMBS or CDO collateral are exposed to further deterioration in the underlying mortgage markets. Here, Moody's approach involves developing stress scenarios that estimate the negative impact of potential further deterioration in the underlying mortgage market on the guarantors' exposures, and capitalization.

In our projected ABS CDO model results using Moody's current cumulative loss expectations for the troubled 2006-vintage subprime mortgage pools, most of the guarantors would experience zero expected claims<sup>2</sup>, with no guarantor suffering expected claims that would be material from a rating perspective. If Moody's cumulative loss estimates are stressed significantly beyond current expectations, however, some guarantors could suffer meaningful increases in expected claims in our modeling, although we note that many of our stress-case assumptions are conservative and that these stressed model results are highly sensitive to the underlying inputs, some of which – as discussed below – are based on broad assumptions about specific CDO collateral composition and performance.

We continue to refine our ABS CDO analysis, which is complicated by the substantial number of granular exposures underlying many of these securities, as well as issues of correlation between the different underlying risks. We will also continue to monitor the impact of any underlying rating actions, should they occur, on the credit profile of the guarantors. Our analysis suggests that further deterioration in the US subprime residential mortgage market could have significantly different net effects on individual guarantors given their unique risk and franchise profile. If Moody's subprime cumulative loss expectations were to increase beyond current estimates or if the guarantors' insured deals were to suffer large rating downgrades, Moody's would evaluate the impact of such developments on the capital adequacy and, ultimately, the ratings of the guarantors.

We note that most of the established guarantors are facing today's challenging mortgage markets from a position of financial strength, with solid capital ratios and ample reinsurance capacity. Should market developments unfold such that a guarantor's capital ratios deteriorate meaningfully from their current levels, we would evaluate the company's ability to correct the situation through such means as raising additional capital or ceding portions of the existing book to reduce portfolio risk. Because ratings are so important to the industry's value proposition, we believe that a highly rated financial-guarantor with a strong ongoing franchise would likely take whatever action is feasible to preserve its rating during times of stress. Beyond the immediate disruption to the guarantors' business opportunities due to chaotic conditions within the global credit markets, these events are likely to be a positive catalyst for financial guarantor business growth over the medium term, as credit re-prices to levels that increase demand for their core product.

<sup>2</sup> Expected claims is defined as the average claims to the guarantors resulting from the stochastic simulation for the given subprime cumulative loss assumption.

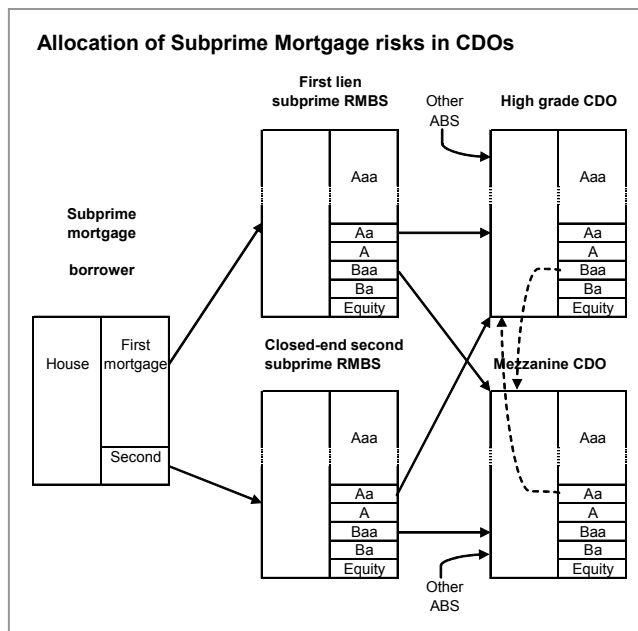
## Financial Guarantors' Subprime Risks: From RMBS to ABS CDOs

### Where to Find Subprime Mortgages: A Primer on Financial Engineering

Subprime mortgages are mortgage loans extended to borrowers with weak credit profiles (often with FICO scores below 620). They can be first mortgages, with a first lien on the property serving as collateral to the loan, or second mortgages (generally closed-end loans where the borrower receives a specified amount at closing) that are subordinated to the first mortgage. As an example, a subprime borrower might obtain an 80% first mortgage and a 20% closed-end second mortgage to purchase a home (see accompanying diagram).

Such loans are generally packaged by type (i.e., first or second mortgages) into pools of collateral, which form the basis of Residential Mortgage Backed Securities (RMBS). Different tranches of these securities, created with varying levels of priority on the cash flows generated by the underlying pool of mortgages, are then sold to third parties. The Aaa-rated tranche has first priority, followed by the Aa-rated tranche, the A-rated tranche and so on, down to the equity of the transaction.

ABS CDOs, in turn, may invest in tranches of RMBS transactions, as well as in other asset backed securities. ABS CDOs have generally been classified as "high-grade" when they invest primarily in Aa-or-higher-rated tranches, and as "mezzanine" when they invest in Baa-or-higher-rated tranches. Both types, however, typically have a small allocation within the collateral pool that may be invested in lower-rated collateral. As the dotted lines in the diagram show, a high-grade CDO may ultimately be exposed to lower-rated RMBS collateral if it purchases highly-rated tranches of a mezzanine CDO (since the mezzanine CDO can hold Baa and Ba-rated RMBS tranches). Similarly, mezzanine CDOs can invest in lower-rated tranches of high-grade CDOs.



### Risks of Direct Subprime RMBS Exposure Should Remain Well Contained

Collectively, the financial guarantors insured roughly \$7½ billion in residential mortgage backed securities collateralized by subprime mortgage loans during 2006. This volume, however, was lower than in prior years. At the same time, the average enhancement level in 2006 increased, due to tighter underwriting criteria on the part of the guarantors and increasing competition from alternative forms of execution (e.g., senior-subordinated structures). Furthermore, because most of the subprime RMBS transactions wrapped by the guarantors during 2006 had underlying ratings of Aaa, the typical level of subordination on

#### Guarantors' Exposure to Subprime RMBS

The table below shows the typical subordination, or credit enhancement, levels for subprime RMBS transactions issued in 2006. Differences in credit quality of the underlying mortgages could lead to meaningful variations in credit enhancement levels.

#### Typical Credit Enhancement Levels <sup>[1]</sup>

	Subprime First lien	Subprime Second
<b>Aaa</b>	± 28.0%	± 42.0%
<b>Aa</b>	± 19.5%	± 33.0%
<b>A</b>	± 14.0%	± 25.5%
<b>Baa</b>	± 10.5%	± 19.0%
<b>Ba</b>	± 7.5%	± 14.5%

[1] For 2006 vintage deals rated by Moody's

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first-lien deals (i.e., the cumulative losses that would need to occur before the guarantor pays claims) averaged approximately 26% to 30%. The guarantors also wrote a modest volume of subprime RMBS with underlying ratings of Baa to Aa, which carry smaller levels of subordination.

Evaluating the impact of higher subprime mortgage pool losses on the RMBS transactions insured by the guarantors is quite straightforward as they typically insure the senior-most tranches of these securities. Therefore, as long as cumulative losses remain below the insurance attachment point, the guarantor's exposure may become riskier with higher underlying loan loss rates (due to an erosion of subordination levels), but the guarantor would not be subject to claims. Because Moody's current cumulative loss expectations for the worst performing pools originated in 2006 range from 10% to 16%,<sup>3</sup> it appears that the guarantors' Aaa-rated exposures would still enjoy substantial subordination, although the few deals that were rated Baa at origination could potentially be exposed to claims. Any such claims would likely remain modest, however, as the subordination built into these transactions would absorb most of the losses<sup>4</sup>.

### Net Interest Margin Securities (NIMS)

NIM securitizations comprise another less prevalent and riskier form of mortgage-related exposure, although most of the financial guarantors have steered away from this asset class. In a NIM securitization, an RMBS issuer securitizes the residual cash flows from existing mortgage-backed transactions to monetize these residuals and accelerate the receipt of cash flow from outstanding deals. In a typical mortgage securitization structure, excess spread, which is a stream of cash formed out of the disparity between the interest rate paid on the mortgage loans (net of fees and expenses) and the lower interest rate paid on the deal's securities, is made available to protect the deal's security holders by absorbing losses on the underlying loans and by building credit enhancement to absorb future losses. Excess spread that is not needed to absorb losses or build credit enhancement is ultimately returned to the issuer of the mortgage-backed security. It is this "extra" excess spread that is securitized in a NIM transaction.

Because the cash flow available to a NIM deal is usually subordinated to the needs of the RMBS transactions underlying the NIM, there is no specified amount of principal and interest that the NIM securities will definitely receive, and the timing and amount of the cash flow that ultimately reaches the NIM bonds are likely to be highly volatile. Moreover, the performance of a NIM security will be especially sensitive to the prepayment and loss experience of the underlying transactions since prepayments and losses lead to a reduction in total residual receipts. As a result, the performance of these transactions can deteriorate sharply during adverse market conditions.

Among the guarantors, FSA has been the most active in this sector by providing excess-of-loss coverage (with the first-loss position often assumed by the mortgage insurance arm of Radian Group). While some NIM-related losses could occur in the current environment, they should remain immaterial to FSA's financial strength given its senior position and relatively modest exposure.

### Subprime Risks in ABS CDOs Are Harder to Assess

#### Complex Exposures, but Underwriting Approaches Provide Protection

In contrast to RMBS, the effect of potentially higher-than-expected subprime mortgage pool losses on ABS CDOs insured by the guarantors is indirect, making it more difficult to assess. ABS CDOs, unlike RMBS, do not invest directly in mortgages but invest in securities that may themselves, either directly or indirectly, invest in mortgages. In many instances, the ABS CDOs insured by the guarantors have invested in subprime RMBS and/or in other CDOs that have, in turn, invested in securities that include some subprime RMBS. The complexity of these exposures, with the subprime mortgage loan risk being once or twice removed from the

<sup>3</sup> See Moody's special report, US Subprime Mortgage Market Update: July 24, 2007.

<sup>4</sup> For example, assuming that a guarantor insures the senior Baa tranche of a \$500 million subprime mortgage deal (a \$448 million tranche reflecting a 10.5% subordination), cumulative underlying losses of 16% are modeled as resulting in claims of \$28 million for the guarantor (net of subordination of \$52 million), representing a 6.25% severity of loss.

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direct investment of the ABS CDO, renders reasonable estimation of CDO performance (based on estimated or stressed cumulative subprime loan losses) quite challenging<sup>5</sup>.

Nevertheless, the underwriting approaches employed by financial guarantors tend to militate against "worst-case" outcomes for these exposures. Financial guarantors typically work with CDO managers to determine exposures (whether RMBS or CDO) that would fall within the guarantors' underwriting criteria. This should help mitigate the risk of adverse selection and improve the overall characteristics of insured transactions. Furthermore, certain protective triggers built into insured CDOs can meaningfully improve the guarantors' position by accelerating the amortization of the tranches that they insure, diverting cash flow away from more junior tranches, revoking the manager's ability to trade underlying assets and/or allowing for the replacement of the collateral manager.

We note that the guarantors generally participate in the CDO market by writing credit default swaps (CDS), as this form of execution (as opposed to an insurance policy) better meets the needs of their counterparties. However, unlike traditional corporate CDS transactions, the guarantors' obligation to pay claims does not accelerate upon the default of the underlying exposure (given the use of 'pay-as-you-go' language). Furthermore, the absence of collateral posting requirements means that the guarantors' liquidity and financial flexibility are insulated from the negative impact of CDS price dislocation.

### Direct Subprime RMBS Risks and CDO Risks Within ABS CDOs

In today's troubled mortgage environment, certain tranches of mezzanine CDOs with large subprime mortgage exposures could well suffer large increases in expected losses, given Moody's current cumulative loss expectations on 2006-vintage subprime mortgages. Moody's currently expects the best quartile of pools of subprime first lien mortgages underwritten in 2006 to produce cumulative losses in the 5% to 7% range while the worst performing quartile is expected to generate cumulative losses in the 10% to 16% range<sup>6</sup>. This means that impairment to the principal amounts associated with some Baa-and-lower-rated RMBS tranches is likely (2006-vintage Baa-rated tranches typically attach at subordination levels of around 10% to 11% and detach at 13% to 15%<sup>7</sup>). As a result, high grade CDOs are significantly less at risk of meaningful increases in expected loss (in relation to total deal size) than are mezzanine CDOs as high-grade CDOs typically invest in A through Aaa-rated tranches that benefit from higher subordination levels. On the other hand, the subordination built into each rated tranche of a high-grade CDO is lower than for a mezzanine CDO.

Ultimately, however, credit performance is highly dependent upon the actual composition of investments within the structure of each CDO. In addition to CDO attachment points and the weighted-average rating of the investment pool, other key variables include the concentration in subprime RMBS and ABS CDO collateral, the vintage of that collateral, RMBS originator and servicer details, the underlying collateral composition of each ABS CDO held by the insured CDO, the timing of losses incurred by the pool, and the existence of structural protections such as triggers -- tied to over-collateralization or interest coverage tests -- that accelerate repayment of the senior tranches or confer some other benefit to those creditors. Within the guarantors' insured portfolios, for example, subprime RMBS collateral varies significantly from CDO to CDO. In many instances, RMBS collateral consists of earlier-vintage deals where exposure to the worst-performing 2006 loans is not at issue. And as noted earlier, the guarantors also often work with CDO managers to determine an approved list of lenders whose mortgage collateral may be held by the ABS CDO, which can help to limit exposure to the worst performing pools.

Nevertheless, the collateral pools of ABS CDOs with large exposures to the worst-performing subprime risk could face substantial deterioration. This means that CDOs which invest in tranches of such CDOs are also exposed to possible stress, including high grade CDOs that may be indirectly exposed to lower-rated tranches of subprime mortgage deals through their investments in A- or Aa-rated tranches of mezzanine CDOs. As there is typically somewhat incomplete transparency into the specific underlying CDO risks held within the guarantors' ABS CDOs, due in part to their managed nature, and/or the precise benefit that would ultimately

<sup>5</sup> Moody's special comment, The Impact of Subprime Residential Mortgage-Backed Securities on Moody's-Rated Structured Finance CDOs: A Preliminary Review, March 23, 2007, highlights the potential effect of the downgrade of subprime mortgage backed securities on the ratings of ABS CDOs.

<sup>6</sup> See Moody's special report, US Subprime Mortgage Market Update: July 24, 2007.

<sup>7</sup> See Moody's special report, Challenging Times for the US Subprime Mortgage Market, March 7, 2007.

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be derived from exercise of trigger options, it is difficult to determine with accuracy the potential impact that further deterioration in subprime mortgage performance may have on the guarantors' ABS CDO positions.

### Survey of ABS CDO Exposures

Guarantors' ABC CDOs with Subprime and CDO Collateral Originated in 2006 and 2007					
	Net Par \$million	Average Underlying Exposure Type			Average Subordination
		Subprime	CDO	Other [1]	
<b>MBIA</b>					
High Grade	\$10,613	33.6%	21.0%	45.4%	13.9%
Mezzanine	\$ 473	44.0%	5.0%	51.0%	37.0%
<i>Total</i>	\$11,086				
<b>Ambac</b>					
High Grade	\$19,082	36.6%	24.0%	39.4%	20.4%
Mezzanine	\$ 2,910	16.9%	81.1%	2.0%	40.9%
<i>Total</i>	\$21,992				
<b>FGIC</b>					
High Grade	\$ 5,949	43.2%	20.8%	36.0%	15.1%
Mezzanine	\$ 2,228	78.4%	5.3%	16.4%	39.7%
<i>Total</i>	\$ 8,177				
<b>SCA</b>					
High Grade	\$13,159	17.6%	23.0%	59.3%	12.5%
Mezzanine	\$ -	0.0%	0.0%	0.0%	0.0%
<i>Total</i>	\$13,159				
<b>CIFG</b>					
High Grade	\$ 1,600	22.1%	14.4%	63.5%	13.1%
Mezzanine	\$ 4,858	48.0%	6.1%	45.9%	35.0%
<i>Total</i>	\$ 6,458				
<b>Industry</b>					
High Grade	\$ 50,403	31.6%	22.5%	45.9%	16.3%
Mezzanine	\$ 10,469	45.4%	27.8%	26.8%	37.8%
<i>Total</i>	\$ 60,872				

[1] Including other RMBS collateral.

Moody's preliminary review of the guarantors shows that only three, Financial Security Assurance, Assured Guaranty Corp and Radian Asset Assurance have not insured meaningful volume of ABS CDOs in recent years. Most of the remaining guarantors rated by Moody's, including Ambac, CIFG, FGIC, MBIA and Security Capital Assurance, have been active in this sector, insuring in aggregate approximately \$61 billion in ABS CDOs during 2006 and 2007. An important point, however, is that almost all of this exposure attaches at the "super-senior" level (i.e., senior to a Aaa tranche), thereby providing significant collateral protection against changes in the underlying expected losses.

Yet the large differences in performance of subprime mortgages by vintage and originator, or even pool to pool, combined with the potential impact on the various tranches of RMBS, calls for a more in-depth review of the specific investments of ABS CDOs. Guarantors have not uniformly tracked – in detail – the composition of cascading CDO assets held within the CDOs that they insure. Nevertheless, we continue to develop stress scenarios based on a variety of assumptions about both the specific construction of, and the performance of, underlying collateral.

## Financial Guarantors' Subprime Risks: From RMBS to ABS CDOs

### Scenario Testing and Exposure Monitoring of ABS CDOs

#### Overview of Scenario Testing

In order to assess the potential for claims on the financial guarantors' exposures to CDOs containing subprime RMBS, including CDOs that, in turn, hold CDO collateral containing subprime RMBS, Moody's developed a model that estimates the expected loss content of 2006-7 vintage CDOs, via stochastic simulation, based on a combination of company-provided data and Moody's assumptions. All companies provided us with the general type (high grade or mezzanine) and asset breakdown (% subprime, % CDO) of their insured CDOs on a deal-by-deal basis. We did not model pre-2006 ABS CDOs, assuming that their assets were largely unexposed to recent vintage subprime loans. In some cases, we used further details, where available from the guarantor, such as the rating distribution and CDO collateral breakdown (high grade, mezzanine or other). In the absence of specific data from the company, we made the following assumptions regarding the asset composition of each ABS CDO:

High-Grade CDO Assumptions					Mezzanine CDO Assumptions				
X% [1]	Subprime	60%	Aa		X% [1]	Subprime	0%	Aa	
	Collateral	40%	A			Collateral	10%	A	
		0%	Baa				90%	Baa	
Y% [1]	CDO Collateral	20%	High Grade	20% Aa 80% A 0% Baa	Y% [1]	CDO Collateral	20%	High Grade	0% A 90% Baa 10% Ba
		60%	Mezzanine	20% Aa 80% A 0% Baa			60%	Mezzanine	0% A 90% Baa 10% Ba
		20%	Other				20%	Other	
Other = 100% - X% - Y%					Other = 100% - X% - Y%				
[1] Data provided by the guarantors.									

At an even more granular level, we used the following assumptions to describe the characteristics of the CDO collateral held within their insured CDOs, where we have assumed the following "inner CDO" distribution by type and rating<sup>8</sup>:

Inner CDO Assumptions									
<b>20% High Grade</b>					<b>60% High Grade</b>				
45% Subprime	60%	Aa			45% Subprime	0%	Aa		
	40%	A				10%	A		
	0%	Baa				90%	Baa		
55% Other					55% Other				
<b>20% Other</b>									

<sup>8</sup> We have assumed that the CDO collateral held within the guarantors' insured CDOs do not themselves contain CDO collateral.

## Financial Guarantors' Subprime Risks: From RMBS to ABS CDOs

### ***Subprime RMBS characteristics and performance***

- In our base case, we assumed a lognormal distribution of cumulative losses with a 10% mean and a 3% standard deviation.
- For stress scenarios, we increased the cumulative losses on subprime pools, keeping the standard deviation constant.
- We assumed that the "other" collateral held within the CDO does not generate losses (which, for mezzanine deals, may understate risk given the low average rating of the collateral.)

### ***Limitations of, and conservative bias of, the model***

- We did not take into consideration the actual timing of CDO pool losses (from subprime RMBS or CDO collateral), instead making the conservative assumption that all cumulative losses occur on day one. This is likely to overstate actual CDO expected losses.
- We did not capture the possible benefit of positive (nor did we assume adverse) selection on the part of the guarantors, which could result in above average performance. Guarantors also use different definitions for subprime collateral, resulting in somewhat inconsistent reporting.
- Our model does not give benefit for actual triggers built into the deals (i.e. over-collateralization and interest coverage tests). The breach of such triggers when deals perform below expectations could lead to earlier amortization or other changes that benefit senior creditors, thereby improving actual performance relative to our modeled results.
- We applied the same loss distribution to all subprime collateral held within a CDO without regard to vintage. This is conservative in that some subprime collateral was originated in 2005 or earlier, which is likely to perform significantly better than implied by our assumptions.

### **Current Subprime Performance Expectations Suggest Little or No Loss**

Based on the modeling work described above, no guarantors would experience material increases in expected claims (defined as the average claims to the guarantors resulting from the stochastic simulation for the given subprime cumulative loss assumption) from a rating perspective given Moody's current cumulative loss expectations for 2006-vintage subprime mortgage pools. This result is generally consistent with the tone of public disclosure provided by the guarantors themselves, and is not unexpected given the senior nature of their exposure. We note, however, that our model does not specifically focus on the potential for CDO downgrades and the impact that such downward rating migration would have on the guarantors' current capital adequacy ratios. The table below shows the effect of our ABS CDO stresses on the capital profile of the guarantors, as captured by the reduction in hard capital ratios<sup>9</sup>.

<sup>9</sup> Moody's hard capital ratio shows the relation between a guarantor's claims paying resources and its insurance portfolio's cumulative losses at the 99.9<sup>th</sup> percentile. A ratio of 1.0 times implies capital resources consistent with a Aaa probability level but Moody's overall expectation is a hard capital ratio of at least 1.3 times for a Aaa-rated guarantor to account for possible subsequent capital needs and prudent risk management.



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