

**Statement of Gary Witt**  
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**Submitted by request to the**  
**Financial Crisis Inquiry Commission**  
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**Opening Remarks**

Chairman Angelides and members of the Commission, my name is Gary Witt. Since 2008, I have been teaching full-time at Temple University in Philadelphia and no longer have any affiliation with Moody's. I am pleased to be able to participate in today's discussion. The opinions I express are mine alone.

The Financial Stability Act that recently passed both houses of Congress expands the powers of the SEC to regulate of the credit rating industry. The SEC will determine over the coming months and years how best to use these new powers to foster more accurate credit ratings. I hope they find our deliberations useful.

I was an analyst and then managing director in the US Derivatives group at Moody's from September 2000 until September 2005 when I was reassigned within Moody's away from CDOs. As one of four managing directors in this CDO group for 18 months from March 2004 until September 2005, I reported to Gus Harris. To the best of my recollection, I was responsible for the following areas: cash-flow ABS CDOs, market value CDOs, Collateralized Fund Obligations (CFOs), Catastrophe Bonds, and along with Bill May, Structured Financial Operating Companies.

Rather than delving further into details, I would like to use this time to provide some context to our discussion of the years preceding the financial crisis.

I'll start with an analogy to describe the market players. Picture the organizations in the financial markets as animals roaming an open plain. The hedge funds were wolves, hunting in packs, eating what they killed. The investment banks were a now extinct species of predatory cats, saber-toothed tigers, larger and more powerful than the hedge funds. The money center banks were the elephants, big, indestructible, almost a feature of the landscape. And the rating agencies? They were definitely the goats – specifically, the scapegoats. The analogy is almost perfect. From the perspective of the other market players, rating agencies fought over scraps to perform a necessary but lowly task. Just as described in Leviticus,

the scapegoats' primary function is to absorb the blame for the sins of the community. They are the animals that everyone loves to hate.

During this financial crisis, many people were quick to assign blame to the rating agencies. This is appropriate up to a point. We at Moody's, along with almost every major participant in the capital markets, failed to grasp the magnitude of the housing bubble before 2007; however, as in the parable above, there is a strong tendency to blame the rating agencies far more than is justified by their previously mistaken opinions. I believe this tendency results from three related reasons.

The first reason is that people expect too much from ratings. My wife once asked me, "What good is a rating if it can't predict the future?" The answer is that ratings are tools that help investors manage risk. A bond rating boils down the received wisdom of the market to a single symbol. Especially for managers of large portfolios, ratings provide easy organization of a complex risk environment. They are useful and publicly available to all investors at no charge but investment decisions should always be based on much more than just a rating.

Second, a rating downgrade is bad news. It's bad news for the issuer and bad news for investors. By definition a rating agency is the bearer of this bad news, the messenger that is so often shot.

The last reason that large rating agencies like Moody's are too popular as scapegoats is the glaring conflict of interest at the heart of their business model. They are paid by the issuers they rate. Managing this conflict requires that Moody's balance the competing interests of two groups: investors in Moody's shares and investors in the debt that Moody's rates.

During my tenure, management did focus on market share and profit margin so a question I often ask myself is this. Did the competition among rating agencies in the securitization markets lead Moody's management to over-emphasize the short-term interests of shareholders? I don't know. I can say that it is extremely difficult to know where the line should be drawn between these two competing interests. While short-term profits are easy to measure, bond-holders interests are served by the zealous pursuit of an elusive and distant goal, the right rating.

In my opinion, addressing the conflict between these two asymmetric goals is the most important task the SEC faces in its regulation of the credit rating industry. I have described my ideas on addressing this issue in a published article that I included with my written testimony. Thank you.

## Written Statement

Please refer to the four Moody's methodology papers that I have submitted as background for my testimony as well as an article submitted to Baseline Scenario, a blog managed by Simon Johnson and James Kwak.

- a) Moody's Approach to Rating Multisector CDOs – Sep 2000
- b) Moody's Correlated Binomial Default Distribution – Aug 2004
- c) Moody's Revisits its Assumptions Regarding Structured Finance Default (and Asset) Correlations for CDOs – June 2005
- d) Moody's Modeling Approach to Rating Structured Finance Cash Flow CDO Transactions – Sep 2005
- e) Reforming Credit Rating Agencies – May 20, 2010

### **Experiences Rating CDOs at Moody's until Sep 2005**

#### Background

I finished my Ph.D. in Statistics from Wharton in the fall of 1987 and joined Prudential Securities writing models to value CMOs. As a statistician, my background in mathematical finance was weak so about one year later, I joined Citibank to work for an NYU Finance professor and options theory specialist Georges Courtadon from whom I learned much. I wrote models for valuation and especially risk management for various option trading desks, especially non-dollar interest rate options. In 1990, I become a trader on that desk, trading caps, floors and swaptions in several currencies but mostly DM, Sterling, Yen, and Swiss. In 1991, I moved to London to join a derivatives trading subsidiary of Mitsui Bank as an interest rate derivatives trader. I continued to work as an interest rate derivatives trader in London until 1999. I moved back to New York to work for Prudential Securities again, this time to arrange derivatives transactions in conjunction with their structured finance underwriting and trading operation. It was at this time when I first learned about securitization in general and CDOs in particular.

### Rating CDOs at Moody's

While at Prudential I met Jerry Gluck, a Managing Director in Moody's CDO group and several other Moody's CDO analysts. Relative to S&P and Fitch, I was impressed with the transparency and intellectual coherence of Moody's approach to rating CDOs and with Jerry and his staff. I was not fond of the sales aspect of investment banking so I approached Jerry and he hired me as a Moody's analyst in the CDO group in Sep 2000. At that time, ABS CDOs were rated according to the Binomial Expansion Technique (BET) in the attached file "Moody's Approach to Rating Multisector CDOs". The BET model assumes asset defaults are independent events. A more detailed description of this BET model is given in the modeling section of my testimony.

After Jerry announced his retirement, I was promoted in March 2004 to become one of three Managing Directors in the CDO group in NY reporting to Gus Harris who ran the NY CDO group.

### The CDO Rating Process

I would describe the rating process for CDOs during the period March 2004-Sep 2005 as follows. An investment bank analyst or manager would contact the MD in the CDO group in charge of that CDO type and describe a planned CDO underwriting for a month or two hence to request that Moody's rate it. During this time period, a rating application describing the rating fees would be sent unless the MD was confident that the investment banker was already aware of the details of Moody's rating application. The MD would assign a quantitative and a legal analyst to the CDO based on a number of factors, the most important being availability and expertise. The two analysts' contact details would be given to the investment bank analysts.

The interaction between Moody's analysts and the investment banking analysts would be through a series of conference calls, on-site visits, and email information exchanges intended to convey all the information necessary for the Moody's analysts to rate the CDO. The analysts would work independently unless/until there was an issue needing to be discussed with the relevant MD. Sometimes the relationship between the banking and rating analysts was strained. The investment banking analysts tended to be highly motivated, ambitious people expecting to get their own way. Banking analysts would sometimes use deceptive or intimidating tactics to achieve their goals. Managing these banking relationships took up a great deal of time and focus.

In addition, our analysts would speak with and visit the Collateral Manager if no one had done so in the recent past. The rating process would culminate in a rating committee usually chaired by the MD. A rating letter would be sent to the arrangers just prior to the closing date of the CDO that would specify exactly the ratings of all the rated securities and a definition of those ratings.

*Rating Decisions were based closely on a transparent methodology*

The rating decision taken during the rating committee was based largely on modeling results. For cash-flow ABS CDOs, the expected loss of each tranche was calculated under several different combinations of interest rate scenarios, default timing scenarios and prepayment scenarios for a total of about one hundred different expected loss numbers. There were specific guidelines for converting those expected loss results into ratings. Moody's CDO rating methodology was published on its website and freely available to all interested parties. As such it was very transparent. The methodology used to produce these expected losses (and hence the ratings) was based on public information.

It is important to understand that most groups within rating agencies do not have methodologies that are transparent or even objective to the extent that the CDO group at Moody's did during my years there. I believe the benefits of a transparent, objective rating methodology outweigh the costs but there are good reasons for opinions to differ on this point. If issuers know what the methodology is, they will structure their issues to conform to it. Also, the fact that CDOs are derivative instruments makes a transparent, objective policy possible because publicly available ratings of the assets are the most important inputs necessary to determine the rating of the CDO notes. Further, a transparent methodology can be a straightjacket as it reduces flexibility in many ways. For instance, changes in rating methodology are more difficult because of its immediate and obvious consequence for outstanding ratings.

The benefits of a transparent methodology are that it provides strong rating discipline to the rating agency. It increases accuracy as any deviations from published methodology are likely to be caught by other market participants. Letting in the sunlight through transparency allows the rating agency to benefit from the suggestions of other market players as to what changes in rating policy are warranted. It facilitates an efficient issuance pipeline as market players can make reasonable estimates of ratings themselves and plan accordingly. It reassures other market players of the integrity of the rating process by removing even the appearance of favoritism or bias in rating decisions.

*Did Rating Analysts and Investment Bank Analysts work too closely?*

There are some misconceptions and legitimate concerns that one often reads in press in relation to this process. It is often stated that rating agencies acted as consultants or structured CDO transactions. During my 18 months as an MD at Moody's, I know of no cases of analysts being paid as consultants to structure deals. On the other hand, concerns that rating analysts and investment banking analysts worked too closely together prior to the issuance of securitized debt is a legitimate concern. Typically, it was stated in the offering documents of these CDOs as a condition of issuance that each tranche achieve a certain rating from a certain rating agency. Obviously, the only way the underwriter could include the rating of each tranche in offering documents as a condition of issuance was if the underwriter already knew the rating prior to issuance. On complex securitization, allowing such language to appear in the offering documents guarantees that investment banks and rating agencies will work closely together during the structuring phase of the transaction. The SEC could prohibit such language in the offering documents of these securities and could require a certain waiting period (e.g. four weeks for long dated securities) until ratings are issued. They could allow for a rating agency to be engaged prior to issuance so that investors would know who would rate the issue but not the actual rating level. The downside of such a policy is that investors would not know the rating of securities on the offering date and would bear an additional "rating risk." This would force investors and underwriters to rely less on ratings in the initial offering period. It would also be very helpful in combating ratings shopping (addressed under Market Share Considerations).

Staffing decision made as a result of pressure from a bank

When Rick Michalek testified on April 23, 2010 before the Senate's Permanent Subcommittee on Investigations that "I was told by a different managing director that a CDO team leader at Goldman Sachs ... would prefer another lawyer", he was referring to me as the unnamed Moody's managing director.

In my opinion, Rick Michalek was an exceptionally thorough legal analyst. His zealous document reviews were an added expense for investment banks who hired top law firms as transaction counsel with high hourly fees. It was my understanding that this behavior (exceptionally thorough document reviews that resulted in high legal fees being charged to investment banks) had led to a personal reprimand from Brian Clarkson, then head of structured finance. Rick confirms this in his testimony writing about a meeting with Brian Clarkson "the primary

message of the conversation was plain; further complaints from the ‘customers’ would very likely be abruptly end my career at Moody’s”

To the best of my recollection, in late 2004 or early 2005, I received a request from a CDO structurer at Goldman Sachs that Rick not be assigned to further Goldman Sachs CDOs for the next year. I was told that failure to comply with their request would result in a phone call to one of my superiors. I was concerned that this could possibly result in Rick’s dismissal. I discussed the situation with Rick and we both agreed that the best course of action was to comply with Goldman’s request. My thinking was that if I needed Rick’s expertise on any specific issues on later Goldman deals, as long as he was employed by Moody’s, I could at least have him review sections of their documents on an as-needed basis without his formal assignment to the transaction. Rick was my friend and I wanted to protect him but more importantly, he was an excellent resource for document review on complex or deliberately misleading deal documentation and I needed to retain his expertise.

#### Liquidity Puts for Commercial Paper Issued out of CDOs

Watching some testimony of previous FCIC hearings, I was reminded of some experiences I had as an analyst and MD in the CDO group that I thought might be of interest to the commission. These events occurred over five years ago but this is what I remember.

In late 2003 I worked with Rick Michalek on two CDOs underwritten by Citi that were very early versions of high-grade CDOs that issued a large volumes of P-1 rated commercial paper. I was of the opinion then as an analyst and later as an MD that the long-term Aaa rating on ABS CDOs did not imply that those securities would remain liquid throughout their lifetime. My perspective was that a CDO could only issue P-1 rated commercial paper if a P-1 counterparty made a binding commitment to purchase the CP if no one else would. I was very conscious of the importance of money market funds to the financial system, the importance of CP to money market funds, and the importance of a P-1 rating via Rule 2a-7 as a criterion for collateral in money market funds.

The solution from Citi and other banks was to embed a “liquidity put” in the underlying transaction documents. I believed this was similar to Asset-Backed CP conduits although I was not that familiar with ABCP conduits at the time. There seemed to be an emphasis on the part of the banks to distinguish between these liquidity puts and an outright credit guarantee of the underlying Aaa CDO tranches. I suspected it was referred to as a liquidity put instead of a credit

guarantee to minimize the apparent risk to Citi although I could see little difference between the two.

I found the documentation concerning the liquidity puts on these transactions to be impenetrable. I was very concerned that the complexity of the documents could conceal contingencies under which Citi would *not* be obligated to purchase CP in the event of a failed auction. As this would result in a payment default to a CP investor, my estimation of the value of Rick's document review expertise and dogged determination increased dramatically as he was able to effectively review these complex agreements.

### Market share considerations in ABS CDOs

In my early years at Moody's as rating analyst I was assigned CDOs to rate and my focus was narrow. Follow the methodology and get the right rating. After I was promoted to managing director and had to deal with budgets and staffing I began to see a bigger picture. There was a legitimate need to consider the interests of shareholders in making a profit. As an MD, my marching orders as I understood them were to first get the ratings right and then second to maximize profits. I was told that it was acceptable to lose ratings and have a declining market share as long as you had a reason. If we lost ratings because the other agencies ratings were higher than ours and I believed that we were right and they were wrong, I needed to be able to articulate to my superiors the reasons why we were right. If the situation persisted, I needed to publish the explanation of why our ratings were right and our competitor's ratings were wrong.

As an example, at Moody's the CMBS group changed its methodology to be more conservative at the beginning of the financial crisis. Tad Phillip from the CMBS group advised Brian Clarkson and Noel Kirnon that he believed the conditions in the commercial property market would deteriorate and that Moody's should increase its rating standards. They all expected to suffer lost market share and lower rating revenue and they certainly did. There was a rapid loss of market share (my recollection is their market share dropped from 75% to 25%) in spite of the fact that the financial crisis had already begun. My recollection is that the press hardly noticed or commented. This is an important story that illustrates that Moody's management was willing to forego large amounts of lost revenue in order to get to the right rating. On the other hand, this CMBS story illustrates how it was difficult to make changes in methodology based on forward looking concerns about the markets as Tad was able to point to current market dislocations as

evidence. Methodology almost always depended on past data as the only unassailable objective source of information and this is an exception that illustrates the rule.

### *Coping with low market share in mezz RMBS*

I received emails with attached spreadsheets on a periodic basis detailing CDOs rated by S&P and/or Fitch but not by Moody's. I was often asked to research the reasons why Moody's did not rate these CDOs. As 2004 progressed into early 2005, to the best of my recollection, there were a number of ABS CDOs not rated by Moody's due to the fact that Moody's did not rate several of the underlying mezzanine RMBS tranches, in which case the CDO would have received a lower Moody's rating due to our notching policy. The issuer might be able to avoid a lower rating if the issuer paid extra fees to obtain rating estimates for those tranches not previously rated by Moody's. Because the process of obtaining rating estimates was expensive, time-consuming and uncertain as to outcome, many issuers did not obtain Moody's ratings when large percentages of the underlying collateral were not Moody's rated.

This was a source of concern for my direct superior Gus Harris. I recall visiting with him the offices of one particular issuer, C-Bass on more than one occasion where we would discuss ways that Moody's could reduce the cost and speed the process of obtaining the necessary rating estimates of those tranches unrated by Moody's.

During that time period interest rates were rising. Three month labor started 2004 at 1% and rose to 2.5% by the end of 2004 and 4.5% by the end of 2005. Although I was not in the RMBS group at Moody's and did not follow these events on a daily basis, it is my understanding and recollection based on press reports from that time period and from other market participants that the primary reason that Moody's did not rate the underlying mezzanine RMBS tranches was that S&P did not update its interest rate assumptions even after rates began to increase. This had the effect of making S&P's ratings on mezzanine RMBS higher than Moody's. After some criticism, S&P did update its interest rate assumptions in the middle of 2005 and Moody's market share in mezzanine RMBS rose to a substantially higher level. I left the CDO group in Sep 2005 but I have seen evidence that Moody's market share in ABS CDOs increased later in 2005, 2006 and 2007 as its share in the underlying RMBS collateral increased.

### *Ratings Shopping*

A very legitimate issue for concern by regulators is ratings shopping. It was interesting to hear Secretary Geithner's comments about regulatory arbitrage at the FCIC hearing on the Shadow banking System. He pointed to the case of Countrywide choosing its own regulator by establishing itself as a thrift. The situation with ratings and rating shopping in the securitization markets is much worse. Underwriters and/or issuers can and do change rating agencies at any time. They are also more than willing to use the threat of dropping an agency from a transaction to try to obtain leverage on whatever issue is of concern to them. The situation is exacerbated by the fact that most investors hardly make a distinction between the better known agencies viewing the ratings and the rating agencies as interchangeable (as a Moody's employee I was often mistakenly referred to as working for S&P by other market players, sometimes when they were visiting our offices). Issuers almost always opt for the highest rating obtainable period. The previously mentioned example of the CMBS group changing its methodology to be more conservative at the beginning of the financial crisis is of course a classic illustration of rating shopping. In spite of the fact that the financial crisis had already begun, issuers still went with the highest rating with apparently little regard for quality. Issuers only priority is to offer debt on the most favorable terms possible. An article in the Wall Street Journal just last week by Serena Ng described how the practice is alive and well. The important point to understand is that no single rating agency can address this problem. It can only be addressed through regulation. The Credit Rating Agency Reform Act of 2006 probably made the situation worse with its focus on increasing competition among rating agencies without any compensating mechanism to combat rating shopping. More recently, the amendment to the Financial Stability Act offered by Senator Franken may help but it too must be monitored for unintended consequences. If the SEC or its appointed board promote any particular agenda by dictating which rating agency rates which transactions, rating agencies will seek to issue ratings in a way that conforms to that perceived agenda.

### Overview of Management Responsibilities as a Team MD in CDOs: Mar04-Sep05

The previous sections have mostly described the role of a managing director in the new issue rating process for CDOs. During this time period, MDs had many other responsibilities.

Along with Bill May and Yuri Yoshizawa, I was a Team MD in the US Derivatives Group. We reported to a Group MD, Gus Harris who headed US

Derivatives, who reported to a Senior MD heading Global Derivatives, Noel Kirnon, who in turn reported to the head of Structured Finance, Brian Clarkson. During this time, all three of these executives above me in the hierarchy had offices on the eighth floor of 99 Church St as did Bill, Yuri and I and the most of the US Derivatives Team of about 80 analysts. The TMDs each had 15-20 direct reports and no staff. We had no independent research staff and no administrative staff. I shared a secretary with many other people and her time was often allocated to the more senior managers on my floor. The management structure was still totally flat at my level but as we grew there was a great need to create another level of hierarchy which I worked toward throughout my eighteen months with the appointment of team leaders who could substitute for me as committee chairman in their area of expertise when needed.

Transaction volume was growing by 50% per year and in some areas faster. During this time, we were responsible for methodology and monitoring of existing transaction in our areas. During my eighteen months as an MD in CDOs I spent a huge amount of time working on methodology because the ABS CDO market especially was in transition from multi-sector to single sector transactions which I felt clearly implied a need to update our methods.

The problem of recruiting and retaining good staff was insoluble. Investment banks often hired away our best people. As far as I can remember, we were never allocated funds to make counter offers. Basically we had a few seasoned quantitative staff. We compensated by hiring large numbers of junior staff to flesh out our ranks but inexperienced people had to be trained. Then, they became prime targets to be hired by I-banks. It was extremely difficult for us to hire experienced quantitative analysts. One very frustrating experience I had was in trying to hire a mid-thirties quant from Wharton whom I knew personally to be extremely good but unhappy at the consulting firm where he worked. He would have been a big asset for the CDO group but my boss refused to pay an extra \$20,000. He was hired away by an insurance company for \$20,000 more than we offered him. We were better able to attract good legal staff because working conditions at the law firms were difficult, so some experienced lawyers were happy to work at Moody's. There had been across the board salary raises just prior to my coming to Moody's. Apparently management was determined not to repeat that mistake. Our complex product line was increasing the importance of experienced quants. We had almost no ability to do meaningful research. Our market was growing rapidly. In my opinion, penny-pinching on salaries in a group with very large profit margins but these serious staffing issues was poor management.

I was also in charge of several other segments of the CDO market but the biggest time killer was the Structured Financial Operating Companies (SFOC). These were a mixed bag consisting of several existing Derivative Product Companies established in the 1990s by various banks around the world to use collateral posting requirements to create Aaa counterparties to offer interest rate or currency derivatives. A new type of SFOC was the Credit Derivative Product Company that would perform the same counterparty rating enhancement for offering credit derivatives. These were more complex than the older DPCs and were only emerging so we had to grapple with many novel risks. There were several other types of SFOCs that demanded my time as well as the other product lines I mentioned in my opening remarks.

Another problem was that senior people from investment banks often called with complaints or requests. We were expected to address their concerns if at all possible. Senior bankers generally had relationships with our superiors and would call them if unsatisfied. I, and I believe my two colleagues as well, were in a reactive mode almost all the time. It was a very difficult working environment that left little time to reflect or to prepare for the future.

#### Modeling Considerations

*Note: There is additional detail about Moody's modeling in the final section of this written testimony which is a rebuttal to an article posted on Bloomberg.*

The FCIC preliminary staff report "Securitization and the Mortgage Crisis" dated Apr 7, 2010 contains an accurate depiction of the construction of a CDO in Figure 3 on page 9. A pool of BBB RMBS bonds are used as a collateral pool against which CDO liabilities are issued. RMBS tranches in the middle of the capital structure rated A or BBB were referred to as mezzanine bonds, hence the term mezzanine ABS CDOs.

#### *ABS CDO liability ratings depended heavily on ABS ratings*

Almost all Moody's CDO rating methodologies were derivative in the sense that the most important input was the rating on the bonds in the collateral pool. The purpose of the methodology was to transform this pool of asset ratings into ratings on each of the CDO liabilities. The first step in this process was to convert each collateral bond rating into a default probability via standard tables compiled from Moody's long-term rating performance.

*Using the BET to calculate expected loss and rate CDOs*

When I joined Moody's in Sep 2000, ABS CDOs were rated according to the Binomial Expansion Technique (BET). The BET depended first on the ratings of the underlying assets and second on a measure of portfolio concentration called the diversity score. The BET modeled the actual portfolio with a representative portfolio. The default probability for each bond in the representative portfolio was the average default probability of the actual portfolio. For a BBB portfolio the default probability would about 5%.

*How can \$100mm of BBB bonds support a \$70mm AAA CDO rating?*

The number of bonds in the representative portfolio was the diversity score. To be more precise, the diversity score was defined as the number of *independent* bonds in the representative portfolio. The basic idea was to represent a large number of correlated bonds with a smaller number of uncorrelated or independent bonds. As an example, consider a portfolio 100 BBB corporate bonds from different industries each with a notional of \$1,000,000 and a default probability of 5%. There is a CDO issued using this collateral. The senior bond gets first priority on all money from these \$100,000,000 worth of bonds. It has a notional of \$70,000,000.

Using a BET approach we might model this portfolio as 10 independent bonds each with a notional \$10,000,000 and a default probability of 5%. For simplicity assume default results in a total loss. Then the probability that the senior bond defaults (does not pay in full) equals the probability that more than three of the \$10mm model bonds default. Here are default probabilities of the model portfolio.

**10 independent bonds each have 5% chance of default**

Number of defaults	Probability
0	59.87%
1	31.51%
2	7.46%
3	1.05%
4	0.10%
5	0.01%
6	0.00%
7	0.00%
8	0.00%
9	0.00%
10	0.00%

Since there is such a low probability of default for each bond (5%), there is actually a 60% probability that no bonds will default. From the table we can see that the probability that more than three bonds default is

$$0.10\% + 0.01\% = 0.11\%$$

That is about 1 out 900 which would be a Moody's rating of about Aa2.

If we increased the diversity score, the number of independent bonds to 20 each of \$5mm and repeated the exercise to calculate the probability that more than six of these bonds default, the probability would be 1 out of 30,000, clearly Aaa. That would be accurate if we believed that ten representative bonds understate how much diversification we have in our portfolio.

As the example illustrates, probabilities can easily be calculated for differing default percentages of the collateral pool. With these probabilities and some further assumptions about loss given default, the expected loss of each tranche of the CDO liabilities could be calculated and the rating determined. The expected loss is simply the probability of each loss scenario times the loss for that tranche. The loss for each tranche is calculated from the collateral loss by a separate model of the cash-flow waterfall or priority of payments that determines how cash from assets is allocated among the liabilities in each period.

The BET was wonderfully simple but it depended heavily on the calculation of the diversity score. For the first CDOs rated with this method, emerging market and high yield debt (aka junk bonds) during the period 1995-2000, the diversity score was calculated by dividing bonds into groups and counting how many bonds were in each group. Within each group the contribution to diversity score increased at a decreasing rate and was capped at five so that maximum diversity score contribution from a single group was five. For corporate bonds the groups were industries and the maximum possible diversity score was the number of industries times five. There were about 30 industries but the typical high yield CDOs had a diversity score between 40 and 50.

### *Multisector ABS CDOs*

After the Asian financial crisis and LTCM debacle, credit spreads on risk assets in 1999-2000 remained wide. Investment banks held inventories of highly rated collateral with unusually wide spreads and were seeking a solution of how to sell them. It was in this environment that the first ABS CDOs were issued and rated. They were tellingly referred to as multisector CDOs because emphasis of early

ABS CDOs from this period was on constructing a diversified portfolio of ABS. A typical ABS CDO from 1999-2002 contained 33% RMBS, 25% CMBS, 10% Manufactured Housing (MH), and one-third from securitizations of credit cards, auto loans, student loans, aircraft leases, equipment leases, mutual fund fees and other more exotic categories of receivables. See the paper I submitted with my testimony "Moody's Approach to Rating Multisector CDOs".

This paper continues to use the BET as the basis for modeling defaults. One innovation is an alternative method for calculating the diversity score, often referred to as the two-moment method because the representative portfolio is chosen to match the mean and the standard deviation of the default distribution on the actual portfolio. This two-moment matching scheme is possible because default correlation assumptions were introduced at that time.

Here is the first paragraph in the section *Assumptions about Default Correlations*. "In order to apply the alternative diversity score, we must make assumptions about default correlations. Implicitly, any measure of diversification relies on such assumptions. Because there have been very few defaults among structured instruments, our default assumptions are based on a priori views as to the extent to which different asset classes are related."

My understanding was that the correlation assumptions were educated guesses derived from discussions with analysts in these various securitization areas. Little data was available so little data was used. In any event, it was these correlations that determined the diversity score for ABS CDOs at Moody's until the second half of 2005. They were some slight modifications (as I recall to HEL) over these years but essentially these original default correlation assumptions were used. The Sep 2000 paper shows calculation of the diversity score but does not list correlations. The table below is based on the best information I have at this time but I believe it to be accurate for investment grade assets in ABS CDOs during 2004-2005. Correlations between below investment-grade assets were slightly higher.

**HEL**- Home Equity Loans

**MH**- Manufactured Housing

**Resi A** – Residential A, later called prime

**Resi B&C** – Residential B&C, later called Alt-A and sub-prime

**CMBS** – Commercial Mortgage Backed Securities, this is the correlation assumption for the Conduit category within CMBS.

**Mut Fund Fees** – Mutual Fund Fees

## Indicative Default Correlation Assumptions for ABS CDOs

	HEL	MH	Resi A	Resi B&C	Cards	CMBS	Aircraft	MFFee
HEL	14.0%	3.0%	10.75%	3.0%	7.5%	0.0%	0.0%	0.0%
MH	3.0%	14.0%	3.0%	10.75%	7.5%	0.0%	0.0%	0.0%
Resi A	10.75%	3.00%	14.0%	3.0%	7.5%	0.0%	0.0%	0.0%
Resi B&C	3.0%	10.75%	3.0%	14.0%	7.5%	0.0%	0.0%	0.0%
Credit Cards	7.5%	7.5%	7.5%	7.5%	14.0%	0.0%	0.0%	0.0%
CMBS	0.0%	0.0%	0.0%	0.0%	0.0%	12.0%	0.0%	0.0%
Aircraft Lease	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.0%	0.0%
Mut Fund Fees	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.0%

### *Explanation of Table Correlations*

For example the correlation between two Resi A bonds was 14%.

The correlation between a Resi A bond and a Resi B&C bond was 3%.

Higher correlations implied lower diversity scores.

In general the more bonds in the collateral pool, the higher the diversity score.

Here is a rule of thumb to understand the relationship between the default correlation and the diversity score. If  $D$  is the diversity score and  $\rho$  is the correlation, then, in the limit as the number of identical and identically correlated bonds gets large, the maximum possible diversity score is

$$D = 1/\rho.$$

So a portfolio of 100 Resi B&C bonds would have a diversity score of no more than 7 because  $1/0.14 \approx 7$ .

Again, the table above is not a definitive source for these correlation assumptions. Most ABS CDOs had correlation assumptions built into their deal documentation which was used by the trustee to calculate the diversity score to monitor its adherence to the diversity score test. Typical diversity scores for these multi-sector ABS CDOs were 16-20. Credit quality was typically in the Baa1-Baa3 range, i.e. these were mezzanine ABS CDOs. These deals were in the range of \$200mm-\$500mm and often had over one hundred separate bonds in the collateral pool.

After the attacks on September 11, 2001 and the bursting of the tech bubble, various of these asset classes experienced large credit losses: notably aircraft leases, mutual fund fees and manufactured housing. By the time I was promoted to MD in early 2004, the reaction of buyers in the ABS CDO market was to concentrate more heavily on either residential or commercial mortgages. ABS

*CDO become more concentrated*

CDOs increasingly became concentrated in either RMBS or CMBS with a corresponding drop in diversification. The average diversity score for Mezzanine ABS CDOs rated at Moody's dropped from 17 in 2003 to 14 in 2004.

For modeling purposes in these ABS CDOs, the BET drastically reduced the number of assets to account for the fact that they were increasingly correlated. I have always believed that simple models are best, especially when used by large numbers of people not accustomed to using complex mathematical models. The BET was very useful in this way but for these high correlation, low diversity CDOs, the gap between the actual portfolio and the representative portfolio was becoming too wide. The assumption of independence in the BET was becoming a problem as the portfolios we were modeling became more highly correlated. Further the trend toward concentrated portfolios was continuing.

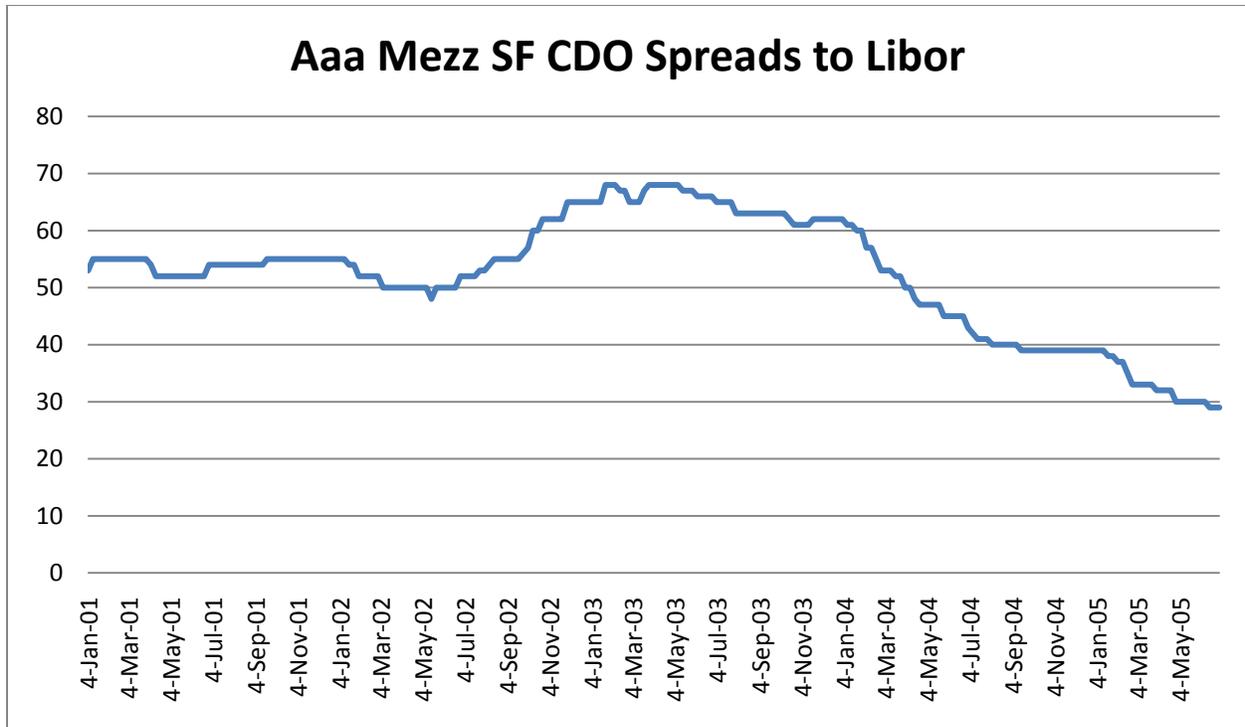
The obvious alternative was to use the normal copula to simulate the loss distribution of the collateral pool. Other rating agencies and investment banks were rapidly moving to adopt it. It did not depend on the assumption of independence. I was not a fan of the normal copula for several reasons. It depended on the multivariate normal distribution which was famous among statisticians for having thin tails. This problem was especially pronounced for high-grade CDOs which were becoming more popular. These were ABS CDOs that had an average rating in the Aa2-A2 range. I did see the normal copula as an improvement over the assumption of independence but I was wary of simulations in the context in which we ran our business. It was too hard to catch calculation errors as simulations vary with each implementation. I wanted to retain a closed form distribution like the BET except with correlation built explicitly into the model.

In spite of my difficult work environment, I worked hard on weekends and late at night to develop just such a model. My goal was to find a way to assume a uniform portfolio including uniform default correlations to determine a valid, useful portfolio default distribution. I wanted to keep the diversity score and default correlation framework but introduce correlation explicitly into the model. I achieved this goal. I wrote and was allowed to publish on Moody's website in August 2004 the paper "Moody's Correlated Binomial Default Distribution." It includes a measure of correlation in the model and so addresses what I viewed as the major drawback of the older BET methodology, its assumption that assets are independent.

The correlated binomial with default correlations as described in this August 2004 paper was used for a new type of CDO, Trust Preferred (TRUPS) CDOs but it was not adopted as Moody's methodology for ABS CDOs. In theory, we would have used it for CDOs with a diversity score of less than ten but this rarely occurred.

The Aug 04 paper contains a comparison of expected losses for the BET versus the correlated binomial and the normal copula. All calculations are based on the old default correlations assumptions from the Multisector paper. The normal copula expected losses are calculated by converting from default correlations into copula (or asset) correlations via the following scheme. For a given default probability, use the default correlation to calculate the joint probability that two assets default. Then, choose the copula correlation that gives the same joint probability of two asset defaults. Using this scheme, for the range of default correlations and default probabilities encountered in these applications, as Table 4 shows, the expected losses are very similar for the correlated binomial and the normal copula. The expected losses at the Aaa level for the BET were much lower indicating that the BET would give higher or less conservative ratings. It should be emphasized that I did not have an agenda to lower our ratings. I wanted to use a more accurate model for concentrated portfolios but did not have a premonition of the house price declines that were still more than two years in the future.

The more widely known methodology, the Normal Copula was instead adopted. I accepted this decision as it was reasonable. I believe it to be an improvement over the BET for highly concentrated CDOs. In June 2005, after the research by various analysts and after various committee meetings chaired by Noel Kirnon, then head of global CDOs, the methodology and parameters in the paper "Moody's Revisits its Assumptions Regarding Structured Finance Default (and Asset) Correlations for CDOs" based on the normal copula were adopted. It is my belief based on what I know, that the new correlations were based on a more systematic study of data than the earlier correlations from the Multisector paper of Sep 2000 - mainly because, by 2005, more data was available. My understanding is that this paper defined the ratings of ABS CDOs until at least Sep 2007.



**Credit Spreads on Mezzanine ABS CDOs from 2001 until June 2005**

This graph is included to provide some perspective on the market for Aaa ABS CDOs at the time that these correlations were updated. Spreads on Aaa mezzanine ABS CDOs had been declining steadily for two years.

This June 2005 paper does include the correlation assumptions in it. A comparative sample is given the below table. With the benefit of 20/20 hindsight the correlations in that paper should have been higher. The same statement is true for the default correlation assumptions used in the BET. It would have been difficult to justify raising correlations substantially higher given the historical data and trends in CDO spreads in the market at the time shown in the graph above.

In reference to the following table, it must be emphasized that these are normal copula correlations and not default correlations. Direct comparisons between the two are not meaningful. The valid comparison is to consider the impact on expected loss calculations for CDO tranches at various level of subordination where the collateral portfolio has been categorized using both the default correlation and copula correlation approaches.

**Indicative Copula Correlation Assumptions for ABS CDOs - June 2005 –  
Assumes One Year Vintage Penalty (one year apart - not the same year)**

	Prime	MidP	SubP	MH	Cards	CMBS	Aircraft	MFFee
Prime	22.0%	4.0%	4.0%	4.0%	3.0%	1.0%	1.0%	1.0%
Midprime	4.0%	24.0%	4.0%	4.0%	3.0%	1.0%	1.0%	1.0%
Subprime	4.0%	4.0%	27.0%	4.0%	3.0%	1.0%	1.0%	1.0%
MH	4.0%	4.0%	4.0%	47.0%	3.0%	1.0%	1.0%	1.0%
Credit Cards	3.0%	3.0%	3.0%	3.0%	26.0%	1.0%	1.0%	1.0%
CMBS	1.0%	1.0%	1.0%	1.0%	1.0%	21.0%	1.0%	1.0%
Aircraft Lease	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	40.0%	1.0%
Mut Fund Fees	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	40.0%

This categorization was done for two portfolios in the Sep 05 paper described below “Moody's Modeling Approach to Rating Structured Finance Cash Flow CDO Transactions”. Using the example portfolio Diversity Score 10 from table 4 with a recovery of 30% and a default probability of 3.5%, I found that the expected loss using the appropriate stress for the BET was higher at 19% but lower further out in the tail of the portfolio. So the correlated binomial using the MAC to mimic the normal copula as described in the following paragraph would be more conservative than the BET at the Aaa level for this mezz portfolio. More detail about the assumptions used in this example were provided to the FCIC staff.

Subordination Level	Norm Copula/CBM E(Loss)	BET E(Loss) with Stress Levels
19%	0.0191%	0.0200% Aa1 Stress
20%	0.0148%	0.0123% Aa1 Stress
21%	0.0113%	0.0050% Aaa Stress
22%	0.0087%	0.0044% Aaa Stress
23%	0.0067%	0.0037% Aaa Stress

I formally left the CDO group in Sep 2005 after completing work on the paper, “Moody's Modeling Approach to Rating Structured Finance Cash Flow CDO Transactions” It was written by a seasoned quantitative analyst and myself to allow Moody’s analysts to use the simpler Correlated Binomial with CDOROM to rate CDOs in a way that would very closely mimic the rating from the Normal Copula method. It describes an algorithm to determine a normal copula asset correlation (Moody’s Asset Correlation or just MAC) that is converted to a default correlation.

The default correlation is then used in the correlated binomial to replicate the loss distribution from the normal copula as specified in the June 2005 paper. Cash ABS CDOs were rated using this scheme after I left the CDO group. The idea was that the MAC would be a single measure of portfolio concentration similar to the diversity score. Also, the correlated binomial was a closed-form distribution with only three parameters and so was much easier to use than a normal copula simulation. So after September 2005, Moody's did use the correlated binomial to rate ABS CDOs as a computational convenience but only in a way that guaranteed that the expected loss and hence the rating would replicate the normal copula.

### Departure from the CDO group and aftermath

In the second quarter of 2005 I began to feel that my responsibilities were too large relative to the authority or the resources I had to address them. The pressures of revising methodology while running the group at a time of sharply rising rating volumes made me think more about how thin my resources were relative to my responsibilities. I did not feel that we were getting the ratings wrong, but I did think that we were not allocating nearly enough resources to getting the ratings right.

I called a university in Texas that had offered me a teaching job in the past. I accepted their invitation to visit the campus, meet some new people and give a lecture. They again offered me a job. I told my superiors at Moody's I was considering this job offer in late April or early May 2005. They requested that I decide quickly. The school could not match their previous offer from years before as I anticipated so in the end I turned them down and stayed at Moody's but assumed that management's trust in me was permanently diminished.

In the summer of 2005, I was asked by the head of Structured Finance at that time, to leave the CDO group and work on unspecified new products. This move was perceived by all who knew me as a demotion, 15 direct reports to zero, many tens of millions in revenue to manage down to zero. Even so, I was happy to agree to his request. I was relieved to be absolved of the responsibilities in the CDO group.

I suspected that the head of Structured Finance would begin to ignore me but to my surprise, when I pitched him the idea of Operational Quality ratings for hedge funds, he was very supportive. With his support I hired a small but solid staff and built the OQ ratings into a successful business. With this success, I began to acquire additional responsibilities for asset manager ratings. My last nine months

at Moody's I was in charge of 25-30 people worldwide rating hedge funds, mutual funds and money market funds.

During this time I had one last interaction with the CDO group. By 2007, Eric Kolchinsky had taken over my old job as MD in charge of ABS CDOs. Years before, Eric had been an analyst working for me and he began to confide in me his concerns about the mortgage market and its implications for ABS CDOs. As 2007 progressed he became much more worried but complained that his superiors did not share his concerns. In September I encountered him one day in a grave mood. He said that he knew from a senior RMBS analyst that large scale downgrades in RMBS were imminent but that he feared his supervisor would force him to continue rating ABS CDOs that would then have to be immediately downgraded. I advised him to inform the head of credit policy, Andy Kimball. He was concerned about retaliation so I volunteered to contact Andy myself. Andy and I traded emails where I informed him of the situation and sent him details of upcoming ABS CDO transactions. He thanked me and acted immediately to change policy with the CDO group so that any new ABS CDO ratings would take into account the pending downgrades of RMBS. A few weeks later Eric was transferred out of the rating agency, Moody's Investors Service, to a different subsidiary. I was disturbed by this sequence of events but never knew the whole story behind it.

Another disturbing incident from this period concerned a management meeting in October or November of 2007. Moody's reputation had suffered a strong blow with massive RMBS and related CDO and SIV downgrades. All the MDs worldwide were invited to hear the CFO and CEO speak about the state of the company. As was their practice, management opened the meeting with a lengthy discussion about our profit margin relative to S&P and how this was viewed by the equity analysts who rated our shares. Eventually, an MD from the corporate side of the company raised his hand and asked what management was doing to restore our lost reputation. The question seemed to take the CEO by surprise. I believe this was the question on everyone's mind and most people in the audience were disappointed that it was not the main topic of the meeting.

By the first half of 2008, Moody's reputation and employee morale was sinking. I had been speaking with some faculty from Temple since December 2007 as I prepared to exit Moody's. I resigned and left on good terms at the end of June 2008. I taught a training course for Moody's on structured finance on a consulting basis in the fall of 2008 but was never constrained by any financial arrangement in my ability to offer honest opinions.

## Summary Remarks

In my opening remarks I go to some length to correct the misperception that rating agencies were the primary cause of the financial crisis but it is certainly true that excess trust in ratings badly burned many investors. Worse from a perception standpoint is the fact that rating agencies completely missed the significance of the housing boom but perversely were well-compensated as a result.

As the dust settles, I see two clear goals on the horizon. De-emphasize the role of ratings in regulatory risk assessment and create a balance in the incentives for rating agencies to address the conflict of interest embedded in their business model. Again my ideas on this subject are in the piece I submitted entitled “Reforming Credit Rating Agencies.”

Finally, we are today engaged in an effort to understand the lessons of the recent financial crisis to build a stronger financial system and stronger economy. When considering the role of the rating agencies, we should not lose sight of the obvious. Mindless bashing of rating agencies can lead in the worst case to a defensive reaction on their part, keeping ratings lower than they should be. At a time of diminished confidence in financial markets, it is all the more important that rating agencies aim for the right rating, not the lowest rating. Interest rates on corporate, consumer and government debt are influenced by ratings. We will all pay a price if rating agencies are beaten down into a defensive posture.

## **Rebuttal to Elliot Blair Smith’s Bloomberg Article of Sep 25, 2008**

Motivation: I include this section because the FCIC staff and other governmental investigators and numerous reporters who have contacted me since its publication have used this misleading article as a primary source for information about Moody’s rating practices and my role in them. This article was recently referenced in a popular book, 13 Bankers, by Simon Johnson.

On Sep 25, 2008, Elliot Blair Smith (EBS) published a sensational, misleading and internally inconsistent article on Bloomberg’s website entitled “Race to Bottom at Moody's, S&P Secured Subprime's Boom, Bust.” Smith strings together innuendo and cherry-picked quotes as “evidence” of Moody’s participation in this race. The

article centers on a paper I published on Moody's website on August 10, 2004 entitled "Moody's Correlated Binomial Default Distribution." For reasons that I do not understand, I was the highlight of all his evidence against Moody's. Both published Moody's papers EBS mentions were written by me. No then current Moody's employees outside the PR department were mentioned. I spoke with one of the other two former Moody's employees quoted in the article. He shared my frustration at being quoted out of context to support conjectures with which he disagreed. I wrote to EBS with a complaint shortly after the story was posted. He never responded.

**EBS Claim:** My Aug 10, 2004 paper on the Correlated Binomial "allowed securities firms to sell more top-rated, subprime mortgage-backed bonds than ever before" initiating a "Race to the Bottom" between S&P and Moody's.

That was the first paragraph. In the second paragraph, he claims S&P began making changes the next week.

Assuming no one will notice, he switches from the topic from sub-prime residential mortgages in paragraph one to commercial real estate assets in paragraph two with no explanation how or why they are related. EBS wrote, 'A week later, S&P moved to revise its own methods. An S&P executive urged colleagues to adjust rating requirements for securities backed by commercial properties because of the "threat of losing deals."'

**My Response:** My Aug 04 paper was never adopted by Moody's to rate ABS CDOs. Had it been adopted, it would have raised Moody's standards.

- The methodology from my Aug 04 paper was approved only for TRUPs and ABS CDOs with a diversity score less than ten (see footnote 4). In practice, ABS CDOs were not rated using the methodology from this Aug 04 paper. Bond indentures from CDOs of this time period will clearly show that the diversity scores were above ten and the older BET (Binomial Expansion Technique) model was still in use for at least ten more months.
- Had the Aug 04 methodology been used for ABS CDOs during 2004-2005 with diversity scores between 12 and 16, it would have increased the

*projected* expected loss for Moody's Aaa CDOs relative to the older BET methodology. This would have resulted in Aaa CDOs with additional subordination to cushion them from loss. On page 8, Table 4, the paper clearly demonstrates this for CDOs with diversity scores of 8 and 10. Results are similar for diversity scores 12-16. There is no evidence offered in this piece that my paper did or would have lowered Moody's standards.

- Although EBS is careful to avoid saying it explicitly, the quote from S&P is placed to strongly imply that S&P *reacted to my paper* by making changes to rating requirements for securities backed by *commercial* properties. My paper made no reference to CMBS or commercial deals of any kind. There was no reason for this S&P executive, named later in the article as Gale Scott, to be concerned that my paper would even be used for CMBS related transactions. I seriously doubt that Gale Scott had my paper in mind or was even aware of my paper or me when making changes to rating requirements for securities backed by commercial properties. EBS was no doubt aware that it is almost certainly pure coincidence that the referenced S&P emails were sent one week after my paper was published on Moody's website.

**EBS Claim:** My Aug 04 paper "dispensed with the diversity test".

**My Response:** The Correlated Binomial as described in the Aug 04 paper retained the diversity score as a critical input to the rating model.

- The whole purpose of the Correlated Binomial was to *retain* the diversity score while introducing correlation explicitly into the model. The diversity score is retained as a key input for the Correlated Binomial rating methodology in Expression 4 on page 5 for all CDOs where the diversity score is known (as in ABS CDOs).
- The older BET model assumed that assets were independent (i.e. zero correlation). As ABS CDOs became more concentrated in RMBS after 2003, the average correlation among the assets increased. My biggest fear at the time I was promoted to MD in the CDO group (Mar 2004) was that our BET model accounted for correlation in an ad hoc way that could not reflect the

increasing correlation among the assets of the CDOs we were rating. I developed the Correlated Binomial to allow Moody's to retain a model with the simplicity, ease of use and intuitive appeal of the BET and to retain its popular diversity score parameter calculated from default correlations. This Aug 04 paper was intended to present an alternative to using normal copula simulations that S&P, Fitch and all the I-banks adopted. I was overruled and Moody's adopted a Normal Copula approach in June 2005.

**Sep 2005 Paper:** Just before leaving the CDO group in September 2005, I wrote an algorithm to determine a normal copula asset correlation (Moody's Asset Correlation or just MAC) that when be converted to a default correlation could be used in the correlated binomial to replicate the loss distribution from the normal copula as specified in the June 2005 paper mentioned in the above bullet point. Cash ABS CDOs were rated using this scheme after I left the CDO group. The idea was that the MAC would be a single measure of portfolio concentration similar to the diversity score. Also, the correlated binomial was a closed-form distribution with only three parameters and so was much easier to use than a normal copula simulation. So after September 2005, Moody's did use the correlated binomial to rate ABS CDOs as a computational convenience but only in a way that guaranteed that the expected loss and hence the rating would replicate the normal copula. EBS references the September 2005 paper writing "In September 2005, Witt and colleagues published a follow-up analysis. Compared with the BET, the new model now projected that the likelihood of collateral defaults affecting CDO bonds rated at least Aa could be 73 percent lower at the extreme, in a range of possibilities." I have no idea what he means here. The Sep 05 paper makes no projections of collateral default or expected loss based the BET.

**EBS Claim:** In the section entitled "Tale of Two CDOs", EBS compares Belle Haven in Dec 2004 to McKinley Funding III in Dec 2006. EBS points out that the leverage on the later deal was higher and writes, "Both CDOs were downgraded as the subprime market deteriorated, with the earlier CDO holding up better than the later one."

**My Response:** All CDOs backed by RMBS have performed very poorly as the US has sustained the largest nationwide decline in house prices in its history. This is not the result of lower rating standards at Moody's.

- The deal issued later in Dec 2006 contains collateral backed by houses sold later and so presumably at a higher price. These mortgages are further underwater. It is no surprise that the later CDO has a worse performance.
- I do not have the deal documents from the two transactions but have anecdotal evidence that the average rating on the later deal was much higher. (This would be reflected in Moody's Weighted Average Rating Factor or WARF, Moody's most important measure of credit risk of the underlying securities of a CDO.) This would probably account for much of the difference in the subordination between the two transactions but he does not report the WARF so I cannot say.
- This is however, the one piece of his story concerning Moody's that may contain a grain of truth. My biggest concern with the normal copula was that it could lower standards for high-grade ABS CDOs (WARF under 100 or an average rating of underlying collateral of single A or higher), of which these two are examples. However these were a minority of ABS CDOs. The larger share of ABS CDOs were mezzanine deals. These were the CDOs that had the worst performance. For mezzanine ABS CDOs concentrated heavily in RMBS, I do not believe that Moody's changes in methodology lowered standards. Further, it is ironic that this article mentions only me as an active decision maker at Moody's during this time period when I offered an alternative to the normal copula and was overruled. It was the use of the normal copula that may have resulted in a lowering of Moody's standards for this minority of RMBS CDOs. I qualify this statement with "may" because other modeling changes were made in June 2005 that may have mitigated the impact of the normal copula for high-grade ABS CDOs.

**Summary:** I left the CDO group at Moody's in September 2005 (a fact that EBS knew but never states). As far as I know, the only substantial change to the

Moody's modeling methodology for ABS CDOs between September 2000 and September 2007 was the change from the two-moment BET and its default correlation assumptions to CDOROM with its asset correlations in June 2005. This article by EBS claims Moody's participated in a race to the bottom in its subprime ABS CDO modeling methodology and so makes the implicit assumption that Moody's BET approach was superior to Moody's later correlation-based modeling method for ABS CDOs for modeling the highly correlated subprime RMBS. I disagree with this assumption in general and in particular disagree with the notion that the large volume of subprime CDOs would not have been issued had Moody's continued to use the BET for rating ABS CDOs.

Aaa rated ABS CDOS spreads to Libor were above 60 in 2003 and fell steadily to below 30 by June of 2005. They did not rise above 40 until March 2007. Moody's methodology was completely transparent which is why EBS was able to read all about it. Why did investors continue to demand these assets at increasing lower spreads if rating standards were declining as EBS states?

I believe the simple truth is that Moody's, along with virtually the entire capital market, failed to grasp the magnitude or significance of the housing bubble until 2007 and assumed that no large-scale nationwide declines in house prices would occur because they had not occurred since the Great Depression which people viewed as a singular, remote time period that would not be repeated. Moody's models for both RMBS and CDOs were based on fairly recent historical data and so implicitly assumed that large scale house price declines would not happen. Earlier model versions made the same assumption. My best understanding is that there was no systematic decline in the standards of Moody's ABS CDO models. There was a systematic decline in the credit quality of the underlying mortgage loans that Moody's models, along with almost everyone else's models, failed to address.