Where Did the Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions

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Many of the current difficulties in residential mortgage-backed securities (RMBS) and collateralized debt obligations (CDOs) can be attributed to a misapplication of agency ratings. Changes in mortgage origination and servicing make it difficult to evaluate the risk of RMBS and CDOs. We show that the big three ratings agencies are often confronted with an array of conflicting incentives, which can affect choices in subjective measurements of risk. Of even greater concern, however, is the fact that the process of creating RMBS and CDOs requires the ratings agencies to arguably become part of the underwriting team, leading to legal risks and even more conflicts. We analyze the fundamental differences between rating structured finance products like RMBS and CDOs and traditional products like corporate debt. We show that the inefficiencies of rating RMBS and CDOs are leading investors to discount U.S. markets. We conclude by providing several policy implications of our findings.

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INTRODUCTION

The residential mortgage-backed securities (RMBS) market has experienced significant changes over the past decade. Non-agency ("private label") securities, which are not guaranteed by the government or the government-sponsored enterprises, now account for the majority of RMBS issued. When changes to origination and servicing occur unpredictably over time or across issuers, thereby affecting the cash flows of some unknown number of mortgages, RMBS become more difficult to value. Hence, changes in origination and servicing practices, along with the existing complexity of RMBS, results in greater opacity in the RMBS market.

Those sentiments suggest that the RMBS market was transparent at some previous instant. In this paper, we explain that the general nature of bond ratings, as well as a fundamental misapplication of the corporate ratings process to RMBS, has never provided sufficient transparency for market efficiency. Rather, the benefits of securitization to date have rested primarily upon a chance combination of a lengthy economic expansion coupled with asset price increases of the sort that are fundamentally excluded from standard measures of inflation. We discuss ways in which conflicting incentives and the misapplication of corporate bond ratings methods have skewed the evaluation of risk in RMBS and CDOs.

The paper begins with a background discussion of beliefs about fundamental changes in risk in today’s markets. In Part II, we review many well-known legal and institutional shortcomings of the way the bond ratings industry presently approaches RMBS. Part III presents fundamental flaws to the ratings process for RMBS and CDOs, suggesting that a substantial overhaul is necessary to adequately characterize risk in not only RMBS, but the entire universe of structured finance. In Part IV, we explain how the complexity of RMBS and ABS masks risk transfer, which can fool investors and regulators into believing that securitized funding arrangements are safer than they really are. Parts V and VI show that similar problems affect the CDO markets, where risk is also ill-characterized and masked through complexity. Part VII links those risks to present economic conditions, suggesting that growth will be restored to equilibrium whether policymakers act or not. In Part VIII, we suggest policy conclusions based on our findings. Overall, fundamental differences between RMBS and corporate investments necessitate more dynamic ratings and greater transparency if ratings are to be the basis of regulatory approaches RMBS and other structured finance products under arrangements like ERISA and Basel II.

I. UNRECOGNIZED RISK AND BOND RATINGS

Conventional wisdom holds that market volatility or market risk has declined. For risk that remains, markets have reduced the price for taking on that risk. Figure 1 illustrates the conventional view as it related to mortgage markets. Since 2003, swaption volatility has decreased substantially, along with the Mortgage Bankers Association Refinancing cost index and residential mortgage-backed security (RMBS) yield spreads over LIBOR. Such circumstances have reduced mortgage costs to homebuyers and set the stage for the “new financial markets,” that are thought to more efficiently value and price risk. Of course, risk does not
go away. It can be diversified in portfolios, but diversification works to only offset risk. Hence, if risk is priced lower, that pricing must reflect either an increased appetite for fully-disclosed risk or the lack of disclosure of risk for the same risk appetite.

**FIGURE 1: RESIDENTIAL RMBS YIELD SPREADS, MBA REFI INDEX, AND 2X10 SWAPTION VOLATILITY**

![](image1)


Our previous report illustrated many of the key changes to residential mortgage origination and servicing standards that have occurred over the past two decades. Those changes have ultimately resulted in a wider range of risk among the types of financial instruments we call mortgages. Figure 2 illustrates

**FIGURE 2: RISK GRADING IN THE MORTGAGE INDUSTRY**

<table>
<thead>
<tr>
<th></th>
<th>A+</th>
<th>A−</th>
<th>B</th>
<th>B−</th>
<th>C</th>
<th>C−</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortgage History (Last 12 Months)</td>
<td>0 x 30</td>
<td>0 x 30</td>
<td>1 x 30</td>
<td>2 x 30</td>
<td>3 x 30</td>
<td>4 x 30</td>
<td>5 x 30</td>
</tr>
<tr>
<td>Foreclosures/NOD</td>
<td>None</td>
<td>None</td>
<td>None in last five years</td>
<td>None in last four years</td>
<td>None in last three years</td>
<td>None in last two years</td>
<td>None in last two years</td>
</tr>
<tr>
<td>Installment Debt (Last 24 Months)</td>
<td>0 x 30</td>
<td>0 x 30</td>
<td>1 x 30</td>
<td>2 x 30</td>
<td>3 x 30</td>
<td>4 x 30</td>
<td>5 x 30</td>
</tr>
<tr>
<td>Revolving Debt (Last 24 Months)</td>
<td>1 x 30</td>
<td>1 x 30</td>
<td>2 x 30</td>
<td>3 x 30</td>
<td>4 x 30</td>
<td>5 x 30</td>
<td>6 x 30</td>
</tr>
<tr>
<td>Bankruptcy</td>
<td>None</td>
<td>None</td>
<td>Discharged with good credit past five years</td>
<td>Discharged with good credit past four years</td>
<td>Discharged with good credit past three years</td>
<td>Discharged with good credit past two years</td>
<td>Discharged with good credit past one year</td>
</tr>
<tr>
<td>Judgment/Chargeoffs</td>
<td>None</td>
<td>Minor, under $500 allowed</td>
<td>None over $600 in last two years</td>
<td>None over $1,000 in last two years</td>
<td>None over $1,000 in the last two years</td>
<td>None over $1,000 in last year</td>
<td>$1,000 in last year</td>
</tr>
<tr>
<td>Debt-to-Income Ratio</td>
<td>≤80% LTV - 40%</td>
<td>33%/38%</td>
<td>$80%/38%</td>
<td>28%/33%</td>
<td>45%</td>
<td>50%</td>
<td>55%</td>
</tr>
</tbody>
</table>

the increased gradation of risk among mortgage borrowers. The additional grades of risk arise from the willingness to underwrite mortgages for more risky borrowers, encouraged by the democratization of credit since the 1970s, as well as making riskier loans to more typical borrowers. Both practices increase the total amount of risk to be sold in the marketplace. However, increased grading of risk induced increased complexity, and therefore increased opacity. Risk that is more difficult to see, by virtue of complexity, is risk just the same.

There are plenty of reasons to believe that the amount of risk in the marketplace has increased while opacity has made it seem otherwise. Figure 3 shows that defaults on ABS and RMBS increased substantially between 1991 and 2003 and declined sharply thereafter. During that decline, however, the ratings agencies have continued to revise their loss expectations to account for the dynamics of the mortgage meltdown. For instance, on March 27, Standard & Poor’s raised its expectation for losses on 2006 subprime mortgage bond issues to as high as 7.75 percent from a previous peak assumption of about 6.5 percent.1 Moody’s made similar revisions on April 20, 2007. As a result, both Moody’s and Standard & Poor’s parent corporation stock prices are down over the past three months, partially due to reputational concerns.2

Of course, it is up to the reader to translate the revised loss expectations into default scenarios. Figure 4 provides that translation from Fitch’s “Residential Mortgage-Backed Securities Criteria.” Ratings agency “criteria” are the documentation circulated by ratings agencies to describe their loss analysis and ratings methods. Figure 4 shows that Fitch anchors their expectations of the relationship between losses and ratings changes in a number of academic studies as well as their own research. The data are taken from criteria published well before the meltdown, offering insights untainted by recent “adjustments” to ratings agency methods meant to better capture risk (next time). Figure 4 illustrates that loss levels of 7.7 percent are expected to begin to impose losses on investment-grade securities.

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Data from the Mortgage Bankers Association suggests that losses may continue to mount. The MBA Survey shows that many states are already illustrating foreclosure and near foreclosure rates levels not seen since the thrift crisis. Mortgage Bankers Association data from the third quarter of 2006 showed that Ohio had the highest foreclosure rate in the country, while other Midwestern states with fairly low home price appreciation over the last decade—namely, Michigan, Indiana, Iowa, and Kentucky—were also among the highest. At that time, California was below the U.S. average. States like Arizona and Nevada ranked among the lowest, but foreclosures in those states are accelerating.

What is interesting about these trends is that while as early as January 2005, delinquency and foreclosure data pointed to substantial deterioration in the overall credit performance of even fixed-rate prime mortgage loans, actual losses on securitized pools were extremely low during that period. Hence, S&P reported 981 RMBS upgrades and only RMBS 17 downgrades in 2004, and Moody’s reported 414 RMBS upgrades to only 4 RMBS downgrades for the same period. That is the kind of news that led many to believe in decreased market risk. Figure 5 suggests the trend toward increased home price appreciation could be at its end, leaving losses to accumulate in pools for some time.

It bears emphasis that the strong home-price appreciation since 1998 is the principal factor that prevented delinquencies and defaults from developing into losses before 2007. Figure 6 shows that markets are therefore beginning to price risk in the housing sector with strong increases in spreads on almost all types of securities.

![Figure 6: ABX:HE Tranche Spreads for Pricing RMBS](image)

**Source:** Nomura, Securitization & Real Estate Update, Feb. 28, 2007.

The following sections discuss elements of risk that were missed by investors and ratings agencies and what can be done to better evaluate risk going forward from the present meltdown. We explain that movements toward transparency for these fundamental factors can go a long way to ensuring stability for the socially and economically important segment of the U.S. economy, one that is crucial to both consumer well-being and economic growth.

II. **Structural Changes in the Bond Rating Industry: The Move from Passive to Active**

A. **A Brief Background on the Role of Credit Rating Agencies**

Since the creation of the modern credit rating industry by John Moody in 1909, ratings were offered to investors to assess credit-risks to the ability of a dynamic institution to meet its financial obligations. Historically, the rating agencies revenues were generated by subscription fees from subscribers who received research and ratings on the creditworthiness of issuers of debt securities. The value of ratings to investors is generally assumed to be a benchmark of comparability it offers investors in differentiating between securities. Credit rating agencies (CRAs) have long argued that the ratings scales they employed were consistent across assets and markets. Not long ago Moody’s stated “The need for a unified rating system is also reflected in the growing importance of

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modern portfolio management techniques, which require consistent quantitative inputs across a wide range of financial instruments, and the increased use of specific rating thresholds in financial market regulation, which are applied uniformly without regard to the bond market sector.\textsuperscript{5} In a similar pronouncement in 2001 Standard & Poor’s stated their “approach, in both policy and practice, is intended to provide a consistent framework for risk assessment that builds reasonable ratings consistency within and across sectors and geographies”.\textsuperscript{6} Whether issuing institutions were corporations, municipalities, sovereign nations or other such issuers, they were ongoing concerns sensitive to developments within markets and within the institution. The CRAs analysis emphasized the expected cash flow generated by the obligor’s ongoing business in determining the credit risk to the note-holder. There was little that a rated entity could do to change their credit characteristics before the rating process. Today, the agencies seem to be more circumspect in answering questions about the comparability of ratings across geographies and products.

Since the 1970s, largely due to issuer demand for ratings as a way to increase investor confidence, the rating agencies revenues have increasingly been generated by issuers of securities.\textsuperscript{7} In the past few years, these revenues have been increasingly driven by ratings for relatively newer structured finance products. As a result rating definitions have undergone significant changes to their meaning as well as the manner in which they are employed. These changes and their implications to the integrity of the rating process are significant.

In an effort to meet market demands for investment grade assets with higher yields, the rating agencies created new models and approaches to rating these assets. Given the limited number of Nationally Recognized Statistical Rating Agencies (NRSROs) and requirements directing certain investors to purchase only “investment grade” rated assets, their move to rate newer asset classes strengthened their market power,\textsuperscript{8} or in the words of one rating industry executive, their “partner monopoly”.\textsuperscript{9} As highlighted by the table below, structured-financial products became a major growth opportunity for the ratings agencies.

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\textsuperscript{5} Nomura, \textit{Bond Rating Confusion}, June 29, 2006, at 2 [hereinafter \textit{Rating Confusion}].

\textsuperscript{6} Id.


\textsuperscript{9} Letter from Sean J. Egan & W. Bruce Jones, to Jonathan G. Katz, Secretary, United States Securities and Exchange Commission (Nov. 10, 2002), \textit{available at} http://www.egan-jones.com/sec_letter.aspx (“In the case of most US corporate ratings and an increasing number of structured finance transactions, S&P and Moody’s are the only firms used. The industry could more accurately be described as a "partner monopoly", a term used by U.S. Department of Justice personnel. A partner monopoly differs from an oligopoly in the sense that the two firms share the market whereby the gain in revenues by one firm does not reduce the revenues of the second firm. Since two ratings are normally needed for the issuance of bonds, the gains of Moody's do not come at the expense of S&P and vice versa.”).
industry and has become an increasing proportion of their revenues.

**FIGURE 7: GLOBAL STRUCTURED FINANCE ISSUANCE IS GROWING RAPIDLY**

![Graph showing global structured finance issuance growth](http://library.corporate-ir.net/library/12/123/123831/items/236937/MCO%20March%20Long%20FINAL.pdf)

The concentration of rating agency power is not limited to the structured finance market and extends into traditional credit rating business. However, unlike other debt markets where the number of issuers allows for the broad diversification of operational and model risk, there is a significant concentration

10. Bank for International Settlements, Committee on the Global Financial System, *The Role of Ratings in Structured Finance: Issues and Implications* 24 (Jan. 2005) (*"Model risk is ... not confined to structured finance. However, given the lack of historical default data and the analytical challenges in assessing credit risk exposures (e.g.
in structured finance. For example, a recent report by the French securities regulator pointed out that “12 banks account for more than 70 percent of European deals, and three rating agencies cover the entire market (two of them accounting for 80 percent). According to 2005 figures for the French market, three legal firms account for more than 60 percent of the legal structuring work in the CDO market, and three others account for more than 50 percent of volume in the RMBS market.”

This concentration could have the effect of amplifying rating model risks, the risks to legal structures, other legal risks, counterparty risks, and the risks of misapplications of accounting rules (particularly FAS-140).

Moreover, traditional corporate bond ratings have long a long history of application and have been empirically tested through various economic cycles. Many structured products – notably CDOs – have not. According to the Bank for International Settlement’s Committee on the Global Financial System, the risks associated with structured products may not have been fully grasped by some investors.

The move to securitize assets has largely been driven by lenders’ desires (for capital purposes) to move assets off their balance sheet. The largest market for securitized assets, however, is constrained to invest in only ERISA-eligible securities, i.e., securities rated investment grade by the NRSROs. Hence the market for securitized loans has developed as a “rated” market, which has been facilitated by rating agencies’ willingness to rate securitized assets.

Bank capital declined as the market for securitized loans evolved. This was...
generally a positive movement for lenders, but as competition for loans increased the profitability of traditional lending decreased. Hence, securitization became a driver for new mortgage product development, which helped increase homeownership rates and home prices in the past decade.

The changes in the role of rating agencies, as their business has evolved from the rating of dynamic and on-going enterprises to static and defined-lived structured assets, warrants inquiry into not only the rigors of their structured finance rating models but also their historic claims of being publishers protected by the First Amendment’s protections of the freedom of the press. Historically rating agencies have claimed that their letter-grade ratings were merely an opinion of the creditworthiness of an issuer or, according to a Fitch general counsel, “the world’s shortest editorial.” Courts have found that “ratings are speech and, absent special circumstances, are protected by the First Amendment… [and] as a matter of public concern, would receive the heightened protection of the actual malice standard.” Given the changing nature of their business and compensation there may be reason to question whether, today, they should be viewed as editorializing or advertising.

B. Are Credit Rating Agencies Still Publishers or Are They Underwriters?

The Senate Commerce Committee offered the following opinion in its Enron report: “The credit rating agencies seem to be trying to walk a fine line between maintaining enormous market power through both official and unofficial uses of their ratings, and insisting that their ratings are purely their ‘opinion,’ and therefore pure speech under a First Amendment analysis.” Although the authors do not claim legal expertise, there are clear reasons to consider whether, in structured finance, the commercial speech of the CRAs would be protected upon a challenge.

Rating agency claims of being publishers is called into question, by implication, in a recent report to the European Commission of Securities Regulators The CESR highlighted several areas where the rating agencies were either not in compliance with the “code” or were questionably in compliance

16. Id.
16. See, e.g., Exposure to Litigation Related to Moody’s Rating Opinions, http://sec.edgar-online.com/2007/03/01/0001193125-07-043002/Section2.asp (last visited Apr. 30, 2007) (“Moody’s faces litigation from time to time from parties claiming damages relating to ratings actions. In addition, as Moody's international business expands, these types of claims may increase because foreign jurisdictions may not have legal protections or liability standards comparable to those in the U.S. (such as protections for the expression of credit opinions as is provided by the First Amendment). These risks often may be difficult to assess or quantify and their existence and magnitude often remains unknown for substantial periods of time.”).
19. Financial Oversight of Enron, supra note 17, at 123.
with the code. Although the rating agencies seemed to be compliant with Code 1.1 under “Quality and integrity of the rating process,” the manner in which they complied appears not to meet journalistic standards of ethics. The IOSCO Code explains that “the CRA should adopt, implement and enforce written procedures to ensure that the opinions it disseminates are based on a thorough analysis of all information known to the CRA that is relevant to its analysis according to the CRA’s published rating methodology.” In its submissions, Fitch submitted that “Fitch shall have no obligation to verify or audit any information provided to it from any source or to conduct any investigation or review, or to take any other action, to obtain any information that the issuer has not otherwise provided to Fitch.” Although Moody’s submission in answer to their relevant policy was not direct, it appears that they also fall short of journalistic standards. Beyond the issues raised specifically by the CESR staff, there may be reason to question the spirit with which one or more agencies comply with other provisions of the code. It is not clear whether an agency’s decision to recuse itself of the responsibility to verify information provided by an issuer fully meets the implied standard. Nor is it clear whether such conduct falls short of the standards the agencies are expected to meet as “investment advisors” under the 1940 Act.

20. CESR Code 1.15, 2.5, 2.12, and 3.9.
23. Id. at 21.
24. Moody’s Investor Service, Code of Professional Conduct 6 (June 2005), available at http://www.moodys.com/cust/research/MDCdocs/01/2003400000425277.pdf (“Moody’s has no obligation to perform, and does not perform, due diligence with respect to the accuracy of information it receives or obtains in connection with the rating process. Moody’s does not independently verify any such information. Nor does Moody’s audit or otherwise undertake to determine that such information is complete. Thus, in assigning a Credit Rating, Moody’s is in no way providing a guarantee or any kind of assurance with regard to the accuracy, timeliness, or completeness of factual information reflected, or contained, in the Credit Rating or any related Moody’s publication.”).
25. THE COMMITTEE OF EUROPEAN SECURITIES REGULATORS, CESR’S REPORT TO THE EUROPEAN COMMISSION ON THE COMPLIANCE OF CREDIT RATINGS AGENCIES WITH THE IOSCO CODE 1 at 13, 1.2 at 14, 1.9 at 21, 1.14 at 26, 2.1 at 31 (Dec. 2006), available at http://www.cesr-eu.org/data/document/06_545.pdf [hereinafter CESR’s Report to EC]. (See e.g. Section 2.1: “not forbear or refrain from taking a rating action based on the potential effect (economic, political, or otherwise) of the action on the CRA, an issuer, an investor, or other market participant.” And, Section 1.14 not “either implicitly or explicitly, give any assurance or guarantee of a particular rating prior to a rating assessment. This does not preclude a CRA from developing prospective assessments used in structured finance and similar transactions.”).
26. See, e.g. Memorandum from Annette L. Nazareth, Director, Division of Market Regulation, United States Securities and Exchange Commission, to William H. Donaldson, Chairman, Securities and Exchange Commission 4 (June 4, 2003), available at http://www.sec.gov/spotlight/ratingagency/baker060403.pdf. (“The Commission has emphasized that, NRSROs, as registered investment advisers under the Investment Advisers Act of 1940 (the “Advisers Act”), have a special duty to base their opinions upon current and adequate information.”) [hereinafter Nazareth Memo].
The need for rating agencies to objectively assess and verify information rises in structured finance transactions since, unlike the traditional ratings process in which an enterprise can do little to change its risk characteristics in anticipation of an issuance, in structured finance, the rating agency is an active part of the structuring of the deal. In practice, arrangers will routinely use the rating agencies publicly available models to pre-structure deals and subsequently engage in a process that is “iterative and interactive,” informing the issuer of the requirements to attain desired ratings in different tranches and largely defining the requirements of the structures to achieve target ratings.


29. Letter from John R. Rutherford, to Nancy M. Morris, Secretary, Securities and Exchange Commission (Mar. 8, 2007), available at http://www.sec.gov/comments/s7-04-07/s70407-17.pdf. ("Normally sponsors of structured products seek to achieve specified rating levels for the various issues of securities ("tranches") backed by the assets in the structure. They engage in iterative discussions with a rating agency. The sponsors propose specified assets and structures of seniority within the tranches to achieve the desired rating levels, and the rating agency indicates whether or not the specified assets and structures achieve those rating levels consistent with the methodologies of the rating agency… The most frequent situation where a rating agency does not rate the securities of a structured product is when the proposed assets and structures of the issuer and the proposed ratings of the sponsor do not meet the credit requirements of the rating agency following its specified methodologies. Normally, in this situation another credit rating agency, which may be an NRSRO, has concluded that the proposed ratings of the sponsor do meet the credit requirements of such agency. In this manner, sponsors of structured products “shop” for the ratings they desire."");

30. Role of Ratings, supra note 10, at 2. ("What distinguishes the rating of structured finance transactions from the rating of traditional instruments is that the former requires the rating agencies to be involved in the deal’s structuring process. This is because a tranche rating reflects a judgment about both the credit quality of the underlying collateral asset pool and the extent of credit support that must be provided through the transaction’s structure in order for the tranche to receive the rating targeted by the deal’s arrangers. Deal origination thus involves obtaining implicit structuring advice by the rating agencies, at least to the extent that arrangers use rating agency models to pre-structure deals and subsequently engage in an iterative dialogue with the agencies in order to finalize these structures. As a result, ratings of structured finance instruments have a decidedly ex ante character. This contrasts with traditional bond ratings, where pre-rating discussions between issuers and agencies play a more limited role.");

31. Authorite des Marches Financiers, Research Department, Is Rating an Efficient Response to the Challenges of the Structured Finance Market?, March 2007, at 6 ("Rating is an integral part of structuring securitization products. The agency is involved at an early stage, and the rating is not an outcome but a target for the arranger, with the
Because RMBS-based CDOs are generally comprised of lower-grade tranches of RMBS, it seems that the role of rating agencies is a necessary function of their sale and distribution. While that is not to say that no investors would purchase the senior assets without ratings, “rating agency ‘approval’ still appears to determine the marketability of a given structure to a wider market.”

It is possible that the ratings process may be considered ‘essential’ to the ability of an issuer to sell the desired assets. Should agencies be therefore considered as underwriters? Are agencies possibly in a “control” position with the “practical ability to direct the actions of the people who issue or sell the securities”?

According to the 1933 Securities act the term “underwriter” includes “any person who… has a direct or indirect participation in any such undertaking, or participates or has a participation in the direct or indirect underwriting of any such undertaking…” It seems plausible there may be a basis for argument that they have participated in the underwriting. “Congress knew of the collateral participation concept and employed it in the Securities Act . . .The Court's footnoted discussion makes clear that, in its view, one who “participates,” or “takes part in,” an underwriting is subject to section 11 liability.” While it is not completely clear if the role played by a CRA would fall under that definition, there does seem to be some basis to consider that risk since the term ‘underwriter’ is broad enough to encompass all persons who engage in steps necessary to the distribution of securities.

The “ex ante” contractual nature of a structured finance rating transaction, as contrasted with a traditional rating process, allows arrangers to adapt the profile of a tranche in response to pre-rating feedback. Therefore, the essential role the rating agencies play gives reason to question whether their asserted and legally upheld “freedom of the press” protection would be upheld were it challenged in relation to a structured finance transaction.

Rule 436(g) of the 1933 Securities Act exempts the NRSROs from expert liability under Section 11, as they are not considered experts in regard to ratings inclusion in a registration statement. The agencies routinely advise buyers of agency indicating the factors that need to be addressed to obtain the desired rating. In particular, the agency has an indirect influence on how the tranches are configured to ensure that the senior issue obtains the highest possible rating.”) [hereinafter Authorite des Marches Financiers Report]

32. Role of Ratings, supra note 10, at 38.
38. 17 C.F.R. § 230.436.
securities of this fact. It is, however, unclear whether the SEC’s exemption is within the boundaries of Congressional intent given the fundamental changes in the use of ratings since they were given such protection.

Moreover, if a rating agency’s role in an issuance were determined to move beyond the traditional role of publishing opinions and extended to being determined an “underwriter” their liability could become tied to any liabilities of any other “underwriter” of the transaction.

Current problems in the subprime market, the bankruptcies and therefore loss of some of the former industry “deep pockets”, discussions in Congress of “assignee liability,” and the myriad accounts of mortgage fraud on the part of some lenders and some borrowers suggest that litigation against many of the potentially “participant” parties will be among the possible responses to the current crisis. With the majority of lower-rated RMBS tranches having been bought, primarily by Collateralized Debt Obligations and subprime RMBS exposures in CDOs averaging close to 45 percent it is ironic that in a recent hearing of the Senate Banking Committee titled “Subprime Mortgage Market Turmoil: Examining the Role of Securitization,” there was no mention in the written testimony by either Moody’s or S&P, of this very profitable CDO segment of their business.

Perhaps another means to better define precisely the role CRAs play in some structured-finance issues would be to consider their interactions with other engaged parties who are also paid by the issuing client. In structured finance transactions, “legal isolation” is usually a key consideration. Part of the rating


41. Securities Act of 1933 § 11. 77k(a), available at http://www.sec.gov/about/laws/sa33.pdf. See e.g (“In case any part of the registration statement, when such part became effective, contained an untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary to make the statements therein not misleading, any person acquiring such security (unless it is proved that at the time of such acquisition he knew of such untruth or omission) may, either at law or in equity, in any court of competent jurisdiction, sue—…(5) every underwriter with respect to such security.”).


agencies role is to assess the documentation and legal structure of a proposed deal. Just as the arranger/client and their lawyers must be especially diligent in the assessment of legal structure, so too must the rating agencies. “Rating agencies do not always use outside counsel, they ask, on a regular basis and for information purposes, arranger’s lawyers to give them some of the analysis originally destined for the arrangers on questions that concern all parties. There are few lawyers involved in the structured finance sector, and in the event a law firm acts for different participants on the same deal, there could be a potential conflict of interest.”

Although it does not seem likely or supportable, another conceivable view of their role may be that, unlike traditional rating processes where a deal’s terms are fairly well structured prior to the engagement of a rating agency, in the structured-finance-rating process, the agencies consider all of their work to be hypothetical and not deal-specific up to the point of a final execution.

**FIGURE 9: MOODY’S STRUCTURED FINANCE RATING APPROACH**


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45. Authorite des Marches Financiers, *supra* note 31, at 9

46. Letter from Deloitte & Touche LLP, to Jonathan G. Katz, Secretary, Securities and Exchange Commission (June 18, 2004), available at [http://www.sec.gov/rules/policy/s72204/deloitte061804.pdf](http://www.sec.gov/rules/policy/s72204/deloitte061804.pdf). (“For example, AU 625 makes a distinction between specific transactions and hypothetical transactions. Certified public accountants are precluded from issuing written reports on the application of accounting principals to a hypothetical transaction (paragraph .04). In our experience, as the customer and the financial institution evaluate a complex structured transaction, the terms of the modified again, in an iterative process, – sometimes up to the point of execution. Some certified public accountants and their clients consider such transactions hypothetical until they are consummated.”).
C. New Conflicts—The Buy Side

While portfolio selection is generally considered to be efficient and driven by an investor’s expectation of absolute returns relative to acceptable levels of risk, competition often stimulates a race to the bottom where investors’ ability to accumulate assets is driven by relative return, thereby requiring some managers to purchase assets that may be more risky that they would otherwise choose. These behaviors were common in the Internet stock boom of the late 1990s and drove “herding” behaviors among an increasing number of investors whose “momentum” strategies fueled asset price increases that were seemingly not fundamentally grounded in considered risk price premiums.

Investor demand for investment grade assets with higher yields, coupled with lender desire to reduce portfolio exposures, supported the agencies move to create new models and approaches allowing them to rate new structured finance assets. This further supported the rating dominance of Moody’s, S&P and Fitch on a global basis. These models were created in close cooperation with the investment banks that structured CDOs. By creating models to rate CDOs, the agencies provided issuers a way to reconfigure sub-investment grade assets into investment grade tranches of new structured products that would offer a higher yield at a presumably reduced credit risk.

Unlike the traditional rating process for single-named issuers, which rely on empirical analysis at their core, structured-finance rating analysis is essentially driven by statistical models. Even in the relatively short history of CDOs, changes of rating are statistically larger and more frequent than those for corporate ratings or ABS, and the rating process appears to be at risk for potential rating arbitrage by banks. It is also worth noting that “Moody’s structured finance rating migrations are more likely to entail moves of several notches at a

47. BIS Study, supra note 13, at 49 (“To avoid falling behind their peer group, they then have incentives to trade with the crowd (reputation-based herding) to avoid the reputational risk of acting differently from their peers (Scharfstein and Stein (1990)). Similarly, herding can be compensation-based (Maug and Naik (1996)) when fee contracts for delegated portfolio managers contain relative performance elements. Second, institutions might infer private information about the quality of investments from each others’ trades (as in Banerjee (1992) and Bikhchandani et al (1992)). Third, institutional investors might trade together simply because they receive correlated private information from analyzing the same indicators (Froot et al (1992)).”).


Having not been tested in a sustained period of economic volatility or economic stress, it is unclear if the approaches employed—which use computer simulations to ascertain incidence of breaches in a tranches structure and not the severity of those breaches\footnote{19}{Partnoy, \textit{supra} note 49, at 22 (“Although this process employs sophisticated mathematical techniques, the conclusions can be somewhat dubious. For example, a rating agency might run 100,000 computer simulations to determine the number of times a breach would occur, that is, how often a particular tranche would lose value beyond a certain level. However, the variable in this assessment is the number of breaches out of the 100,000 runs, not the magnitude of the breach or any qualitative analysis of the breach.”).}—is an appropriate methodology.

Whether the rating of these reconfigured assets from sub-investment-grade residential mortgage-backed securities to investment-grade tranches in CDOs is the result of true diversification of risk or the result of rating agency alchemy is unclear.\footnote{20}{Frank Partnoy & David A. Skeel Jr., \textit{The Promise and Perils of Credit Derivatives} 12 (University of Pennsylvania Law Sch. Working Paper No. 125, 2006), available at \url{http://lsr.nellco.org/cgi/viewcontent.cgi?article=1129&context=upenn/wps}.} What is clear is that the lack of liquidity, transparency, history and available data coupled with unprecedented complexity has made it difficult for all but the most well funded, well staffed and most sophisticated to analyze the markets or assets. This has further increased market reliance on the CRAs.\footnote{21}{Authorite des Marches Financiers, \textit{supra} note 31 (“Due to the complexity of the deals and the diversity of underlying assets involved, most investors (except investors in junior or highly subordinated tranches) do not have dedicated credit analysts to properly assess structured deals. As a result, many investors rely on rating agencies to assess the quality of each structure, both at initiation and throughout the life of the transaction.”).}

This reliance is strikingly different from the traditional assets a rating agency rates. Where a charter constrained investor disagrees with a rating agency’s assessment of a particular corporate issue it can avoid that issue and find other issues within the desired asset class where it does agree with the rating. The more active role of the rating agencies in structured finance, the essential oligopolistic structure of the industry, the reality that their ratings are required for the sale of investment grade structured finance securities and the theoretically consistent application of their rating methods may mean that an investor who disagrees with the rating agencies approach to structural risk rating is often precluded from any investments in an entire asset class.\footnote{22}{BIS Study, \textit{supra} note 13, at 44 (“Overall, investors appeared to hold the view that rating agencies are more important for structured finance than for traditional debt instruments. Interviewees cited several factors at play: the rating agencies’ role in modeling the risks of complex structured finance instruments; their key role in deal structuring; and a clear information advantage, in particular over less sophisticated investors. An important reason for the reliance on ratings seems to be that many client mandates and internal investment guidelines prescribe minimum rating levels.”).}

\addcontentsline{toc}{section}{References}

\footnote{23}{SEC Hearings on Issues Relating to Credit Rating Agencies (Nov. 21, 2002) (statement of Amy Lancellotta, Senior Counsel, Investment Company Institute, available at \url{http://ici.org/issues/dis/02_sec_2a-7_stmt.html} [hereinafter Lancellotta Statement].)
As a result of this increasing complexity and opacity and the difficulties of investors in analyzing and pricing structured-finance assets and their risks, recent new business initiatives by CRAs have focused on providing valuation services to buy side clients. This may further exacerbate potential conflicts of these organizations. Given the CRAs involvement in defining the pre-issuance structures of CDO deals, defining the collateral and, implying appropriate yields to tranches of structures are they well suited to offering products that value securities, in the secondary market which they may have rated at issuance.57

Fitch has recently rolled out a product that “provides present values, risk … and a complete scenario stress testing environment… Risk can be run across an entire portfolio of deals to calculate book-level hedging requirements.”58. The statement that “investors using RAP CD get full access to Derivative Fitch’s in-house team of quants and market risk specialists, thereby enabling them to outsource the entire CDO risk management process to third party experts”59 seems to raise further questions about the corporate and business line firewalls that separate the rating business from their various advisory services.

D. The Problems With Ratings In Structured Finance—Evolving Models

In a 2005 report from the Bank for International Settlement’s Committee on the Global Financial System the three major rating agencies (Fitch, Moody’s and Standard & Poor’s) were reported to claim “all products they are asked to rate are subject to a common rating process…In addition, all ratings are ultimately mapped into an alphanumeric scale benchmarked to the historical performance of corporate bonds.”60

This claim does not appear to properly reflect current market realities either in theory or practice. There is increasing evidence that the ability to use rating scales for comparability even within some asset-classes has potentially become compromised. Frequent changes to structured finance rating methodologies coupled with the apparent inconsistencies in the application of these ratings criteria between new and existing structured-finance asset classes may significantly impair both the integrity of rating scales and support undue risk taking.

Today, although the scales used to measure disparate asset classes remain the same, the implied default risks of those ratings are different for different asset

57. Autorite des Marches Financiers, supra note 31, at 9. (See e.g “Since 2005, several rating agencies have proposed pricing services for the secondary market of existing deals. To the extent that rating agencies are the sole decision makers for any rating changes and due to the asymmetry of information between rating agencies and market participants in this area where ratings constitute an essential if not exclusive basis for setting a price, such a new service could raise questions about the information used by rating agencies to provide market prices, and the mix of responsibilities this might create between their role as rating entity and their presence in the secondary market for the valuation of the rated paper.”).


59. Id.

60. Role of Ratings, supra note 11, at 14.
classes. Uncertainty about the meaning of original ratings is significant and the meaning of ratings in secondary markets is similarly uncertain. “Can specific structured finance products with a AAA credit rating produce a return of up to 200 bp for investors, while a AAA corporate or a AAA RMBS tranche produces only a 10/20 bp return? What does that mean? A market imperfection, a new product premium, a liquidity premium? Or the market perception that the risk attached to this AAA tranche, especially in terms of volatility, is higher than for a "standard" transaction?”

Finding the correct answers to these questions may be fundamental to the integrity of financial markets and, as importantly, to the proper assessment of bank capital requirements. Under the Basel II framework banks can use ratings in determining the risk weights in the Standardized Approach as long as the issuing rating agency is recognized by that nation’s banking regulators. This delegation of bank supervisory power to the NRSROs has existed in the U.S. banking industry prior to the Basel II guidance and some regulators even assign which rating agency’s models are to be employed.

In January of 2006 the Community of European Banking Supervisors issued “Guidelines on the recognition of External Credit Assessment Institutions” in which it recognized the risk of ratings migration and the need to be able to assess not only “original rating analysis” but a “cohort” approach that incorporates the effect of ratings migration which should include rating migration.

61. Rating Confusion, supra note 5 (“For example, according to S&P, a rating of "BBB" corresponds to a five- year default probability of 1.255% for asset backed securities, but a higher default probability of 2.323% for corporate bonds. Likewise, a rating of “AA” corresponds to a seven-year default probability of 0.315% for ABS, 0.420% for corporate bonds, and 0.701% for CDOs. At Moody’s, municipal bond ratings correspond to half the level of expected loss as corporate bond ratings for purposes of rating CDOs. Inconsistent definitions make it hard for investors to use ratings to compare the credit risk in different kinds of securities.”).

62. Autorité des Marches Financiers, supra note 31, at 13. (See e.g “In light of the constant flow of new innovative structured products, questions should be raised at the European level concerning the potential limitations of agencies' models - can everything really be rated? – and the meaning of ratings. This should be done in close cooperation with the prudential authorities in charge of the implementation of Basle II and of the OEEC regime, with the principal objective of encouraging understanding among the participants and strengthening the market's credibility. It is also necessary to determine if a structured finance rating is equivalent to a corporate rating and, within securitization ratings, whether or not the rating of a cash CDO is equivalent to the rating of a synthetic CDO. In this respect, is there a need for either differentiating structured finance and corporate ratings or for requiring additional information regarding the volatility or sensitivity attached to each structured finance rating, which, for certain products like CDOs.”)

63. Id.


65. See 12 C.F.R. § 955.3(a), (b).


67. Guidelines on External Credit, supra note 64, at 161.
With frequent adjustments to their structured finance models there seems to be an implicit recognition of the inability to define stable measures of significant issues such as default correlation risk.

In an effort to keep up with rapid developments in structured finance markets “the agencies claim to be constantly improving their methodologies.” In Europe alone during 2004, two of the three major rating agencies published 57 releases detailing changes in their rating methods. Of those changes 45 related to ABS and the other 12 related to CDOs. Fitch seemed to acknowledge the “wild west” aspects of the CDO and credit derivatives markets when they wrote “2007 holds much promise for the global CDO and credit derivatives arena as novel methods of packaging risks and analytical models emerge and new players join this growing bandwagon. The lack of transparency makes it difficult to determine whether these adjustments, in part or in aggregate, would have a meaningful impact to existing structures.

Deng and Sanders point out that the rating agencies follow a “learning by doing” approach to determining the required subordination levels in structured finance deals. While this research suggests that the levels of required subordination has been, conservative during the relatively short history of these assets, it also points out that in the process of “learning by doing” the agencies have reduced subordination levels. It is not clear whether these subordination levels will prove to be conservative in a downturn.

The fact that CDOs and other complex credit derivatives “remain largely illiquid and nontransparent” may only serve to amplify structural weaknesses in

68. Authorite des Marches Financiers, supra note 31. (See e.g. “Due to pressure and competition, rating agencies may be asked to rate complicated and innovative (though well remunerated) deals within a very short time, which despite all the due process can potentially lead to errors or an approximate assessment of the risks involved.”)


70. Id.

71. Ratings in Securitization Industry, supra note 69 (“The agencies claim that, statistically, methodological changes rarely lead to rating changes. Investors say that SPVs sometimes receive significant downgrades, but it is difficult to say whether these are partly attributable to methodological changes or solely reflect a deterioration in the underlying asset pool.”).


73. Randall S. Krozner, Governor, North Carolina, Remarks to the 2007 Credit Markets Symposium at the Charlotte Branch of the Federal Reserve: Recent Innovations in Credit Markets (Mar. 22, 2007), available at http://www.federalreserve.gov/BoardDocs/Speeches/2007/20070322/default.htm (“Along with liquidity, transparency in credit markets has also improved over time. Corporate bond markets are more transparent thanks to a regulatory change that took effect in 2002. Dealers must now report nearly all corporate bond trades to the NASD within fifteen minutes, and the NASD immediately reports the trade data to the market. For asset-backed securities and loans, price transparency is available from specialist vendors who aggregate and disseminate dealers’ prices. For example, in the syndicated loan market, one vendor currently aggregates data from more than seventy traders to price nearly 6,000 loans daily. Prices of many credit derivatives, including single-name CDS, credit
the event of an unanticipated adverse event. Generally, when a rating agency makes an adjustment to its models in structured finance, it rarely re-rates existing assets. As a result, rated tranches with the same ratings but of different issuance dates may have meaningfully different risk profiles. In December of 2006, Fitch highlighted that the increased market for “affordability products” and the regulatory scrutiny of those products. As a result they announced they had increased credit enhancement levels. They went on to state that initial credit enhancements required for ‘AAA’ bonds issued in 2006 averaged 20 percent more than for those issued in 2003.76

This may be of particular importance to the risks of cash-flow structures that have a revolving period or to market-value structures. During the revolving period principal proceeds can be reinvested in new assets so long as collateral coverage tests are met. The collateral asset manager (CAM) for revolving mezzanine structured finance CDOs can trade 15-20 percent of the CDOs portfolio during the revolving period. If the rating agencies do not re-rate structures or underlying assets upon changes in their methods this may create significant opportunities for risky rating arbitrage by deal managers. As a hypothetical example, assume the primary assets supporting a CDO structure originated in 2005 were the equity tranches of subprime RMBS from 2003, 2004 and 2005. Now assume that in 2006 a rating agency made adjustments to their models which tightened ratings by increasing required collateral for all new issues. As the principal of the 2005 vintage CDO became available for reinvestment, barring a re-rating, the CDO may be able to reinvest in 2006 vintage assets without having to worry about increased collateral requirements. As a result, the original 2005 vintage structure would be in a position to purchase presumably less valued assets, with less required collateral and receive a higher yield than a new structure would be able to. While we are unaware of any studies addressing these issues conversations with retired rating staff suggest that often the rating agency would merely require a standardized 50bp enhancement to the structure.

It is therefore not clear that rating agencies’ assessments would be considered

derivative indexes, and credit index tranches, are widely available on services such as Bloomberg or Reuters. Complex credit derivatives such as CDO tranches are an exception to all this: They remain largely illiquid and nontransparent.

74. *BIS Study, supra* note 13, at 39. (“The quality and availability of surveillance data during the life of a structure were generally felt to be inadequate, especially in Europe, though improving rapidly. Investors often rely on quarterly reports by the trustee and the rating agency. Sometimes these are sent to the initial investor only. A few investors also pointed out that, as a result of their fee structures, rating agencies sometimes cared less about surveillance than about initial ratings.”).

75. *Ratings in Securitization Industry, supra* note 69, at 16 (“The agencies rate a transaction when it is carried out. Published changes in methodology apply to future transactions. However, the agencies do not take the same approach when updating ratings for past transactions. Some of the agencies do not revisit the old ratings but use the new method in their surveillance. Thus, the surveillance process is based on both the old and new methodologies.”).


appropriate for risk-weighting analysis under Basel II. 78 “Market Value CDOs are enjoying a revival with issuance more than doubling in 2006 from the year before. MV CDOs appeal to managers because they offer greater trading flexibility and can invest in a wide range of assets including high yield bonds and bank loans and SF securities”. 79

In the wake of the recent credit problems in subprime residential mortgage performance the rating agencies have issued research reports and held conference calls with advise investors on the potential rating implications to both RMBS and CDOs with subprime exposures. Many of the details of their analysis highlighted potential risks to their assumptions.

In one of the more striking recent reports 80 Moody’s commented that it is requesting increased levels of loan details from mortgage securitizers to enhance their rating capabilities. The company stated “the data fields essential for running the model were established when the model was first introduced in 2002. Since then, the mortgage market has evolved considerably, with the introduction of many new products and an expansion of risks associated with them”. The report went on to point out that requests for data are broken into three categories:

- “Primary” – a primary field for running their proprietary mortgage rating system “Moody’s mortgage Metrics”
- “Highly desirable” – used to “supplement” their understanding of a borrower’s risk profile
- “Desirable” – further help in risk assessment of a loan

The report implied that their current proprietary model for rating mortgage risk does not currently incorporate the “primary” information they are now requesting nor do they have the ability to assess the requested “highly desirable” or “desirable” data to support their analysis. We again find reason to ask why agencies are not expected to seek out more information than provided to them by issuers or to verify even the non-financial data provided them by issuers.

Even in the existing data fields that the agency has used since 2002 as “primary” inputs into their models they do not include important loan information such as a borrower’s debt-to-income (DTI), appraisal type and which lender originated the loan.

Although the importance of DTI has been relatively less important in a period of strong home price appreciation (HPA) it becomes of more importance in a flat to declining HPA as borrowers have less access to appreciated equity cushion in support of their ability to service a loan. The fact that this information has not been a primary input to their model is even more surprising considering

78. Guidelines on External Credit, supra note 64, at 92 (“Competent authorities should not undertake a detailed assessment of the exact methodology used by the ECAI, but should instead satisfy themselves that the credit assessment drivers used in the ECAI’s methodology are sensible predictors of creditworthiness, and that the ECAI’s internal procedures ensure that its pre-defined credit assessment methodology is applied consistently in the formulation of all credit assessments within each broad asset class or market segment.”).


that traditionally the loan to value (LTV) and FICO score and the borrowers DTI are the three most significant measures of credit risk on a mortgage.81

Similarly, given the mortgage industry’s move to automated appraisals the lack of consideration of appraisal type as a primary input is concerning. “Nonfull appraisal techniques, such as AVMs, rely on public data that is ordinarily several months old. In rising markets, AVMs depend on housing price data that is slightly lower than current market conditions. However, in declining markets, the AVM may overestimate property values given current market.82 The importance of who the lender was, as it relates to loan quality, has also become obviously more important in the wake of recent institutional failures of subprime lenders many of whom failed due to weak underwriting standards.

The following figure details some of the more significant items of loan detail that they are only now requesting.

**FIGURE 10: NEWLY REQUESTED DATA FIELDS**

<table>
<thead>
<tr>
<th>PRIMARY</th>
<th>HIGHLY DESIRABLE</th>
<th>DESIRABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option Arm*</td>
<td>Amount in Collection</td>
<td>Borrower Qualification Payment - Amortization</td>
</tr>
<tr>
<td></td>
<td>Borrower Qualification Payment - Interest Rate</td>
<td>Define amount of largest consumer credit tradeline that is currently open</td>
</tr>
<tr>
<td></td>
<td>Total count of outstanding and open consumer credit tradelines</td>
<td>Up to 12 months of the borrower's monthly payment history on the subject loan from the date of origination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The interest rate of the loan at origination</td>
</tr>
<tr>
<td>ARM FIELDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The specific indicator (i.e. index) which governs adjustments in the loan's interest rate</td>
<td>Months of First Reset</td>
</tr>
<tr>
<td></td>
<td>Here, refers to the rate on a loan to a new rate (in months)</td>
<td>Option ARM Fields</td>
</tr>
<tr>
<td>OPTION ARM FIELDS</td>
<td>Annual Payment Cap</td>
<td>The fully-amortizing, fully-indexed monthly payment</td>
</tr>
<tr>
<td></td>
<td>The minimum payment option available to the borrower (in dollars)</td>
<td>The maximum percentage of the original balance up to which the loan can negatively amortize (i.e. typically 110%, 115%, 125%)</td>
</tr>
<tr>
<td></td>
<td>The length of time during which a borrower has a minimum monthly payment option (in months)</td>
<td>Whether the loan is an “option arm”</td>
</tr>
<tr>
<td></td>
<td>The various payment options available to the borrower once the loan reaches the mandatory recast period or the negative amortization limit</td>
<td></td>
</tr>
</tbody>
</table>

*When evaluating second lien loans, these fields are highly desirable for the underlying first lien loan associated with these second lien loans.


Moody’s adds “generally, in absence of key information, assumptions are utilized” though it is unclear, at any given time, how conservative these assumptions are. As example, on a March webcast and conference call titled


82. See, e.g., Jenine Fitter, *Manufactured Housing: Waiting for the Rebound*, 6 FitchRatings, May 2004, at 1, available at [http://www.aaro.net/pdf/Reading%20Room/FitchReport.pdf](http://www.aaro.net/pdf/Reading%20Room/FitchReport.pdf) (“Fitch is concerned that, under certain weakening housing conditions, any valuation method other than a full appraisal is likely to overestimate property value. As it relates to automated valuation models (AVMs), Fitch believes that the risk of property overvaluation is particularly great in declining markets. In Fitch’s opinion, such risk is paramount when alternative valuation methods are employed because of the time lag in the underlying data collection process. Nonfull appraisal techniques, such as AVMs, rely on public data that is ordinarily several months old. In rising markets, AVMs depend on housing price data that is slightly lower than current market conditions. However, in declining markets, the AVM may overestimate property values given current market conditions.”).
“Subprime Mortgage Distress Effect on CDOs,” Fitch staff were asked about the home price assumptions they are assuming. After several participants pressed them on the issue a Fitch respondent stated that they assumed a mid-single digit HPA. This is in stark contrast to fourth-quarter median home price data for 2005 and 2006 which “confirms a national home price correction has been under way, with the U.S. median home prices down 2.7%.”

Since mortgage backed securities primary risk exposures are to default and prepayment risk, credit risk and market risk, many of the fields Moody’s is requesting have obvious and considerable importance in properly analyzing the risks to RMBS and residential mortgage exposed CDOs. This would be especially true in a period of weakening home prices, rising rates or declining employment and income. Such evolutionary approaches to rating processes are not rare.

Part of the problem in the rating methods for ABS (including RMBS) and for CDOs may well be that these methods, which are statistical, are built on other rating models which are also statistical and the correlations between them may be underappreciated in good times and rise suddenly in bad times.

Default correlations are higher during economic downturns or recessions and it has been viewed that macro-economic factors are the main driver of portfolio losses and “at the portfolio level, dependencies between defaults are crucial and little is known about them.” As agency models are increasingly used to rate assets such as RMBS and CDOs that themselves are more directly tied to exogenous macro-economic conditions than by the endogenous conditions of a particular enterprise, such as a corporate issuer, the importance of measurement data to inform correlation modeling should be more significant in these assets. Historic data is used by agencies in informing correlation assumptions and they “advocate the use of empirical default correlation to benchmark internal models.”


85. Jody Shenn, BLOOMBERG, Apr. 4, 2007, available at http://www.elitetrader.com/vb/showthread.php?threadid=91393. (On April 4, 2007 Bloomberg reported “Moody’s (is) concerned that the ‘growth of synthetics,’ or credit swaps, may leave more CDOs invested in other CDOs exposed to the same bonds as they are. The company said its models ‘were developed using the data that was available at the time,’ such as transactions backed by cash collateral. Moody’s is now working on a research project to reassess the correlation between CDOs at time when exposures can be ‘infinitely replicated,’ it said. Moody’s sees ‘increasing’ correlations in performance, which suggests it will require more protection for bondholders when the project is finished. ‘We’ll update the market with our final findings when we’re done,’ Fu said.”).


87. Id. at 3.

88. Id. at 28.
Given that there is little empirical data on many of these newer assets to be rated, such as non-traditional mortgage assets, should we expect that their correlation assumptions within these newer assets will be subject to increased volatility as “down-cycle empirical data is being captured or should we assume that the statistical assumptions they use will themselves be conservative enough in their adjustments to compensate for the scarcity of full-cycle data?

As example, one of the key considerations in RMBS ratings is the servicer rating of the firm(s) servicing the pool. When home prices are rising, employment is strong, and interest rates are benign, mortgage performance tends to be strong. Such an environment leads to low servicing costs, the management of servicers being less strained, capital requirements and liquidity risks of servicers being low, and the sophistication and operational efficiencies of servicers being less important. As a result servicer’s ratings are less subject to the rigors of market stress testing since almost everyone appears to be doing a decent job of servicing.

As problems emerge for mortgage performance, such as reduced home price appreciation or rising interest rates or declining incomes or employment, market liquidity becomes more scarce as investors become increasingly risk averse. Just as the relation of this effect is positively correlated to servicing performance on the upside it is positively correlated to servicing on the downside. This places the value of using servicer ratings as a forecasting tool in RMBS performance at risk since, at the time mortgage performance declines the cost to servicers of servicing problem loans rise as do the demands on their operational platform’s efficiency and management. So, as liquidity may be moving away the mortgage space it will also be moving away from the servicer market at precisely the time it is most dear.

In an environment of stabilizing home prices or a slowly increasing rate environment, assuming other aspects of the mortgage process were effective (underwriting quality as example), the agencies models might not be subject to stress. In an environment where market liquidity reverses quickly both RMBS and servicer rating models would be subject to significant and perhaps unanticipated stress that the agencies only catch after the effect is generally seen. This raises further question about the predictive value of their models in structured finance.

In a real world example, on October 30, 2006 Fitch announced that it “upped the residential primary servicer rating” of New Century from RPS3+ from RPS3 (the ratings are based on a scale of 1-5 with 1 being highest). At that time the Company’s servicing operation was “commended for its competent management team, established servicing platform, capable default technology, and enhanced cross-functional training platforms”.89

At that time, although the environment in which New Century was more challenging that in recent prior years, New Century appeared to be managing well. The Company, which operated three businesses; portfolio, mortgage loan operations and servicing stated their “average workforce increased from 5,594 for the nine months ended September 30, 2005 to 7,119 for the nine months ended September 30, 2006, an increase of 27.3 percent. This increase in

workforce was mainly due to our acquisition of the mortgage loan origination
platform of RBC Mortgage in September 2005. The remainder of the increase
was primarily due to growth in our servicing platform and the mortgage loan
portfolio. In the same filing the Company stated its “Servicing income
increased 100.8 percent to $47.4 million for the nine months ended
September 30, 2006, compared to $23.6 million for the same period in 2005”. Unfor-

While the rating agencies could not be expected to have known of the
corporate accounting issues of New Century and the Company, in its state-
ment, indicated that other business lines than the servicing business were primarily
responsible for the losses, the liquidity problems that ensued ultimately could
have impaired the Company’s servicing of loans. As a result, on March 5,
Moody’s downgraded New Century’s servicer rating from SQ3+ to SQ4. On
March 7, Fitch lowered the ratings to RPS4 from RPS3+. Shortly after, New
Century defaulted on repurchase obligations. This resulted, in part, from
downgrades of their servicer ratings. On April 6, Moody’s downgraded
the servicer rating of New Century to SQ4- from SQ4.

So, in building models, the agencies might build a servicer rating based on
the performance of a servicer whose business may become at risk based on
businesses other than servicing. Moreover, as the mortgage market becomes
more volatile and difficult for lenders whose loans may be those serviced by the
same company, the risks are compounded. To then use the servicer rating as part
of the rating process for a mortgage-backed security can have the mathematically
equivalent impact of double counting. Obviously, the rating agencies’ role itself
can define the difference between “life” and “death”.

Just as one of the key considerations in the evaluation of RMBS assets is the
servicing entity, “an important pillar of Fitch’s rating process for a CDO is an

downgrades of their servicer ratings. 4 On April 6, Moody’s downgraded
the servicer rating of New Century to SQ4- from SQ4. 5

90. New Century Financial Corp., Quarterly Report (Form 10-Q), at 62 (Sept. 30,
00009256906001359/a24944e10vq.htm#103.

91. New Century Financial Corp., Notification of Late Filing (Form 12b-25),
available at http://www.sec.gov/Archives/edgar/data/1287286/
000119312507045551/dnt10k.htm.

92. New Century Ratings Downgraded Moody’s lowers servicer rating to SQ4,

93. See New Century’s Survival in Doubt Fitch lowers servicer rating,

94. New Century Crumbling Defaults disclosed in SEC filing, MORTGAGE DAILY,

95. Coco Salazar, Mergers Dissolve: Latest Mortgage M&A’s Corp activity,
assessments of the capabilities of the originator, servicer or portfolio manager ("manager") to service or manage the CDO." 96

"Fitch places significant weight on the quality of individuals involved in the management of CDO portfolios. Key-person risk represents one of the explicit scores within the staffing category of Fitch’s CDO asset manager ratings scorecard. Among the factors incorporated into the evaluation of key-person risk are: the depth of overall management and staff, key-person participation in CDO debt and/or equity, and the relative challenge for the organization in acquiring qualified replacement personnel. Variables that may affect this challenge include location, as well as reputation and market position of the firm." 97 While these are each logically and sensible items to consider of importance in assessing the rating of a CDO we are again confronted with the reality that the new ratings methods of a novel asset are informed by the new ratings methods of a novel component (in this case CAM) and there is little empirical history to support either of these scales.

No one would argue that reputation, as example, is a critical indicator in judging a person or institution, reputational risk arises quickly as demonstrated over the past decade by the fall of former stars including Long Term Capital, Enron, Amaranth. More recently we have seen over 60 U.S. mortgage lenders disappear between late 2006 and late April 2007. For shorter lived assets, and over shorter periods ratings adjust more slowly than market-prices 98 so why, if rating agencies do not observe such deterioration before they are observable in markets, and re-rate existing assets only infrequently, should investors be bound to their process?

With limited historic data, relatively no significant cyclical macro-economic experience and a large backlog of not yet profiled CDO managers 99 a fuller understanding of their assessments appears critical.

E. Regulatory Issues

Given the rapid growth in issuance shown in the table above it would seem appropriate to consider whether the rating agencies have been appropriately spending on operational risk issues including systems and staff, relative to the growth in rated assets.100

97. FitchRatings – CDOOpinions, Apr. 19, 2005, at 3
99. Walden Siew, *Subprime turmoil may take toll on CDO managers*, Reuters, Feb. 28, 2007, available at http://www.reuters.com/article/reutersEdge/idUSN221522892007070228. see e.g “Fitch Rating, for example, has profiled 66 CDO managers, about a third of which have some exposure to subprime debt” and “a backlog of about 60 new managers still need to be profiled”
100. Committee of European Securities Regulator’s Report to the European Commission on the compliance of credit rating agencies with the IOSCO Code - Ref: CESR/06-545 at 70 (“EFFAS points out that the key factors to achieve a high standard
Just as bank regulators are tasked with examining regulated institutions and look at such issues as capital, assets, management, earnings, liquidity and sensitivity to market risk, the SEC staff review aspects of the rating agencies’ business and seem to have some ability to, among other powers, make sure that the agencies are staffed with an appropriate number of experienced ratings staff and operate independently of the companies they rate.101 The SEC examines the rating agencies every five years102 and their authorities, in approval of new and continuing registration of NRSROs, are defined by law.

Last year, Congress passed the “Credit Rating Agency Reform Act of 2006”103 which, among other things authorized the SEC to suspend or revoke the NRSRO status of a current registrant if it didn’t have the financial or managerial resources to produce ratings with integrity.104 In a letter to SEC Secretary Katz in June of 2005, S&P’s President Kathleen Corbet in answer to the SEC’s question: “The Commission requests comment on the appropriate subjective criteria that a credit rating agency should use in assessing the experience and training of an analyst to meet the proposed NRSRO definition?” responded that “While Ratings Services is confident that its standards and procedures for analyst background and training would meet any minimum requirements imposed by the Commission, Ratings Services does not support the promulgation of NRSRO designation criteria that are conditioned on specific attributes of a rating agency’s staff.”105

of credit rating are human resources and the skills of the staff employed. The professional background and qualification of the CRAs employees is not published and there is not a framework of statutory rules requiring a specific professional standard of training. So it concludes that it is difficult to assess whether the resources employed by the CRAs are sufficient.

Similarly, Rating Evidence stresses that only a very few analysts undergo training to absorb the CRAs rating philosophies and approaches at one of the universities offering rating education. Thus usually the analysts receive only on-the-job and in-house training. This respondent concurs that the confidence in the ratings would increase if rating analysts education would be more structured like in other professions.”).


102. See Lancellotta Statement, supra note 56.

103. Credit Rating Agency Reform Act, supra note 101.

104. Id. (“The Commission shall grant registration (to applicant’s for NRSRO status) under this subsection— (i) if the Commission finds that the requirements of this section are satisfied; and (ii) unless the Commission finds (in which case the Commission shall deny such registration) that— (I) the applicant does not have adequate financial and managerial resources to consistently produce credit ratings with integrity and to materially comply with the procedures and methodologies disclosed under paragraph (1)(B) and with sub-sections (g), (h), (i), and (j); or (II) if the applicant were so registered, its registration would be subject to suspension or revocation under subsection (d).”).

While little publicly available information is available about the specific number of analysts the rating agencies employ to rate particular asset classes there is reason to wonder if the rating staff would have the necessary capacity to review and update their ratings if there were a significant increase in asset volatility, deterioration the in macro-economic environment or liquidity event. It has been suggested that “ratings frequency also poses problems in the CDO market. Sources say that rating agencies usually only surveil the bonds once a year.”

In testimony to the Senate Banking Committee in February of 2005, Fitch’s President and CEO stated that Fitch “has approximately 1,600 employees, including over 750 analysts, in over 49 offices and affiliates worldwide. Fitch currently covers over 4,400 corporations, banks and financial institutions, sovereigns and 40,000 municipal offerings in the United States. In addition, we cover over 7,500 issues in structured finance, which remains our traditional strength.” In the same hearings Moody’s President, Raymond McDaniel stated “we have more than 1,000 analysts in 18 countries around the world…Our ratings and analysis track more than $30 trillion of debt issued in domestic and international markets, covering approximately 10,000 corporations and financial institutions, more than 20,000 municipal debt issuers, over 12,000 structured finance transactions, and 100 sovereign issuers”.

Given the increasing rating agencies play in supporting bank capital requirements and as they have expanded internationally, IOSCO, the International Organization of Securities Commissions has become increasingly active in assessing the role of credit rating agencies. In December of 2004 IOSCO released code of conduct for the rating agencies to which the SEC has explicitly noted its support in the current rulemaking process. The December, 2006 report by the Committee of European Securities Regulators regarding the compliance of CRAs with the code was part of the monitoring process in response to questions raised whether voluntary compliance with the code was

106. *Id.* at 7. (“Ratings Services believes that the Commission could appropriately consider the number of analysts employed by a credit rating agency in the NRSRO designation process. However, mandating disclosure by rating agencies of the average number of issues rated by those analysts would serve little practical purpose and might in fact mislead the market.”).


appropriate and effective or if regulators would need to be more proscriptive.\textsuperscript{112} It was recently reported that European officials would report to the annual meeting of IOSCO that more monitoring of ratings is needed and that “structured products such as collateralised debt obligations and collateralised loan obligations are unusually opaque products and investors cannot see through to the credit quality of the underlying borrowers making interest and principal repayments on those securities. They [Officials] are also concerned about potential conflicts of interest developing among rating agencies whose staff work closely with banks that issue CDOs and CLOs to design securities that are eligible for particular credit ratings. Because of the opacity and complexity of these debt instruments, investors such as pension schemes are more dependent on guidance from rating agencies”\textsuperscript{113} The suggestion that officials are not only concerned about actual conflicts of interest but the appearance of conflicts that might undermine investor confidence?

F. Rating Agencies Are Activist in Ways They Have Never Been

Over the past several years we have witnessed a seemingly significant public role of the agencies as described by the de-facto designation they have received as gatekeepers of bank capital adequacy.

There are examples over the past few years that, given their increased importance to global capital flows, are worth public policy consideration. Whether or not these activities are a result of real or perceived conflicts of interests on behalf of issuing clients is unclear. What is clear is that NRSRO powers have extended to areas of public policy in ways we have not witnessed before.

In early 2004, after accounting problems were discovered at Freddie Mac but before those of Fannie Mae were fully uncovered, Congress again embarked on a legislative process to create a new regulator with enhanced powers. One of the key provisions legislators considered was one that would better define the receivership authority of the GSE’s regulator in case they became seriously undercapitalized. In early April S&P “hinted about a possible downgrade of GSE debt if a new regulator had receivership powers”.\textsuperscript{114} This announcement supported the GSE’s goals of trying to prevent receivership authority from being included in legislation. It is unclear if this was done out of support for one of the

\textsuperscript{112} Committee of European Securities Regulator’s Report to the European Commission on the compliance of credit rating agencies with the IOSCO Code - Ref: CESR/06-545 at 2 (“On 30 March 2005, at the request of the European Commission, CESR delivered its advice (CESR/05-139b) regarding the potential options to regulate Credit Rating Agencies (CRAs). In its advice, CESR proposed not to regulate the Credit Rating Agencies industry at an EU level for the time being, and instead proposed that a pragmatic approach should be adopted to keep under review how CRAs would implement the standards set out in the IOSCO Code of Conduct.”)


rating agency’s largest single clients or as a result of fundamental analysis. It was later reported that the Chief Executive of the national Association of Home Builder’s, a longtime political ally of the GSEs, visited “Wall Street bond-rating agencies Standard & Poor's, Moody's Investors Service, and Fitch Ratings, Howard spread the word that Fannie's and Freddie's bonds might be downgraded if the legislation passed.” After Fannie’s regulator released a long anticipated investigation report there was a great amount of uncertainty about the Company’s financial condition as there had not yet been any agreement announced between the regulator and the Company. During that three day period between the release and an announcement of an agreement with the Regulator Fannie Mae’s stock lost about 15 percent of its market capitalization. “Remarkably, during this uncertain time, Standard & Poor’s (S&P) issued a statement that affirmed Fannie Mae’s AAA rating on its senior debt.”

In February of 2005, after the full extent of Fannie’s problems were better understood the Senate banking Committee held hearings during which Senator Sununu asked S&P President Kathleen Corbet “Ms. Corbet, less than a year ago, one of your analysts, Michael DeStefano, suggested that the GSE legislation we were considering before this Committee would cause S&P to reconsider the AAA rating it had for GSE unsecured debt. I read this account to mean that if we included receivership provision in that bill, then you would basically downgrade the credit rating of the GSE’s.” Ms. Corbet responded “First of all, Senator, if I may, let me start by saying that Standard & Poor’s does not advocate positions on any legislation”. Senator Sununu responded “You say that it is not your intention or your policy to have analysts comment on or lobby for or against specific pieces of legislation. But do not you think weighing in with a perspective on how this affects a de facto position on legislation?” Senator Reed continued, in his questioning “I think a quote from a report by Mr. DeStefano and Ms. Wagner would be, The slightest evidence that Congress would in any way agree to lessen its authority or cede it to others would in itself necessitate a rethinking of how much confidence bondholders should have that their interests would be taken into consideration in the case of a failed GSE.” And I think your response was you do not comment on legislation, but can you comment on that quote?”

This was not the first time that the rating agencies have become involved with legislation in a seemingly direct way. While the author’s can find no high profile examples, prior to this decade, in which rating agencies had the effect of potentially impacting legislation, this was the second such even in a very short period. The prior case was not at the national level but rather at the states level. While the motivation for their actions is unclear, it is interesting to note that in both examples, at least one agency’s position was aligned with their customer’s financial interests and their own.

On October 1, 2002, the Georgia Legislature passed sweeping new anti-predatory lending legislation. The Georgia Fair Lending Act\(^{118}\) contained a provision that assigned unlimited liability exposures to lenders who made “high cost loans” (and noteholders). In January of 2003 the three major credit-rating agencies announced that they would no longer be willing to rate RMBS originated in Georgia\(^{119}\). As a result, the Georgia legislature moved quickly to make amendments to their legislation to stop lenders from leaving the State. As other States began to move to pass similar legislation they were reminded of the effect that the Georgia law had and also limited their liability provisions.

G. Other Legal Risk Securitization Law

As we discussed previously in this paper, recent problems in the subprime mortgage finance market and housing industry are likely to give rise to litigation against various involved parties. Those suits are likely to be brought on behalf of homeowners, private investors and, potentially qualified institutional buyers of structured financial assets.

Given the brief history of securitization markets it would seem important for investors to fully consider risks to structures and the potential risks that conflicting interests could bring to bear. In practical terms securitization is the process by which an institution transfers its assets to a legally isolated and bankruptcy remote “special purpose entity” (SPE or SPV).

The assets, structured properly, are allowed to be removed from the balance sheet of the selling company it then records a gain in accordance with accounting standards. To be effective for the selling company the sale must comply with domestic and international accounting standards. Auditors will not sign off on moving of assets “off of the balance sheet” for accounting purposes without a legal opinion recognizing the securitization as a “true sale”. That is to say, simply, that the assets have moved beyond the control of the seller.

This serves several purposes, especially for financial institutions. Among them, it generally allows the firm to have less deposits to fund loan activity, in most periods this market financing will be less costly to larger institutions than other funding, and it generally allows them to hold less regulatory capital than they would have to if they held all of the credit risk.

The position of the agencies, in the case of the Georgia legislation further highlights the potentially inconsistent approaches they use in the rating process. While the agencies took a strong stance on their inability to rate assets whose legal isolation was in question in that case they appear not to have widely highlighted the risk to investors as a result of LTV Steel or NextBank.

In December 2000, LTV Steel filed for voluntary Bankruptcy protection under Chapter 11 in the US Bankruptcy Court of Northern Ohio\(^{120}\). In their filing the Company asked the court to grant an emergency motion to allow them to use the collections from the securitizations and claimed that the transactions were not “true sales” but rather “disguised financings”\(^{119}\). The Court granted the Company’s

\(^{118}\) Georgia Fair Lending Act, GA Code. Ann. §§ 7-6A-1 et seq.


\(^{120}\) *See*, e.g., In re LTV Steel Co., 274 B.R. 278 (Bankr. N.D. Ohio 2002)
motion though it did not rule whether or not the securitizations were “true sales”. Although this case could have caused the rating agencies to take the same position as the Georgia law, of ambiguity making it difficult to rate the risks to noteholders they chose not to. In fact, one of the agencies appeared to pressure attorneys to avoid commenting on the matter in legal opinions. “Standard & Poor's insisted that attorneys submitting true-sale opinions to the rating agency stop referring to LTV, noting that the court never made a final decision and that such citations inappropriately cast doubt on the opinion. Seven months later, in a delicately worded press release, S&P withdrew that prohibition—apparently because lawyers refused to ignore such an obvious legal land mine.”

Rating agency claims of their inability to assess the limits of credit risk exposures to investors in Georgia as a result of the 2002 legislation becomes more interesting to note given their relative silence in addressing potential ongoing risks to investors that could be posed by the explicit authority of the FDIC, after meeting certain thresholds, to abrogate contracts as receiver of a failing institution. In the case of NextBank the FDIC abrogated an accelerated payment contract provision for noteholders of a credit card securitization. Unlike the LTV Steel case, there was a clear determination in Bank of New York v. FDIC. Although the FDIC did not seek to invalidate or question the legal isolation of the securitization trust it did, nonetheless, abrogate certain payments to noteholders. It is therefore not only unclear how far the FDIC’s authority would extend into a securitization trust but it is unclear if this is considered in rating assessments.

Corporate bond values are not dependent upon recourse, servicing incentives, and other external factors. That is because even if the bonds are collateralized by specific assets, the corporation is explicitly tied to those assets and services and otherwise maintains their profitability within the corporate structure. If the collateral backing the corporate bonds experience difficulty generating cash flows sufficient to pay creditors, the corporation can channel excess revenues from other operations to cover the shortfall. Those differences, described below, create the basis for important fundamental differences in rating corporate bonds and RMBS or ABS.

III. TRADITIONAL BOND RATINGS DO NOT PROPERLY ACCOUNT FOR RESIDENTIAL MORTGAGE-BACKED SECURITY RISKS

While the type of discretionary decision-making described above can be fairly benign for typical corporate debt ratings, it has dire consequences for RMBS and CDO ratings. Ratings are intended to reflect risk to investors, and are of utmost importance in markets where financial instruments are highly differentiated and market price signals are lacking.

While arguments for proper ratings paradigms are often derailed by the minutiae of complex RMBS and CDO securities, we maintain that sufficient

121. Tim Reason, False security? Corporate insolvencies are testing whether securitization is a stable structure or a flimsy façade- Bankruptcy 2003, CFO: MAGAZINE FOR SENIOR FINANCIAL EXECUTIVES, June 2003.

prima facie evidence to argue that traditional ratings practices create dire consequences when applied to RMBS and CDOs (and other structured finance securities) in fundamental structural differences between the different firms involved, i.e., the RMBS pool trust versus the corporation. We demonstrate below that merely creating a pool of investments does not build diversification. Then we show that the static nature of the “firm” in structured finance makes the securities of that firm much more volatile than equivalently-rated corporate securities. When those static “firms” invest solely in fixed-income investments that is no reason to delay downgrades as there is no way for the static firm investments to recover and no way to redeploy capital. Since there is also no way for the “firm” to siphon off excess earnings, however, there is also no reason to delay upgrades.

Hence, RMBS, as part of a static capital structure, funding a static investment strategy composed exclusively of fixed income assets, and trading thinly over-the-counter with few market price signals, require dynamic ratings in order to adequately reflect risk. The main point is therefore that, in the case of RMBS, bond ratings are being used for something they were not initially intended and often sold on the basis of a fundamental misunderstanding of diversification. Below we show the implications of these fundamental shortcomings. Section III.A focuses on how the principal of diversification has been misrepresented by Wall Street. Section III.B analyzes the implications of rating RMBS with corporate debt rating techniques. Section III.C provides several case examples to illustrate common performance characteristics of ABS and RMBS.

A. Pooling Mortgages does not create Diversification

One of the primary myths perpetuated on Wall Street is that mortgage pools are diversified. Commonly cited claims read like the Wall Street Journal editorial on April 25, 2007, in which Ted Frank wrote that, “…diversification [in mortgage pools] reduces the risk of lending to borrowers with suboptimal credit.” Such claims represent a fundamental misunderstanding of the distinction between risk pooling, risk sharing, and diversification.

Risk pooling is the mere act of adding another investment to build up a portfolio. Suppose we have one $100,000 mortgage with a 2 percent probability of complete loss (the borrower never pays and an earthquake sucks up the house and land). Expected payout on the loan is $98,000 and standard deviation (risk) of the investment is 14 percent. It seems like we can lower the standard deviation of the outcome by accumulating a pool of mortgages. By accumulating, say, 10,000 identical uncorrelated mortgages the standard deviation of the pool indeed declines to $14%/√10,000 = 0.14%.

The problem is that we have decreased the percent of portfolio risk (standard deviation) but increased the dollar amount of the portfolio. Basic MBA-level finance, however, teaches that if we wish to compare the risk of two investments of different scale, we must compare the dollar profits from the two. When we combine a number of uncorrelated investments both expected profit and standard deviation grow in direct proportion to the number of investments. Since the
The risk/return tradeoff does not improve with the accumulation of more mortgages, there is no diversification in pooling mortgages.123

The advantage of pooling investments lies in the ability to more efficiently share risk with other investors. After the pool is constructed, the risk of the mortgage pool can be distributed by allowing investors to share the risk through purchasing securities representing a partial claim on the pool. Those investors, each with a fixed-size portfolio to allocate across investments, can now allocate risk across more sources of risk, helping them diversify their own portfolios. According to Bodie, Kane, and Marcus, “portfolio risk management is about the allocation of a fixed investment budget to assets that are not perfectly correlated. In this environment, rate of return statistics, that is expected returns, variances, and covariances are sufficient to optimize the investment portfolio. Choices among alternative investments of a different magnitude require that we abandon rates of return in favor of dollar profits.”124

B. Current Bond Ratings Methods are Misleading when Applied to RMBS

This section examines the fundamental differences between debt originated by corporations and debt originated by mortgage pool trustee (RMBS). Both the corporation and the pool trustee fund a pool of investments with a structure of securities. Differences between the two, which arise primarily from differences in static versus dynamic capital structures, static versus dynamic investment pools, and investment in real versus fixed-income assets, are illustrated in Figure 10.1.

FIGURE 10.1: FIXED AND STATIC FIRMS ILLUSTRATED

Corporate entities invest in pools of real investment projects that can substantially outperform or underperform expectations. As a result, investment returns can be evenly distributed above and below expectations. Corporate entities can dynamically manage their investment strategy. If an investment project underperforms the corporation can sell that project and invest the proceeds in another, completely different, project. Corporations can also dynamically manage their capital structures. If risk is expected to increase in the future, the corporation can accumulate additional equity by selling stock or saving current period excess earnings (retaining earnings) from real investment projects to buffer creditors from that increased risk.

124. Id. at 234.
In contrast, the assets in the mortgage pool are a pre-specified pool of fixed-income investments. While fixed-income investments may outperform expectations, that only means they pay in full as originally contracted. The upside potential is therefore the expected loss rate, which has historically been just over 0.15 percent in the mortgage sector. Since the mortgage pool must be brain-dead in order to avoid being classified as an investment company (and therefore taxed) the assets are pre-specified. The pool trustee therefore has no authority to change the pool investment strategy in reaction to unexpected underperformance. Since the pool trust is brain-dead, the pool trustee also has no authority to change the capital structure by selling new equity to buffer creditors from the increased risk. The pool’s ability to accumulate additional equity by saving current period excess earnings is inherently limited by the minimal upside potential on the fixed-income assets.

These simple distinctions create several important differences between corporate debt and mortgage pool debt (RMBS) with respect to 1) the fundamental source of default risk; 2) the meaning and relevance of performance point estimates; 3) the dynamics of cumulative losses; 4) the shape of statistical distributions on conditional losses; 5) the width (standard error) of those statistical distributions; and ultimately 6) the nature of decision-making in upgrade and downgrade decisions and 7) the use and relevance of credit enhancement.

1. Corporate Default Risk is a Function of Investment Decisions, while RMBS Default Risk is a Function of Investment Performance

The dynamic nature of corporate investment decisions creates benefits and risks for corporate debt that are not relevant to RMBS.

The main risk with dynamically managed investment strategies is that investors are at the mercy of management’s future investment decisions. If management changes the investment strategy the composition of the dynamically-managed pool of assets may change adversely and/or unexpectedly over life of investment.

The primary risk of corporate debt is therefore the classic free cash flow problem of standard corporate finance. Corporate finance teaches us that a number of mechanisms discipline free cash flow. Company seasoning, management longevity and reputation, as well as monitoring by financial institutions, provides assurance to investors. Hence, all of those factors are part of the background due diligence that feeds into the bond rating process.

Of course, substantial benefits arise from a dynamic investment strategy. The most basic benefit is that the ongoing series of individual corporate investments creates a stable portfolio of investment projects in the same way that dollar cost averaging does for individual investors – creating stable returns from vintage diversification.

In contrast to corporate debt, the benefit of a static mortgage pool investment strategy is that there is no free cash flow problem because the brain-dead trust

125. The 1-4 family first-lien home mortgage chargeoff rate at all commercial banks averaged 0.168% across the 1992-2006 period and never exceeded 0.348% annually. See Statistics on Banking, available at www.fdic.gov.
cannot redirect the investments (although the servicer can alter the servicing platform *ex post*, which is precisely the point of the structural changes outlined in our earlier paper).

There is a substantial risk however, that the static mortgage pool investments will be imperceptibly fundamentally flawed *ex ante*, since changes to origination standards may be manifested in adverse loan performance only after a substantial lag. Of course, such a movement precludes future securitizations from that originator due to the reputational cost, but the originator also will not have to provide costly *ex post* support to preserve market access. As the saying goes, the only securitization without recourse is the last. Furthermore, static mortgage pools offer no opportunity for vintage diversification, save through master trust structures, which are cost effective only for the largest issuers. Even in a master trust, however, vintage diversification can only occur within the mortgage sector: the mortgage pool cannot accumulate non-mortgage investments.

In summary, an investment in corporate debt is an investment in a proven ongoing dynamic investment strategy. An investment in a mortgage pool is an investment in a static pool of unproven fixed-income investments. We explain below how those differences make rating corporate debt very different from rating RMBS.

2. **Performance Point Estimates that are the Basis for Corporate Bond Ratings are not Relevant for RMBS**

Bond ratings are based on a point estimate of expected losses. If expected losses breach a threshold of the firm’s ability to repay, the debt rating is downgraded.

Expected loss point estimates are easy to compute for corporate bonds because the investment strategies of most corporations are well-established and management has credibly committed to continue investing in similar quality assets in the future. Free cash flow problems have generally been resolved and corporate governance problems contained. Investors generally know the asset quality from prior firm performance and are able to use management’s reputation to extrapolate the firm’s investment strategy into future.

The above characteristics align with the view of an investment in a corporation as a stake in a dynamic investment strategy. The expected loss estimate on a consistent investment strategy is constant across time. A constant expected loss rate is relatively easy to estimate and implement. If expected losses are expected to breach a threshold of the firm’s ability to repay and the corporation is not willing to change the strategy, the debt rating is downgraded.
Expected loss point estimates are more difficult to compute for mortgage pools because mortgage pools are initially relatively unseasoned.\textsuperscript{126} Figure 11 illustrates the difference between loss estimates on corporate investments and mortgage pools. The steep rise in losses in the left-most region of the expected loss curve for the mortgage pool characterizes the ramp-up problem for unseasoned investments.

A steep path of cumulative losses during the ramp-up period can indicate a problem with the underlying collateral. The problem becomes, how do you identify “too steep?” Uncertainty about the steepness of the ramp-up period has therefore been the source of most previous private structured finance problems.

When pools have shown higher defaults during the ramp-up phase, the mortgage pools have not be able to trap adequate excess spread to fund the credit enhancement (which provides the primary backstop for default). This was a typical problem with deals in the early 1990s, when several deals had to be restructured in order to avoid complete failure.\textsuperscript{127}

More recently, many mortgage pools exhibited similar early payment default (EPD) problems where defaults rose faster than anticipated while the pool was seasoning. On April 17, 2007, Wells Fargo announced that “…its revenue was reduced by $90 million because of steps it took to address continued woes in the subprime mortgage sector. The bank reduced the value of subprime loans in its portfolio and set aside more funds for early payment default on loans that have been securitized.”\textsuperscript{128} “After studying the collateral attributes of early payment default (EPD) loans and comparing them to loans that did not default in the first 12 months after issuance, Fitch found that Fair Isaac Corp. (FICO) scores have

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure11.png}
\caption{Expected Losses in Corporate and Structured Finance Debt}
\end{figure}

\textit{Source: R&R Consulting (2004).}

\textsuperscript{126} Seasoning requirements that stipulate mortgages be over 24 months old at pooling are not especially relevant when a 2/12 ARM, for instance, goes into pool at that time.

\textsuperscript{127} Note that all restructurings involving commercial banks required regulatory approval, which in some cases was granted to avoid critical undercapitalization that would have required regulatory discipline (see, for instance, Higgins and Mason 2005).

\textsuperscript{128} Ann Carrns, \textit{Some Prime Home Loans Seen Being In Trouble}, \textit{WALL ST. J.}
become less significant as an early default indicator when other high risk loan attributes, such as piggyback second liens or loans with no-income verification, are present.\textsuperscript{129} Such conclusions support our earlier assertions that fundamental changes to origination and servicing standards over the past decade have led to difficulties in valuing and pricing RMBS.

Given that problems predicting a moving expected loss rate early in the life of a mortgage pool are the source of most RMBS problems, it appears that predicting a moving expected loss rate on unseasoned collateral is much more difficult than predicting a constant expected loss rate on an ongoing established corporate investment strategy.

3. \textit{Cumulative Losses on Structured Finance Debt are Non-Decreasing}

The point was made earlier that corporate obligations invest in real assets. As a result, corporate investment portfolios can substantially outperform or underperform expectations. Furthermore, corporate investment strategies can be altered to take advantage of new investment opportunities, sometimes generating returns that offset earlier losses.

Mortgage pools invest in fixed-income assets. Fixed-income assets cannot substantially outperform expectations, but can significantly underperform expectations. Furthermore, since the investment strategy and capital structure of the mortgage pool is static, significant losses that accumulate in the pool cannot be offset by either significant outperformance (that would generate excess retained earnings) or changes to the investment strategy. The dynamics arising from the different nature of the underlying collateral in corporate and mortgage pool investments is illustrated in Figure 12. The solid s-shaped cumulative loss profile (in gray) is that for a dynamic pool of real corporate investments, which can recover from adverse shocks due to the real nature of the assets.

In contrast, because some corporate investments may be written off as losses while others may perform substantially beyond expectations, corporate debt may illustrate fluctuating cumulative loss dynamics.

Because mortgage pools are invested exclusively in fixed-income with little potential for substantial outperformance, however, the pool has little or no opportunity to recover from adverse loss rates. Static mortgage pools, because of their ramp-up period and their limited upside potential, therefore illustrate rising cumulative loss dynamics, with deviations lying primarily in the steepness of the ramp-up curve.

FIGURE 12: ACTUAL AND EXPECTED LOSSES ON CORPORATE INVESTMENTS AND MORTGAGE POOLS


The rising cumulative loss profile (in black) is that for the mortgage pool, which is a static pool of fixed-income investments. Note that the solid black line, lying only slightly below the expected loss profile (the dashed black line), represents the best possible outcome given previous losses, i.e., that in which the remaining fixed-income investments in the pool pay out all remaining principal and interest. The small amount of equity in the pool relative to the amount of debt securities dictates that the “best case” line lie only a small distance below the cumulative expected loss profile.

While corporate investments have equal upside and downside performance risk, mortgage pool investments have more downside risk than upside. That means that the shape of the statistical distributions used to calculate expected default probabilities, that is, bond ratings, is significantly skewed.

4. The Statistical Distribution of Mortgage Pool Performance Is Skewed Relative to that of Corporate Investments

As pointed out above, a corporation can accumulate additional equity by selling stock or saving current period excess earnings (retaining earnings) from real investment projects to buffer creditors from that increased risk. Moody’s-KMV, in fact, uses that residual equity value to help estimate the probability of default on corporate debt. KMV, as most models, treats the potential equity returns as normally distributed, which suggests a statistical distribution of expected losses facing corporate investments is similar to that represented in the leftmost panel of Figure 13.

130 While some may be tempted to argue that the master trust structure (allowing issuer’s other pools to co-insure one another) is meant to address that problem, it is still the case, however, that pool cumulative loss profile will not recover. Other pools merely contribute their own equity to subsidize non-performing pool.
The rightmost panel of Figure 13 illustrates further, however, that the skewed mortgage pool loss distribution is centered around a moving point estimate, whereas the (normal) corporate investment loss distribution is centered around a constant point estimate. The ratings exercise for RMBS therefore becomes estimating the area under an unknown distributional shape with a moving center. But there is more.

The mortgage pool’s ability to accumulate additional equity by saving current period excess earnings is inherently limited by the minimal upside potential on the fixed-income assets. Furthermore, since the pool is brain-dead, the pool trustee has no authority to change their capital structure by selling new equity to buffer creditors from that increased risk. A mortgage pool’s investment cash flows are therefore constant at best, and typically deteriorating to some extent as losses accumulate (at a decreasing rate) through the life of the pool.

Residual equity is built up only from cash flows that accrue above expectations, that is, unexpectedly low default or prepayment rates. With low expected loss rates to begin with, upward performance potential is typically limited to the two percent or so of equity typically included in RMBS structures.

Both corporate investments and mortgage pools, however, face equal downside potential of total loss. Since there is limited upside potential to the point estimate losses for the mortgage pool, the distribution of probable point estimates in any time period is skewed rather than normally distributed. Figure 14 confirms the general shape of the skewed distribution from FitchIBCA’s Monte Carlo simulation of residential mortgage pool losses presented in their technical literature.
5. Mortgage Pool Cumulative Loss Distributions Narrow over Time

The distribution of expected performance of corporate investments remains constant for the life of the deal. That is, the width of the normal distribution of expected losses remains constant around a constant mean.

In contrast, the width of the skewed distribution of expected losses on mortgage pool losses tightens around a moving mean. That is, the conditional expectation of performance improves through the life of the deal. Seasoning, the structure of the pool, and the erosion of uncertainty through time determine how fast, and by how much, the credit quality changes. The rightmost panel of Figure 13 represents the concept by narrowing the skewed distribution as the investment portfolio moves to the right, through time. The effect is sometimes referred to as “telescoping” distributions.

Ratings agencies must therefore not only estimate the appropriate mean point estimate at any given time in the mortgage pool’s life and the properties of the skewed distribution of probable losses, but also the width of the skewed distribution. Since all of these properties are variable, each is estimated with statistical uncertainty. Furthermore, since the midpoint, the skewness, and the width all change significantly soon after the deal goes on the market, ratings at inception are less meaningful for RMBS and CDOs than for corporate debt. Dynamic ratings are therefore necessary to properly assess secondary market risk in RMBS and CDOs in lieu of market depth and transparency.

To summarize so far, we have shown that mortgage pool performance is expected to change over time according to unknown processes and evolves with skewed telescoping loss distributions. Those observations lead to important implications for 1) upgrading and downgrading RMBS compared to corporate debt, and 2) the value of credit enhancement on performing RMBS. Those implications are analyzed in the next two sections.
6. Implications: When Mortgage Pools Do Not Perform, the RMBS Will Not Be Promptly Downgraded by Traditional Ratings Methods

Because the performance of investments underlying corporate debt are normally distributed and centered around a constant mean with a constant variance, it is fine for corporate debt ratings to be determined by conventional one-parameter loss estimates. Corporate debt ratings changes can therefore be governed by conventional statistical inference, which suggests that once actual losses are more than, say, two standard deviations from the mean initial estimate the deal should be upgraded or downgraded.

What’s wrong with imposing those assumptions in the case of RMBS? First, the midpoint estimate of the cumulative mortgage pool loss estimate, itself, requires a distributional assumption. Second, the distribution of probable returns around that midpoint is skewed, meaning that statistical inference on the basis of standard deviations arising from the normal distribution is not relevant. Third, the skewed distribution, itself, changes over time according to an unknown process so that the distributional estimates, themselves, are subject to uncertainty. The effect of those influences is graphically represented in Figure 15.

**Figure 15: Relying on Corporate Debt Rating Methods Results in Late Downgrades on RMBS**

![Graph showing cumulative loss level over time for mortgage pool and actual mortgage pool performance.]

*Source: R&R Consulting (2004).*

The dashed black line in Figure 15 is the expected loss profile for the mortgage pool. The skewed distribution along the dashed line represents the statistical distribution of expected loss outcomes for the mortgage pool, conditional upon the specific time period. The solid black line is actual mortgage pool performance. The solid black line’s position above the dashed line represents substantial performance deterioration, in that actual losses are larger than expected losses. The downgrade decision therefore centers on the question, “Are actual losses severe enough to represent an abnormal deviation from performance substantial enough to justify a securities downgrade?” “Substantial enough” in this context is usually taken to mean something akin to two or more standard deviations away from the mean.
The gray dashed line is the midpoint of the expected loss distribution for corporate investments. The gray normal distribution is the distribution on expected losses on corporate investment. Note that in the middle of the life of the mortgage pool, the actual losses on the mortgage pool are not two standard deviations away from the mean of the corporate loss distribution (point 1 in Figure 15). That loss level, however, is already well into the tail of the skewed (proper) mortgage pool loss distribution (point 2 in Figure 15), however, suggesting that the RMBS should have been downgraded some time ago. Standard normally-distributed loss assumptions used for corporate debt will therefore downgrade RMBS much later than is warranted under accurate distributional assumptions.

Additionally, since the skewed loss distributions for mortgage pool performance are narrowing over time and the static fixed-income portfolio has no chance of significant recovery, the RMBS have no chance of later upgrade. When mortgage pools do not perform, therefore, the outcome is dramatic and final.

7. Implications: When Mortgage Pools Perform Normally, Credit Enhancement Is Wasted

The narrowing width of cumulative mortgage pool loss distributions over time (telescoping) also has implications for positive mortgage pool performance scenarios. Earlier we showed that because mortgage pools are composed of fixed income investments, portfolio performance has more downside risk than upside risk leading to a skewed performance distribution. On the short side of that skewness, the slightest increase in performance above expectations may in fact lie well beyond the statistical distribution of expected returns. In that case standard corporate bond rating techniques would not award a ratings upgrade to that deal even though the deal may substantially warrant such treatment.

A more important result of the narrowing width of cumulative mortgage pool loss distributions over time, however, is that loss scenarios that threaten default become less probabilistically likely as time goes on in performing deals. As each period passes, the pool seasons further and performance is more predictable. Furthermore, there is less time for something exogenous to go wrong and reduced risk of last-minute cash-flow diversion.

Figure 16 illustrates the effect. Even if actual cumulative losses lie the same distance below expected losses throughout the life of the deal, the reduced width of the performance distribution results in increased credit quality (decreased probability of loss) over time.
Upward ratings drift resulting from the telescoping cumulative loss distributions also means that credit enhancement is wasted on deals that offer merely consistent performance. Credit enhancement is a decision about what level of risk to cover or leave exposed. Credit enhancement is reflected in Figure 17 by the shaded area under the probability distribution that exceeds the loss boundary, the area of which represents the probability that credit enhancement will be necessary to cover losses to investors. The deal will hold insurance or issue special securities to cover the risk of loss in that region. Hence, credit enhancement helps prevent investors from experiencing losses above some probabilistically-determined amount. Such coverage is relatively expensive, however, because it carries a high risk of loss should performance sour.
As time proceeds the cumulative loss distribution tightens around the mean. Hence, in the event of positive performance the deal gets safer and safer—that is, the amount of the shaded area under the statistical distribution that lies above the loss boundary indicating credit enhancement coverage gets smaller and smaller. Moving right across Figure 17, the level of loss that credit enhancement protects against becomes increasingly unlikely. The expense of maintaining coverage against such a level of loss exposure is therefore wasted.

8. Summary

In summary, because RMBS are constructed on the basis of mortgage pools that consist of static portfolios of fixed-income investments that become seasoned over time, performance over time becomes increasingly predictable. That increased predictability results in RMBS ratings that telescope in quality towards either default or AAA. Furthermore, all the tranches of securities associated with a specific mortgage pool will migrate toward default or AAA together. This all-or-nothing nature of the risk in structured finance is the source of relatively high AAA yields (and yields across the credit spectrum) that attract investors to the sector, as well as the source of concentrated defaults that have historically hit various ABS and RMBS sectors to date. The problem with rating RMBS therefore is not that the future is hard to predict. The problem is that the traditional ratings process, when applied to RMBS, is being used to do things for which it is not designed.

Most importantly, therefore, it is crucial to systematically refresh ratings early in the life of a structured finance deal using the rich data set contained in the servicer’s report in order to monitor the relationship between mortgage pool seasoning and the pool factor (the number of mortgages left in the pool). There is no analog for this function in standard corporate finance.
Below, we discuss specific examples of the properties outlined above. Actual cases are presented to show that the lack of legal isolation further confounds risk measurement. The main point is that a structured finance bond will either over- or under-perform a corporate bond with the same initial rating. In the structured finance world Goldilocks is rarely satisfied: on the basis of current ratings techniques, structured finance either runs too hot or too cold, but rarely just right.

C. Case Examples of Structured Finance Performance

Case studies can illustrate the phenomena described in the previous section. We use ABS*TRAK to highlight how to identify key movements in pools and securities performance relevant to the conclusions above. ABS*TRAK uses an automated deal-by-deal data upload with precise transaction structures manually coded. ABS*TRAK has distinct calibration and monitoring phases. In the calibration phase, outputs on each transaction are scaled so the ABS*TRAK on the most senior class of notes matches precisely the official rating agency rating. Calibration insures internal consistency across time for all classes of notes analyzed by the ABS*TRAK. In the monitoring phase, updates are generated from monthly servicing data. Numeric outputs include the ABS*TRAK and the theoretical credit curve, also called “theoretical” ABS*TRAK, which are presented in the figures that follow as T.ABS*TRAK1. Since it is the representative dynamics of the deal that are of interest, rather than the specific deals themselves, the examples that follow maintain the issuers’ anonymity.

Figure 18 illustrates pool dynamics that should never legally occur. Merely knowing that defaults cannot recover in a static pool, the downward spike in pool balance is a red flag that something is amiss. The downward spike in annualized periodic defaults suggests that perhaps some new accounts were added to sweeten the credit quality. None of those dynamics, however, show up in the simple cumulative default curve, however, because the trustee is managing the pool to wash out the types of dynamics that are typically monitored by investors.

As an investor, however, the potential for pool management creates a legal risk in addition to the fundamental (and obviously misunderstood) collateral risk. Investors make the right choice here. Investors in the AA tranche bid up the spread on the securities even though the loss dynamics were theoretically saved by the trustee’s action (i.e., the red line remains a zero spread). Note that the y-axis measures basis point discount on the security, so that 10,000 bps is a total loss. The AA-rated A-1 tranche investors therefore face a near-total loss on investment in this deal.

Investors in the BBB-rated B-1 tranche act faster, and investors exposed to the BB-rated C-1 tranche even faster still. Note that none of the prices recover afterward, as expected by the analysis of the previous section. Both the B-1 and C-1 investors face a total loss scenario, although the C-1 is a total loss at about month 5 whereas the B-1 is a total loss at about month 24.
The example in Figure 19 shows what happens when defaults start becoming fundamentally more complex. The annualized periodic default curve in this case looks smooth, so there is not the previous worry about some kind of pool bailout or trustee risk. Nonetheless, losses are mounting faster than anticipated. Evidence for that assertion shows up in the cumulative default profile, which is still not turning downward after 10 months.

What happened here was that bankruptcies hit the pool after funding so that pool losses occurred sooner than expected. In essence, the deal was misengineered in that the loss dynamics were miscalculated. This is a good example of the ramp-up problem presented above.

Eventually, the actual cumulative loss profile catches up with historical expectations, primarily due to the slowdown in annualized periodic defaults in May and June. That realignment is reflected in a recovery in AAA-rated tranche prices at about month 11. Prior to that date, investors were deeply discounting the price due to concerns about the fundamental pool performance. Similarly, investors in the A-rated tranche also regain confidence in month 12 and the pricing of the B-1 tranche returns to normal at that point.
Figure 19: Example 2, Pool and Securities Performance


Figure 20: Example 3, Pool and Securities Performance


Figure 20 shows an example of mortgage loss dynamics. Here, annualized periodic defaults rise in what appears to be a fairly normal seasoning pattern, then spike suddenly, then turn down suddenly. Similar to the first deal, we as
investors would really like to know what is going on here. There seems to be something abnormal in such quick movements.

In this case the cumulative default curve may be beginning to level off after 30 months, but we cannot be sure that is due to fundamentals because of the spike and recovery in the annualized periodic defaults. Investors may not be sure what is going on either. Investors in the AAA-rated B-1 tranche initially discounted their exposures but then priced the securities well below relevant historical risk exposures based on the ABS*TRAK model (the red line), which shows a lot of residual risk in their exposure. Investors in the AAA-rated B-3 tranche are far less sanguine. Interestingly, even though those investors are lower in the waterfall, they initially discounted the securities by less than the B-1 investors. The B-3 investors, however, are discounting the securities much later in the life of the deal, when the loss dynamics are getting strange. The B-3 investors are therefore pricing risk, while the B-1 investors are not.

These examples show the sensitivity of RMBS prices to how well loss assumptions hold up during the very uncertain early seasoning stages of the deal. If the assumptions hold, the deal will perform well up to maturity. If not, the deal will fall apart.

In summary, if capital structure and investment decisions can be changed to ameliorate new risk (and the firm is willing to do so), it is fine for ratings to remain largely fixed and static. If, however, either the capital structure or investment decisions are fixed and static, ratings must move, sometimes fairly often, to reflect new risk. If both capital structure and investments are fixed, ratings become the chief mechanism of reflecting risk to investors.

Since corporations can change their capital structures and investment strategies while corporate debt is outstanding, it is fine to statically rate a firm with a dynamic asset portfolio and dynamic capital structure. Static ratings are a problem for mortgage pool debt, that is, RMBS, however, because mortgage pools are static “firms”—that is, static portfolios of investments funded by static capital structures. Mortgage pool trustees cannot change their investment strategies or alter their capital structures to ameliorate new or unforeseen risk without changing the legal nature of the investment arrangements.

It is easy to see that the limitations of ratings for mortgage pools with static capital structures and investment strategies have the most pernicious effects in markets where a high degree of opacity renders ratings the chief mechanism of monitoring and evaluating risk.

Furthermore, the pernicious effects of static capital structure and investment strategies are heightened when the static firms invest in fixed income assets like mortgages and other types of consumer loans. The problem arises because fixed income asset performance is bounded from above—either the investor gets what they originally contracted for (repayment of principal and interest) or takes a loss. Unlike real investments in, say, equity, since the firm has no opportunity for substantial upside gain the firm has no opportunity to build additional earnings buffer than can help offset unforeseen risk.

In light of these observations, then, the minutiae of the RMBS and CDO securities merely obfuscate a real potential for inadequate risk transfer that can arbitrage regulations anchored on credit ratings, like ERISA and Basel II.
IV. THE COMPLEXITY OF RESIDENTIAL MORTGAGE-BACKED SECURITIES
Masks Inadequate Risk Transfer

RMBS are sets of securities used to finance the purchase of a mortgage pool from a mortgage originator. Like any firm’s securities, RMBS therefore pass the risk of mortgage pool payments to individual investors.

Standard pass-through securities merely pass principal and interest payments through to investors on a periodic pro rata basis. The creation of RMBS through tranching, however, creates a much more complex set of securities. While it is difficult to dispute that pass-through securities adequately pass mortgage pool risk through to investors, it is much more difficult to estimate whether the complex set of tranched RMBS securities passes the risk of the entire mortgage pool through to investors. There are two primary reasons for that difficulty. First, mortgage pools themselves are difficult to value due the commingling of default and prepayment risk. Second, complex arrays of tranched RMBS are often thinly traded, making it difficult to reconcile the total risk of the RMBS structure back to the mortgage pool on the basis of market estimates.

Those two sources of the difficulty correspond to the two sides of the most basic mathematical representation of portfolio risk. Standard MBA textbooks present the simple two-asset portfolio standard deviation as:

$$\sigma_p = \sqrt{\sum_{i=1}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \sigma_i \sigma_j r_{ij}}$$

where the left-hand side of the equation, $\sigma_p$, represents the total risk of the mortgage pool. The right-hand side of the equation represents the total risk of the portfolio of different tranched RMBS sold against the mortgage pool, where $\sigma_i$ are the individual RMBS standard deviations and $w_i$ are the weights (tranche sizes) of different RMBS constructed to finance the pool. The variable $r_{ij}$ in the equation is the correlation coefficient between the different classes of RMBS.\(^{131}\)

One thing we know for sure: the total pool risk $\sigma_p$ does not go away by merely being represented by a more complex set of securities. The sum of portfolio risk in the securities sold to finance the mortgage pool therefore has to equal the original risk of the mortgage pool. Thus, it must be that the right-hand side is composed of securities that are specifically financially engineered to have $\sigma_i$ and $r_{ij}$ properties appropriately weighted $w_i$ in such a way as to accurately reproduce the overall mortgage pool risk.

It is incredibly difficult to say, however, just what the right-hand side of the above equation amounts to in real-world RMBS structures. If the actual structure of RMBS securities is sold to investors on the basis of a combined portfolio standard deviation that is less than $\sigma_p$, risk has been masked. If the actual structure of engineered securities and their weights is sold to investors on the basis of a standard deviation more than $\sigma_p$, risk has been overweighted (and the deal will be uneconomical) to the issuer.

The problem of accounting for risk therefore becomes an exercise in evaluating $\sigma_i$ and $r_{ij}$ to make sure that the total risk of the set of engineered

\(^{131}\) If diversification is to be beneficial, $r$ must be less than one, so that the portfolio standard deviation will be below the mere sum of the standard deviations of its component assets.
securities is equal to the total portfolio standard deviation, \( \sigma_p \). The difficulty of evaluating \( \sigma_p \) at the pool level, as well as the complexity of the securities themselves makes such an exercise nearly impossible.

Fundamental changes in origination and servicing practices such as those described in our earlier draft change the timing and predictability of the cash flows that make mortgages valuable. When those changes occur unpredictably over time or across issuers, thereby affecting the cash flows of some unknown number of mortgages, RMBS become even more difficult to value. Hence, changes in origination and servicing practices, along with the existing complexity of RMBS, results in substantial opacity in the RMBS market.

A. Mortgage Pools Are Difficult to Value

Mortgage pools, like other fixed-income financial instruments, are valued as the present discounted value of expected cash flows. Like most fixed-income investments, mortgages are affected by default risk.\(^{132}\) Mortgages are also, however, substantially affected by prepayment risk—that is, the risk that the borrower will unexpectedly pay off the loan early. While a great deal is known about measuring borrower default risk, relatively little is known about measuring borrower prepayment risk. Whereas default risk is more a function of credit risk, prepayment risk is more a function of market risk; in particular, factors like the level of interest rates, the shape of the yield curve, volatility, seasonality and market competition. Hence, prepayment risk creates substantial difficulty in estimating the value of an RMBS as a function of expected cash flows on the mortgage pool.

Default risk measurement, using consumer credit scoring models like the FICO scores estimated by FairIsaac, is a relatively well-developed and mature industry (though its application to those mortgage originations of recent borrowers with limited credit history is cyclically untested and there is little empirical information with which to assess its performance in a stressed environment). Consumer loans and mortgages assess default risk by examining borrower FICO scores of individual customers prior to approving a loan. FICO scores are accepted by financial firms and their regulators as valid and meaningful indicators of default risk.

While such measures of default risk are well-accepted in the industry, recent trends have called the relevance of traditional FICO score reliance into question. Fitch notes that, “while 2006 vintage EPD loans have FICO scores that average 30 points higher than the 2003 vintage, increased borrower leverage, as evidenced by high combined loan to value ratios (CLTVs) and lack of income verification, has increased default risk for these higher FICO loans.” Fitch goes on to note, “Over 50% of the 2006 EPDs have piggyback second liens. Borrowers with the highest leverage tend to have higher FICOs.”\(^{133}\)

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\(^{132}\) Default risk is the risk that a borrower will not repay, on time and in full, all principal and interest as promised in the financial instrument.

Nonetheless, RMBS prospectuses routinely consider reporting the FICO score distribution of the loans in the mortgage pool sufficient to show expected levels of default risk.

Defaults are costly, but relatively rare. Prepayment risk is less costly, at least in terms of direct costs, but far more prevalent. Calomiris and Mason demonstrate a default rate of just under 4.3 percent in the 4.2 million FHA loans underwritten from 1996 to 2002. By contrast, the prepayment rate in that period was 67 percent. Figure 21 shows prepayment and default rates for the Calomiris and Mason sample. It is immediately apparent that prepayment risk is an entirely different order of magnitude than default risk.

One can be tempted to dismiss prepayment risk by rationalizing that defaults saddle investors with principal losses, whereas investors receive payment in full with prepayment. The real problem, however, is that while investors are repaid the full principal repayment, the stream of interest payments generated by the principal end when they are most valuable—that is, when interest rates on competing investments are low, a classic manifestation of re-investment risk. Thus, prepayment risk, in tandem with textbook interest rate risk, creates a double-edged sword. If interest rates in the economy rise, then the value of the mortgage pool declines (standard interest rate risk). But if interest rates in the economy fall, then mortgage borrowers prepay as they refinance (prepayment risk). Hence, if interest rates move either way the mortgage investor loses.

Calomiris and Mason estimate that prepayment losses in their sample of 4.2 million FHA loans (equal to interest for the remaining expected life of the

mortgage accrued at the difference between the rate on the prepaid mortgage and rates available at prepayment) amount to just over $576 million while interest losses due to defaults amount to only about $12 million.135

The problem with prepayment risk is that, unlike default risk, there is no industry standard to measuring prepayment risk. Public Security Association (PSA) models attempt to correct for prepayment risk but do not estimate it directly. Figure 22 illustrates common prepayment vectors from Fitch IBCA’s, “Rating U.S. Residential Subprime Mortgage Securities.”136 Note that ARM prepayment vectors spike considerably at the end of the fixed period.

Prepayment risk corrections affect the probable maturity of the bonds that RMBS investors buy. When investors purchase RMBS securities, they are therefore not only inferring default risk of mortgages in the pool, but also inferring some probable maturity of their investments (when funds are repaid and interest stops) as well.

Prepayment inferences about mortgage prepayments are based on ad hoc corrections, not predictive prepayment models. The problem with formal modeling is that unlike default risk, which is inversely related to economic performance in a straightforward fashion, the double-edged sword relationship of interest rate risk and prepayment risk creates a non-linear estimation environment. Calomiris and Mason address the problem by estimating two separate components of prepayment risk: one associated with prepayments related to falling interest rates, and another associated with prepayments related to other outside circumstances (like job transfers).

Calomiris and Mason call these two separate components of prepayment risk “endogenous” and “exogenous” prepayments. Exogenous prepayments are predicted as a function of attributes of the borrower and his or her local

135. None of this is meant to suggest that default risk is not as important as prepayment risk. Total default losses (including losses on selling the home as collateral) in the Calomiris and Mason sample amount to $4 billion. The main point, however, is that repayment risk is costly and prevalent.

community. Importantly, exogenous prepayments are initially estimated on prepayments that occur in rising interest rate scenarios, in which we propose that borrowers are not merely responding to refinancing their existing mortgage in an advantageous interest rate environment. Coefficients from the exogenous prepayments model are used to compute an exogenous prepayment “score” (EPS). The EPS is then included in a second-stage model of endogenous prepayments, which uses interest rate movement direction and volatility to estimate endogenous prepayments as a function of borrowers’ option to prepay. While Calomiris and Mason compute a number of variants on the model, the results of the basic second-stage model are included in Table 1. No matter which variant is estimated, EPS is always positive and statistically significant in the second-stage models, indicating the difference in the exogenous and endogenous prepayment decisions.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-51.0834</td>
<td>0.1388</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>EPS Score</td>
<td>0.5294</td>
<td>0.0010</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>% Change in Mtg. Rates</td>
<td>-3.1048</td>
<td>0.0225</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Standard Deviation of % Change in Mtg. Rates</td>
<td>2236.297</td>
<td>5.5339</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

Source: Calomiris and Mason (2007).

The main point of this section is to show that the most basic steps in valuing mortgage pools, and thus RMBS, are inherently difficult. Some elements of valuation, like measuring default risk, are thought to be relatively clear-cut and utilize accepted industry-standard modeling procedures. Other elements of valuation, like measuring prepayment risk, are not well-understood and therefore require subjective adjustments to assumptions about mortgage pool behavior. While there are existing industry standards for correcting for prepayment risk, there are not the types of well-developed models for prepayment risk such as there are for default risk. Hence, even the most basic elements of mortgage pool risk, the left hand side of the risk equation at the beginning of the section, are difficult to value.

B. Complex Arrays of RMBS are Difficult to Value

RMBS are complex structured finance securities used to fund the mortgage pools described above, with all the pools’ inherent default and prepayment valuation difficulties. The complexity of structured finance products is meant to smooth out some of the difficulties inherent in mortgage pool valuation to sell a range of securities with different risk-return qualities to investors who value those specific qualities (and tend to care less about other attendant valuation difficulties). The inherent complexity of RMBS, coupled with fundamental changes to underwriting and servicing standards, however, can also be used to mask adverse changes to mortgage pool origination and performance and therefore pose risk to RMBS investors and therefore risk to funding for socially and economically important consumer mortgage originations.

The complexity of RMBS has increased as the statistical predictability of collateral performance has become more established.
Figure 23 shows how RMBS and other structured finance products have increased in complexity over time. The first private asset-backed security was an RMBS issued by Bank of America in 1977, consisting of a simple pass-through structure—that is, one tranche. As the industry matured and investors became more comfortable predicting mortgage performance, RMBS became substantially more complex.

Table 2: Issues with the Given Number of Tranches as a Percentage of All Issues Per Type (Mean Number of Tranches Per Issue)

<table>
<thead>
<tr>
<th>Tranches per issue</th>
<th>RMBS</th>
<th>EQUIP</th>
<th>CARDS</th>
<th>AUTO</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20.5%</td>
<td>24.4%</td>
<td>58.1%</td>
<td>27.8%</td>
<td>53.8%</td>
</tr>
<tr>
<td>2</td>
<td>26.5%</td>
<td>41.5%</td>
<td>17.6%</td>
<td>55.7%</td>
<td>25.5%</td>
</tr>
<tr>
<td>3</td>
<td>19.6%</td>
<td>14.6%</td>
<td>20.3%</td>
<td>13.9%</td>
<td>9.0%</td>
</tr>
<tr>
<td>4</td>
<td>13.4%</td>
<td>12.2%</td>
<td>2.7%</td>
<td>1.3%</td>
<td>6.9%</td>
</tr>
<tr>
<td>5</td>
<td>10.2%</td>
<td>7.3%</td>
<td>1.4%</td>
<td>1.3%</td>
<td>2.1%</td>
</tr>
<tr>
<td>6</td>
<td>3.9%</td>
<td></td>
<td></td>
<td>1.4%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2.0%</td>
<td></td>
<td></td>
<td></td>
<td>1.4%</td>
</tr>
<tr>
<td>8</td>
<td>0.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10+</td>
<td>2.9%</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total issues</td>
<td>596</td>
<td>41</td>
<td>74</td>
<td>79</td>
<td>145</td>
</tr>
</tbody>
</table>

Note: Classification by type is according to the European classification of securitizations: ‘RMBS’ are residential mortgage-backed securities; ‘Equip’ are securitizations of equipment assets; ‘Cards’ are credit-card securitizations; ‘Auto’ are securitizations of auto-loans.

Table 2 shows that other collateral types that began to be securitized well after mortgages are far less complex. The first non-mortgage securitization was equipment leases, followed by credit cards and auto loans, and more recently, home equity, lease finance, manufactured housing, student loans, and synthetic structures. All of those types of collateral illustrate tranching structures that are measurably simpler than those for RMBS.

It is common to claim that RMBS became more complex as underwriting technology became more efficient. Two examples of this are the movement from standalone trusts to master trusts and the de-linking of tranches through issuance trusts. Standalone trusts are simple and efficient for individual securitizations, but woefully inefficient for repeated securitizations. The reason that standalone trusts are inefficient for repeated securitizations is that each time an issuer wants to sell more loans, it must create a new legal trust structure to house the loan pool and issue the notes backed by that pool. Establishing an identical new trust structure each time a new pool of loans is sold (often at least four times a year) repeatedly incurs substantial fixed legal and administrative costs. Hence, a means by which a firm could establish a “shelf registration” system for securitized assets contributed a great deal of efficiency to the practice of securitization. By the late 1990s, therefore, most assets were being securitized in master trust structures.

Issuance trusts relieved the need to sell the entire structure of tranches at the same time. In the past, the entire series of tranches had to be sold at once to ensure that the lower-tier (junior) tranches provided the desired credit support for the higher-tier (more senior) tranches. The problem is that widened credit spreads resulting from adverse market shocks could (and did, during the 1998 Russian bond default), occasionally shut down issuers’ ability to securitize assets at their regular funding cycle. Those events led to legal developments that allowed lower-tier tranches to be sold any time prior to higher-tier tranches as long as higher-tier tranche maturities remained within those of the lower-tier securities. Relieved of the constraint to sell all tranches of securities in the same market environment, issuers could take advantage of favorable market conditions to provide certainty to their regular funding cycle.
RMBS are currently the most mature and complex of consumer structured finance products. Figure 24 shows some representative RMBS structures. The examples show that RMBS routinely contain many tranches of securities. Furthermore, those tranches include even more sophisticated features to adjust for prepayment and other inherent mortgage pool risks, including complex and difficult-to-value securities like interest-only and principal-only strips, sequential pay securities, and planned amortization class bonds.

C. The Complexity of Valuing the Pool and the Array of RMBS Backed by the Pool Makes it Nearly Impossible to Trace the Accuracy of the Risk Transfer in the RMBS Market

The main point is that the complex arrays of RMBS represented in Figure 24 need to be constructed to meet the constraints that the total pool risk be represented in the entire (very complex) structure of RMBS. Earlier we represented the mathematical representation of a portfolio of securities as:

\[
\sigma_p = \sqrt{\sum_{i=1}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \sigma_i \sigma_j r_{ij}}
\]
Recall that the left-hand side of the equation, $\sigma_p$, represents the total risk of the mortgage pool. The right-hand side of the equation represents the total risk of the portfolio of all the different tranch ed RMBS sold against the mortgage pool, where $\sigma_i$ are the individual RMBS standard deviations and $w_i$ are the weights (tranche sizes) of different RMBS constructed to finance the pool. The variable $r_{ij}$ in the equation is the correlation coefficient between the different classes of RMBS.138

But this representation of risk is valid for only two classes of RMBS securities, say equity and one class of debt. In practice, there can be up to 50 or 60 classes of debt and equity in a typical RMBS structure, each issued in different proportions (weights) and with different, time-varying correlations ($r_{ij}$), making it very difficult to estimate the true risk on the right-hand side. Furthermore, we also showed that even the left-hand side is difficult to value, given the complexities of default and prepayment risk. In that light, overly complex arrays of RMBS can arguably add as much opacity to pool value as they do efficiency to investors.

One thing we know for sure: the total pool risk $\sigma_p$ does not go away by merely being represented by a more complex set of securities. The sum of portfolio risk in the securities sold to finance the mortgage pool therefore has to equal the original risk of the mortgage pool. Thus, it must be that the right-hand side is composed of securities that are specifically financially engineered to have $\sigma_i$ and $r_{ij}$ properties appropriately weighted $w_i$ in such a way as to accurately reproduce the overall mortgage pool risk. To do otherwise would be a fundamental misrepresentation of risk.

In summary, RMBS are complex securities that are difficult to value. Furthermore, RMBS are built on the backs of pools of mortgages, which themselves are complex and difficult to value. Misrating RMBS and other structured finance securities a substantial sector of the U.S. consumer credit market at risk. Furthermore, fundamental changes to underwriting and servicing standards are not easily identifiable in the inherent complexity of mortgages and RMBS, posing risk to funding for socially and economically important consumer mortgage originations. Below we demonstrate that the increased risk is magnified by increasing concentration of CDO investments in lower-tranche RMBS investments.

V. Bond Ratings Also Do Not Account for Collateralized Debt Obligation Risks

CDOs fund a dynamic portfolio of assets on the basis of a static capital structure. In this case, dynamic ratings like those for RMBS are still necessary because the capital structure cannot be altered to accommodate unforeseen (or just plain increased) risk. In fact, funding a dynamic investment portfolio with a static capital structure breeds additional risk through moral hazard, where the

138. Recall further that if diversification is to be beneficial, $r$ must be less than one, so that the portfolio standard deviation will be below the mere sum of the standard deviations of its component assets. Given that the value of all the RMBS is derived from the same pool of mortgages, it is hard to argue that $r_{ij}$ is substantially less than one in many states of the world.
investment manager *purposefully* increases risk in order to maximize the return on the static capital structure.

**FIGURE 25: CDO CAPITAL STRUCTURE ARBITRAGE THROUGH VINTAGE SUBSTITUTION**

![Diagram showing vintage substitution in CDOs](source_image)


Good examples of such capital structure arbitrage are unfolding as we speak. According to FitchIBCA, mezzanine structured finance CDOs typically contain a 3-5 year reinvestment period during which new collateral can be substituted for original collateral that prepays or defaults. As a result, since CDOs that were created in 2003 faced high early prepayment and default rates recently they have taken on risk from the 2005 and 2006 subprime vintages, which are so far performing worse than the original 2003 vintage.139

Figure 25 shows how vintage substitution is forcing the 2003 and 2004 vintage CDOs to take on additional risk from the 2005 and 2006 vintage RMBS. Because of this vintage substitution effect, as the 2003, 2004, 2005, and 2006 vintage RMBS season further, performance is expected to worsen. Hence, Fitch expects RMBS and CDO downgrades to arise later in 2007.140

Even beyond the issue of capital structure arbitrage, such vintage effects create a new and previously unanticipated risk. As investors have shunned new subprime RMBS, home price appreciation and therefore mortgage underwriting has slowed, reducing the volume of higher quality RMBS going forward. Hence, there will be fewer high-quality later vintage assets for CDOs to purchase as they release OC in their credit enhancements and replace earlier vintage investments. As a result, returns will suffer as investors pay increasing premiums to chase investments in a smaller pool of riskier assets in the sector.

It is again easy to see, therefore, that the limitations of ratings for CDOs that fund debt pools with static capital structures and dynamic investment strategies

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140. *Id.* at 5-6.
have the most pernicious effects in markets where a high degree of opacity renders ratings the *chief* mechanism of monitoring and evaluating risk.

As before, the pernicious effects of static capital structure and dynamic investment strategies are heightened when the static firms invest in fixed income assets. The problem arises because fixed income asset performance is bounded from above—either the investor gets what they originally contracted for (repayment of principal and interest) or takes a loss. Unlike real investment projects, since the firm has no opportunity for substantial upside gain the firm has no opportunity to build additional earnings buffer than can help offset unforeseen risk.

Hence, CDOs, structured with a dynamic investment strategy but a fixed capital structure, fixed income investments, and no market price signals require dynamic ratings in order to adequately reflect risk. The main point is therefore that, in the case of CDOs, bond ratings are again being used for something they were not initially intended. In fact, ratings agencies continue to expand the misuse of traditional ratings methods. The April 2007 IMF Global Financial Stability Report warned that one of the most significant global risks outstanding is the way that, “the rating agencies continue to expand the application of their ratings beyond the traditional credit risk domain.”

VI. THE COMPLEXITY OF COLLATERALIZED DEBT OBLIGATIONS FURTHER MASKS INADEQUATE RISK TRANSFER

A. The Complexity of Valuing the Pool of RMBS and other Investments and the Array of CDO Backed by the Pool Makes it Nearly Impossible to Trace the Accuracy of the Risk Transfer in the CDO Market

Earlier we presented the difficulties in accounting for risk transfer in RMBS backed by mortgage pools. CDOs are merely securities backed by pools of RMBS and other fixed-income securities. The same risk equivalence between the mortgage pool and the structure of RMBS must be maintained between the RMBS and fixed-income pool and the CDOs. The main point is again that the complex arrays of CDOs need to be constructed to meet the constraints that the total RMBS and fixed-income pool risk be represented in the entire (very complex) structure of CDOs.

Earlier we represented the mathematical representation of a portfolio of securities as:

\[
\sigma_p = \sqrt{\sum_{i=1}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \sigma_i \sigma_j r_{ij}}
\]

Now the left-hand side of the equation, \(\sigma_p\), represents the total risk of the RMBS and fixed-income pool. The right-hand side of the equation represents the total risk of the portfolio of all the different tranched CDOs sold against the pool, where \(\sigma_i\) are the individual CDO standard deviations and \(w_i\) are the weights (tranche sizes) of different CDO securities constructed to finance the pool. The

variable \( r_{ij} \) in the equation is the correlation coefficient between the different classes of CDO securities.\(^{142}\)

CDOs again aggregate investments that, themselves, are difficult to value. While CDOs differ in construction by type of collateral and purpose, most begin with structures similar to RMBS. JP Morgan’s CDO Handbook (2001) illustrates typical CDO tranche structure composed of some fixed and floating A and B tranches supported by underlying C, D, and equity tranches. The top (A) tranches are typically rated triple- or double-A, the next tier tranches (B) are rated single-A, the next (C) triple-B, then double-B, with the equity typically not rated.

CDO funding structures, like RMBS, attempt to issue as many AAA-rated securities as they can sell given the inherent risk in the underlying collateral. CDOs attempt to issue as much class A, AAA-rated securities as possible because those provide the deal with the cheapest funding. Lucas, Goodman and Fabozzi suggest that typically about 77 percent of the securities in the structure are class A securities and rated AAA, typically paying coupons about LIBOR plus 26 bps.\(^{143}\) About 9 percent of the structure is class B securities, rated A and paying about LIBOR plus 75 bps. The typical 2.75 percent of class C securities are rated BBB and pay about LIBOR plus 180 bps. The riskiest rated bonds, the class D securities, typically comprise about 2.75 percent of the structure, are rated BB, and pay coupons of about LIBOR plus 475 bps. Equity, typically about 8 percent of the structure, is unrated and receives the residual cash flow from the deal.

\(^{142}\) Recall further that if diversification is to be beneficial, \( r \) must be less than one, so that the portfolio standard deviation will be below the mere sum of the standard deviations of its component assets. Given that the value of all the RMBS are derived from the same pool of mortgages, it is hard to argue that \( r_{ij} \) is substantially less than one in many states of the world.

Figure 26 shows actual CDO tranche structures. All the CDOs included in Figure 26 are re-securitizations (also called structured finance, or SF, CDOs). While most structures look similar to that RMBS, some, including those illustrated in columns 3 and 8 are radically different.

The different funding structures reflect how CDOs fundamentally differ from RMBS. In particular, CDOs are different from RMBS in at least six different ways. First, whereas RMBS ABS are supported by static pools of underlying assets, CDO pools are dynamically managed. Hence, the composition of the asset portfolio can change dramatically through the duration of the CDO transaction. Second, CDO transactions close before the pool of underlying assets is fully formed. This aspect may be a benefit or a drawback. Beneficially, the manager may be able to include in the pool greater diversity of collateral across industry, credit, and vintage. As a drawback, however, like the classic corporate free cash-flow problem, investors cannot be sure the manager will act as intended upon investment. Third, CDOs are quite heterogeneous with respect to granularity. Some CDOs may contain as little as twenty underlying assets, while others may contain several hundred. Furthermore, several hundred underlying assets from the same sector, that is, RMBS, does not add true diversification to the pool, leading many in the industry to question the relevance of the traditional calculations of “diversity scores” in contemporary CDOs. Because of the lack of diversification, traditional actuarial loss methods applied to RMBS pools are not properly applicable to CDO pools. Fourth, CDOs may illustrate more ratings

144. Note, however, that even several hundred underlying assets is still a relatively small number compared to the hundreds of thousands of accounts underlying RMBS and ABS pools.

volatility than RMBS due to ratings migration on the underlying collateral or manager trading. Fifth, while the heterogeneity of CDO asset pools adds some degree of diversification to pool performance that is not possible in RMBS, it may also increase opacity to investors. Last, since the CDO market is still growing, secondary market trading is still limited. The development of secondary market trading has been further hampered by the immense heterogeneity across CDO underwriters, collateral managers, and asset types.146

As a result of those differences, CDOs fund portfolios of collateral using a set of tranched securities seemingly similar to those found in RMBS, but using even more complex and esoteric securities than those typically found in RMBS. Section IV.B pointed out that our current understanding of market development is that securities and structures underlying different collateral types evolve as investors become more familiar with underlying collateral performance, particularly the predictability of that performance. Hence, the increased complexity of CDO structures and securities is not obviously rational in light of the opacity and heterogeneity of collateral in CDO pools and the relative youth of the CDO market.

CDOs, like RMBS, use securities like interest-only and principal-only strips to address the different risks that those two sets of cash flows pose to investors. Interest-only securities promise payment only while the loans are outstanding. Once the loan exits the pool, whether through prepayment or default, interest payment ends. Hence, there is great risk of non-payment in interest-only strips. Principal-only strips return investors’ funds, but timing is the issue. Whether the loan prepays or defaults (after which the collateral is sold), the investor usually eventually recovers principal in full. Hence there is little risk of non-payment in principal-only securities (although timing is still an issue: it is not uncommon for recovery to take several years).

CDOs also, however, routinely issue controversial features like Payment in Kind (PIK) terms in order to back up promised cash flows. A PIK term stipulates that, in the event that investors cannot be paid current month interest they are promised an increase in the par value of the bond to be repaid at maturity, that is, an IOU in payment for an IOU. Recent deals have not offered interest on the PIK feature, but sometimes offer greater PIK than the coupon foregone. Nonetheless, PIK-able securities are inherently difficult to value, and attempting to adjust for the lack of interest on the PIK component by making the PIK greater than the foregone coupon just makes cash flow modeling of downstream tranches even more difficult to ascertain with any degree of accuracy.147

The growing investor acceptance of CDO structures has been supported by rating agencies willingness to rate these assets. Unlike other assets that rating agencies rate, these assets are subject to considerable market risk, a risk which rating agencies do not claim to be able to effectively rate. Recognizing these issues, in May of 2005 former Fed Chairman Greenspan warned that “the credit risk profile of CDO tranches poses challenges to even the most sophisticated

market participants” and warned investors “not to rely solely on rating-agency assessments of credit risk.”

Because many buyers of senior CDOs can only hold investment grade assets, they may continue to hold deteriorating and increasingly illiquid assets as long as their ratings have not been downgraded. Because the market is OTC, investors may incorrectly value these assets in their portfolio and be forced to recognize large mark to market losses in a fast moving, liquidating market. As a case in point, Janet Tavakoli points out that the blindness of rating agencies to super-senior tranches can result in 2 different AAA tranches with different attributes.148

In fact, while one may be tempted to think that, due to their inherent similarity, not to mention the relatively high exposure of CDO pools to RMBS investments, CDOs and RMBS would be rated according to fairly similar methods. Even so, Section B suggests one would be drastically wrong to assume that RMBS and CDO ratings methodologies are similar, which leads to the possibility for ratings arbitrage when creating CDOs from RMBS and other types of structured finance.

B. Ratings Arbitrage: CDO Ratings Methods Are Looser than RMBS Ratings Methods, Even when CDOs are Solely made up of RMBS

The advent of CDOs in the mid-1980s represented the first time ratings agencies became consumers of their own ratings. With CDOs, ratings agencies used published ratings on the constituent debt instruments in the collateral pool along with the weights of different instruments in the capital structure, to rate the CDO obligations produced on the basis of that pool. This was not too much trouble in the beginning, because the investments carried in CDO pools were almost exclusively standard corporate debt.

In the late 1990s, however, CDO pools began to carry a much wider variety of debt from a much wider variety of sectors. Upon researching historical loss incidence and severity across those different sectors, it was soon discovered that the disparate sectors exhibited widely disparate performance.

A number of disclosure and arbitrage issues arose in attempting to properly measure and adjust for the widely disparate performance. The disclosure difficulties can be shown through the example of S&P’s experience (noting that S&P is not unique in this regard). Nomura, in their “Bond Rating Confusion,” report, writes, “When the agency embraced a simulation-based rating methodology for CDOs in 2001, it started using different ‘implied asset default rates’ for ABS and corporate bonds.”149 However, the agency refrained from disclosing a complete table of default rates over time for the separate asset classes. Several months later, when S&P published its updated criteria for cash flow and synthetic CDOs, it continued to disclose only a partial table.150

148. Janet Tavakoli, GARP Risk Review Issue 22, January/February 2005 (“If everything else remained the same, but 2% of the portfolio defaulted, slightly more than two percent of the first AAA tranche would not be deemed AAA. The AAA of the second CDO presents a different picture, because 40% of the formerly AAA tranche would no longer be deemed AAA.”).


releasing complete tables of default probabilities for ABS and corporate bonds, S&P temporarily sidestepped the problem of having multiple definitions associated with its rating symbols. Later, when S&P addressed the treatment of municipal bonds in CDOs, it acknowledged the stronger historical performance of the municipal sector but it still refrained from publishing tables with different idealized default rates for the different sectors. \(^{151}\)

**FIGURE 27: DEFAULT PROBABILITIES USED IN S&P CDO RATING CRITERIA**

![Chart 2: Default Probabilities Used in S&P CDO Rating Criteria](source)

*Source: Standard & Poor’s CDO Evaluator ver. 3.2.*

Figure 27 shows the default probabilities from version 3.2 of S&P’s software for time horizons of three, five, and seven years. Figure 27 shows that over time

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horizons of both five years and seven years, S&P ascribes a higher default probability to a CDO rated AA than to an ABS rated A. Over a three year time horizon, a CDO rated AA has a higher probability of default than an ABS rated A-. The tables, therefore, have some bizarre implications. According to Nomura, “Suppose you have a seven-year ABS rated AA+. According to the tables, the instrument has an idealized default probability of 0.168%. If we repackaged the security (all by itself) and call the repackaged instrument a CDO, it ought to get a rating of AAA because the idealized default rate for the AAA-rated CDOs is 0.285% over seven years.”

The ability to repackage financial securities and call them something else, with no fundamental change to their risk characteristics, in order to achieve an improved bond rating is the fundamental source of ratings arbitrage. As long as ratings agencies mean different things when referring to CDOs, ABS, and Corporate debt, incentives will continue to be skewed by risk arbitrage. Furthermore, embedding ratings into regulation through ERISA and Basel II only worsens the incentives to use opacity to the issuers’ benefit (and the investors’ loss).

VII. MORTGAGE-BACKED SECURITIES AND COLLATERALIZED DEBT OBLIGATIONS PROVIDE SUBSTANTIAL LEVERAGE TO THE U.S. MORTGAGE INDUSTRY AND ECONOMIC PERFORMANCE

A. The Incredible Growth of the CDO Sector

The problem with the complex arrays of securities originated as CDOs is that the CDO sector has grown so immensely in a short period of time. Figure 28 illustrates that annual issuance of CDOs has grown from nearly zero in 1995 to over $500 billion in 2006. In fact, CDO issuance is growing so fast that new issuance in 2006 amounted to approximately the total of the three preceding years summed together.
Figure 28 also shows the risk of relying on CDO markets for funding growth of underlying collateral underwriting. Figure 28 shows that CDO issuance dropped off precipitously from 1998 to 2002, exceeding 1998 levels again only in 2003. That drop-off arose from a combination of economic conditions along with unforeseen difficulties in the corporate loan and bond markets and manufactured housing, aircraft lease, franchise business loan, and 12-b1 mutual fund fee structured finance sectors that accounted for a significant component of CDO investments at the time. CDOs have since moved out of those sectors, and into RMBS and commercial mortgage-backed securities (CMBS).

The kind of market dynamics illustrated in 1998 suggest the potential for high volatility in sectors that rely principally upon securitization and re-securitization through CDOs for funding.

B. By Investing Heavily in Junior RMBS and ABS Tranches, CDOs Provide a Substantial Part of the Base for the Roughly 10:1 Leverage in Today’s RMBS Market

The potential for high funding volatility arises because of the structure of RMBS and the types of RMBS that CDOs hold. The structure of RMBS providing funding for a specific pool of mortgages is composed of an array of debt securities that pay investors principal and interest sequentially. If enough principal and interest remains after paying the first class of investors, the second is paid. If money remains after that, the third class is paid, and so on, and so forth. In this manner, the last class of securities to get paid bears the majority of the risk. Without investors willing to purchase the last classes of securities – typically, about 10 percent of the securities sold – the prior classes bear the risk. If the prior classes are not willing to bear the risk, the other 90 percent of the
mortgage pool cannot be funded, that is, the mortgage originator cannot sell the loans. Hence, the last classes of securities are providing about 10:1 leverage for the structure of RMBS, so that every dollar of lower-tranche RMBS supports about $10 of higher-tranche RMBS.

Specific types of CDOs have arisen that specialize in holding such risky classes of securities have become popular in recent years, providing a great deal of funding for lower-tranche RMBS at that 10:1 leverage ratio. But since so much lower-tranche RMBS has been sold to those CDOs, the CDO sector now holds a very high concentration of mortgage risk. If RMBS begins to default and the CDO sector restricts investments in RMBS or shifts out of RMBS, the mortgage industry loses funding of $10 for every $1 CDOs no longer want to buy. This “scissors effect” of leverage produces very volatile effects on the market that is leveraged, in this case, the mortgage market.

So just how much lower-tranche RMBS do CDOs hold? The FDIC reports that 81 percent of the $249 billion of CDO collateral pools issued in 2005, or $200 billion, was made up of residential mortgage products. (FDIC Outlook, Fall 2006) Moody’s CDO Asset Exposure Report for October 2006 reveals that 39.52 percent of the collateral within the 678 deals covered by Moody’s consists of RMBS, just over 70 percent of that in subprime and home equity loans and the other 30 percent in prime first-lien loans. Figure 29 confirms similar magnitudes from a smaller sample of CDOs monitored by Fitch.

![Figure 29: Subprime RMBS Compositions in CDOs Grew Quickly Over Recent Years](source: FitchIBCA, Rating Stability of Fitch-Rated Global Cash Mezzanine Structured Finance CDOs with Exposure to U.S. Subprime RMBS, Apr. 2, 2007.)

It is clear that CDOs hold a lot of RMBS, but what matters is how much of that is lower-tranche RMBS, which is the source of the scissors effect. Moody’s CDO Asset Exposure Report for October 2006 reveals that 70 percent of collateral in the pools underlying the 2005 resecuritization CDO vintage was below AAA-rated, and the largest ratings cohort, at 40 percent, was Baa. About 10 percent of the 2005 vintage collateral pool was rated below Baa. Overall, about 75 percent of collateral in the pools underlying resecuritization CDOs was below AAA-rated, the largest cohort being, again, Baa at 42 percent. About 16 percent of collateral was rated below Baa. Table 3, from Moody’s, shows that overall
weighted average rating factor (WARF) for the top collateral types for the resecuritizations is 225, which equates to about a Moody’s Baa1 rating.

**TABLE 3: TOP COLLATERAL TYPES IN RESECURITIZATION CDOs, 2005 (ALL VINTAGES)**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Sum of Principal Balance (MM)</th>
<th>Percent of Market</th>
<th>Deal Count</th>
<th>WARF</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS - RESIDENTIAL B and C MTG</td>
<td>$21,317.67</td>
<td>12.6</td>
<td>70</td>
<td>200</td>
</tr>
<tr>
<td>ABS - RESIDENTIAL A MTG</td>
<td>$10,007.20</td>
<td>5.91</td>
<td>27</td>
<td>113</td>
</tr>
<tr>
<td>ABS RESIDENTIAL B/C MORTGAGE</td>
<td>$6,372.51</td>
<td>3.77</td>
<td>47</td>
<td>297</td>
</tr>
<tr>
<td>RESIDENTIAL B/C MORTGAGE</td>
<td>$4,812.40</td>
<td>2.84</td>
<td>24</td>
<td>247</td>
</tr>
<tr>
<td>ABS RESIDENTIAL A MORTGAGE</td>
<td>$4,580.33</td>
<td>2.71</td>
<td>47</td>
<td>297</td>
</tr>
<tr>
<td>RESIDENTIAL A MORTGAGE SECURITIES</td>
<td>$3,968.67</td>
<td>2.58</td>
<td>24</td>
<td>222</td>
</tr>
<tr>
<td>RESIDENTIAL B/C MORTGAGE SECURITIES</td>
<td>$4,052.04</td>
<td>2.39</td>
<td>43</td>
<td>319</td>
</tr>
<tr>
<td>ABS - RON SUB-PRIME HEL</td>
<td>$3,937.34</td>
<td>2.33</td>
<td>10</td>
<td>141</td>
</tr>
<tr>
<td>RESIDENTIAL B/C MBS</td>
<td>$3,471.85</td>
<td>2.05</td>
<td>20</td>
<td>382</td>
</tr>
<tr>
<td>HOME EQUITY LOAN SECURITIES</td>
<td>$3,348.96</td>
<td>1.98</td>
<td>22</td>
<td>338</td>
</tr>
</tbody>
</table>


Again, Figure 30 confirms those magnitudes.

**FIGURE 30: RATINGS DISTRIBUTION OF RMBS IN CDO PORTFOLIOS**


Given the above observations, it is reasonable to infer that about 70 percent of the $200 billion, or about $140 billion, in RMBS purchased by CDOs issued in 2005 is below AAA. As we demonstrated earlier, only some 10 percent or so of a typical RMBS financing structure is made up of lower-tier (junior) securities. Those lower-tier (junior) tranches provide the desired credit support for the higher-tier (more senior) tranches. In other words, the 90 percent of the RMBS structure above the lower-tier (junior) tranches cannot be sold until those 10 percent lower-tier (junior) tranches are sold.

Because the 90 percent of higher-tier (senior) securities in an RMBS cannot be sold without selling the 10 percent of lower-tier (junior) securities first, even a small decline in CDO funding of mezzanine RMBS investments relative to the total RMBS market can have a large effect on RMBS funding, and therefore consumer mortgage funding.
81 percent of the $249 billion of CDO collateral pools issued in 2005, or $200 billion, was made up of residential mortgage products. (FDIC Outlook, Fall 2006)

Among RMBS in CDOs, 70%-75% held was below AAA-rated. (Moody’s CDO Asset Exposure Report, October 2006)

$200 billion of RMBS in CDOs x 70% below AAA = $140 billion of lower-tranche RMBS in CDOs

SIFMA puts total RMBS issued in 2005 at $1,326 billion.

Assuming 90% AAA in all 2005 RMBS, that leaves a total of $133 billion in lower-tranche RMBS issued in 2005

Point: CDOs purchased more lower-tranche RMBS in 2005 than was issued in that year.

How large of an effect? SIFMA estimates that about $1,326 billion was issued in private RMBS in 2005. If 10 percent of that is lower-tier (junior) securities, then about $133 billion in lower-tier securities supported the rest of the $1,193 billion.

Hence, the CDO market purchased more mezzanine RMBS in 2005 as was actually issued that year. Furthermore, and crucially, the relatively small amount of RMBS purchased by the CDO market provided support for the rest of the $1,193 billion issued in private RMBS during the entire year of 2005.

In summary, the CDO market adds liquidity to the RMBS market in a highly leveraged fashion by funding lower-tranche RMBS securities, and the experience of the ABS markets in the early 2000s illustrates that the liquidity provided by CDOs is very fragile. As is common in highly leveraged markets, the scissors effect of leverage can create substantial market volatility when investors enter and leave a highly leveraged market quickly. Since CDO difficulties arising from RMBS ratings deterioration is expected to be the proximate cause of mortgage market de-leveraging, we turn to analyzing the relationship between RMBS ratings and CDO ratings.

C. CDO Ratings Changes Follow (Scarce) Ratings Downgrades for Constituent RMBS Collateral

The main problem we have described is that the RMBS market is built upon the shaky statistical predictability of mortgage pool performance. The CDO market then builds upon the shakier foundation of the statistical predictability of RMBS performance to provide additional market liquidity.153

Preliminary evidence for this view lies in the relationship between ratings changes in CDO markets and underlying collateral, that is ABS and RMBS, markets. Given recent events, we now know that there are substantial numbers of defaults and near-defaults in RMBS mortgage pools. It is only a matter of time,

153. As before, as the performance of mortgages shifts due to fundamental changes in origination and servicing practices, investors may be surprised to find the mortgage claim they purchased is based on a pool of loans with very different statistical performance properties than previously experienced or expected.
therefore, before they accumulate to levels that will threaten rated mezzanine RMBS that is the investment of choice in many CDO pools. Many people are therefore asking when the RMBS defaults will hit CDO returns. In an opaque market prices may already be at distress levels – we won’t know, however, until investors try to sell.

We can infer when the defaults will hit CDO performance by reviewing the lessons already learned from the NERA report in 2003. The NERA report analyzed the effects of “notching” in the ratings industry. “Notching refers to the industry practice whereby one agency adjusts ratings of structured finance collateral from other agencies for the stated reasons of (1) bringing them in line with ratings it believes it would have assigned to the collateral and (2) adjusting for uncertainty and perceived differences in monitoring practices.”154 The study came about at a time when ratings agencies were increasingly asked to rate collateralized debt obligations with underlying collateral pools that include structured finance securities rated only by other rating agencies.

The NERA report is important for understanding present conditions in CDO markets because it points out the need for one ratings agency to do substantial additional research before integrating ratings of another agency that relate to, say, underlying collateral in a CDO. First, the outside rating change must be adjusted to be comparable with the CDO’s ratings agency. Then, the CDO’s ratings agency needs to analyze the CDO’s cash flow implications of the change in the single underlying collateral instrument. Last, the CDO’s ratings agency needs to decide whether to take action on the CDO itself. All those steps take additional time when the structures of the securities of concern are more complex.

In footnotes to their “CDO Asset Exposure Report,” Moody’s notes that it can take anywhere from three to seven weeks to normally incorporate another ratings agency’s change into their own CDO ratings.155 Hence, it would be expected that CDO ratings changes considerably lag RMBS and ABS ratings changes due to opacity between markets and across ratings agencies.


Figure 32 graphically illustrates that CDO downgrades followed ABS downgrades after the fallout in ABS in 2001-2003. Before 2003, CDOs experienced significant difficulties with ABS and lagged ratings changes. Those difficulties led to the NERA study discussed above. Figure 32 shows that in the periods that followed, the lagged relationships became much more systematic. Those results can also be shown through statistical VAR analysis of the relationship between ABS and CDO downgrades.
Table 4: Results of VAR Analysis of the Relationship between ABS and CDO Downgrades from January 2005 to December 2006

<table>
<thead>
<tr>
<th>Dependant Variable:</th>
<th>CDO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDO(-1)</td>
<td>0.024350</td>
</tr>
<tr>
<td></td>
<td>[0.23856]</td>
</tr>
<tr>
<td>CDO(-2)</td>
<td>-0.047252</td>
</tr>
<tr>
<td></td>
<td>[-0.45778]</td>
</tr>
<tr>
<td>CDO(-3)</td>
<td>-0.024940</td>
</tr>
<tr>
<td></td>
<td>[-0.19261]</td>
</tr>
<tr>
<td>CDO(-4)</td>
<td>-0.027687</td>
</tr>
<tr>
<td></td>
<td>[-0.20357]</td>
</tr>
<tr>
<td>CDO(-5)</td>
<td>-0.051774</td>
</tr>
<tr>
<td></td>
<td>[-0.39481]</td>
</tr>
<tr>
<td>ABS(-1)</td>
<td>0.100261</td>
</tr>
<tr>
<td></td>
<td>[1.35114]</td>
</tr>
<tr>
<td>ABS(2)</td>
<td>0.109789</td>
</tr>
<tr>
<td></td>
<td>[1.47095]</td>
</tr>
<tr>
<td>ABS(-3)</td>
<td>0.179819</td>
</tr>
<tr>
<td></td>
<td>[2.47077]</td>
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<tr>
<td>ABS(-4)</td>
<td>0.116152</td>
</tr>
<tr>
<td></td>
<td>[1.57518]</td>
</tr>
<tr>
<td>ABS(-5)</td>
<td>0.234360</td>
</tr>
<tr>
<td></td>
<td>[3.25081]</td>
</tr>
<tr>
<td>C</td>
<td>1.391791</td>
</tr>
<tr>
<td></td>
<td>[1.31038]</td>
</tr>
</tbody>
</table>

Note: ( ) represents lag length; [ ] provides the t-statistics; CDO is the depended variable; C is constant.

Table 4 shows the coefficients of the statistical VAR analysis of the relationship between ABS and CDO downgrades, weekly, from January 2005 to December 2006. The coefficient results in Table 4 clearly indicate that CDO downgrades follow ABS downgrades in the aggregate.

Figure 33: Impulse Response Function of the Response of CDO to Shocks in ABS with (+) or (−) 2 Standard Deviations

Figure 33 shows the impulse-response function generated by the VAR, which demonstrates a long-lasting and significant positive correlation between ABS and CDO downgrades. At 12 weeks, ABS downgrades explain about 23 percent of CDO downgrades in the aggregate.
D. The CDO Sector will Drop Collateral Sectors that Underperform

Recent historical lags between ABS/RMBS downgrades and CDO downgrades suggest a similar lag will occur due to the current mortgage mess. As yet, there are not enough RMBS downgrades to manifest a similar effect, but analysts expect the manifestation to soon become evident.

According to Steve Kolyer, a partner at law firm Clifford Chance, which is an outside counsel to S&P, “Ratings may be cut on collateralized debt obligations by this summer as the subprime loans that back the debt structures continue to sour.” After the losses become evident, “…there will be a reassessment of the credit grades of a lot of the instruments that were sold out of the CDOs. That’s when there will be further dislocation.”

Credit downgrades will cause a great deal of troubles in markets. “If rating companies begin to downgrade securities to junk status, some investors may be forced to sell assets they bought when they were initially rated high-grade…. Concerns about delinquencies and defaults on high-risk mortgages spurred weaker performance of subprime mortgage bonds and raise worries that insurance companies and pension may be at risk.” Last month, Moody's cut ratings on nine classes of subprime bonds sold by securities units of UBS AG and cited potential cuts on dozens more from other issuers.

The worry is that CDOs pull out of RMBS, even for a short period, and the scissors effect described above leads to dramatically decreased funding for mortgage originations. Historically, CDOs have fled distressed sectors without looking back. Prior to 2003, CDOs invested heavily in manufactured housing, aircraft lease, franchise business loan, and 12-b1 mutual fund fee ABS. CDOs with heavy exposure to those collateral classes took a beating when collateral underperformance and fraud revealed heavy losses in the pools and, subsequently, a great many defaults on ABS in those sectors.

More importantly for our purposes, however, is the fact that the collateral sectors that caused difficulties for CDOs in 2003 shrunk considerably afterward. The manufactured housing, aircraft lease, franchise business loan, and 12-b1 mutual fund fee ABS sectors are significantly smaller than they were when CDOs were pouring in during 1999-2001. We argue that the shrinkage in those sectors arose from decreased funding by the CDO markets.

We therefore maintain that dramatic shrinkage in the RMBS sector is likely to arise from decreased funding by the CDO markets as defaults accumulate. Of course, mortgage markets are socially and economically more important than manufactured housing, aircraft leases, franchise business loans, and 12-b1 mutual fund fees. Decreased funding for RMBS could set off a downward spiral in credit availability that can deprive individuals of home ownership and substantially hurt the U.S. economy.

The point made in the sum of this and the preceding section is that the CDO market adds liquidity to RMBS and ABS markets in a highly leveraged fashion by funding lower-tranche RMBS securities. According to Lucas, Goodman, and Fabozzi, however, that liquidity is very fragile, and the leverage provided by CDOs creates a scissors, or unwind, effect:
The CDO market is opportunistic in the way it drops collateral types that are out of favor with investors and picks up collateral types that are in favor with investors. The best example of this is the switch out of poor-performing high-yield bonds and into well-performing high-yield loans between 2001 and 2003. Also, certain types of ABS present in SF CDOs from 1999 through 2001 disappeared from later vintages: manufactured housing loans, aircraft leases, franchise business loans, and 12b-1 mutual fund fees. All of these assets had horrible performance in older SF CDOs. In their place, SF CDOs have recently focused more on RMBS and CMBS.157

Hence the degree of leverage inherent in CDO funding, along with the potential for high volatility in that funding, introduces the potential for public policy issues.

E. Domestic Links between Mortgage Markets, RMBS, and CDO Funding and the Housing Sector and Economic Growth

In August 2006, Fitch Structured Finance published a special report on “U.S. Subprime RMBS in Structured Finance CDOs.” That report pointed out a number of the changes to mortgage origination and servicing standards and gave some thought to possible implications for CDOs. In the period of time that has followed the Fitch report many of the changes to mortgage origination and servicing standards have become manifest.

As a result of recent manifestations of risks arising from changes to mortgage origination and servicing standards, in November 2006 the Markit Group reported that there was an interest shortfall on two bonds underlying Markit’s ABX-HE 06-1 BBB and BBB- indices of RMBS performance. More recently, the Wall Street Journal reported on January 27 that the ABX-HE 06-2 index had dropped 10 percent over the last six months, reflecting heightened default risk in the sector.158 Hence, the mortgage defaults that began occurring six or more months ago have become evident in investor pricing of RMBS instruments.

The consensus view seems to be that faced with slowing demand and shrinking profit margins, subprime lenders tried to maintain volume as the housing market was faltering in late 2005 and 2006 by making riskier loans. Those risks are now manifesting themselves in lower profits for issuers, resulting in bankruptcy for some and significantly higher loan loss provisioning for those that remain. RMBS defaults can be expected to result in a significant decline in


158 James R. Hagerty & Michael Hudson, Mortgage-Default Risks Rattle Bond Investors, WALL ST. J., Jan. 27, 2007, at B4. A decline in the ABX-HE signals that sellers of these insurance contracts are demanding larger payments to compensate for what they see as a higher risk of mortgage defaults, which would reduce the value of mortgage securities.
CDO funding for mezzanine RMBS tranches and, ultimately, a significant decline in funding for residential mortgages.\(^{159}\)

Decreased funding for residential mortgages can be expected to affect housing starts and home purchases, which affect the construction and building and home products industries and are key to economic performance. Reduced economic performance further exacerbates defaults, leading to a feedback mechanism that can produce a prolonged slump in US economic performance.

Peter Horndahl and Christian Upper of the Bank for International Settlements, initially reported that while the decline in the U.S. housing sector did not seem to impact RMBS spreads, the ABX:HE, a group of synthetic indexes of U.S. home equity ABS, moved sharply lower at the end of 2006.\(^{160}\) Figure 34 shows that RMBS markets are now beginning to illustrate the effects of high defaults in the mortgage pools that have made recent headlines.

**Figure 34: CDO Issuance and U.S. Home Equity ABS Indices**

RMBS issuance will become more expensive, perhaps prohibitively so, as spreads continue to widen as illustrated at the end of 2006. As prices on the ABX:HE index trend down, bond yields trend higher as investors demand more return as they realize the increased risks associated with RMBS investments. Note that beginning about August 2006, BBB- to AA spreads began widening, pausing only briefly about October. That spread is generally referred to as the price of risk.

D’Amato shows that the price of risk rises with increased defaults, lower housing starts, decreased payrolls, poor economic performance, and lower CDO

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issuance.161 D’Amato’s results are reproduced in Table 5. D’Amato’s mechanism feed upon itself, wherein housing starts drag down nonfarm payrolls, which in turn drag down the real policy rate gap, followed by rising mortgage defaults and decreased CDO issuance. Decreased CDO issuance reduces funding for mortgages, which drags down housing starts, nonfarm payrolls, etc… so that the cycle perpetuates itself. Such a macroeconomic propagation mechanism typically will not be the shock that starts a recession, but is the force that makes recessions long and deep.

TABLE 5: CDO RISK PREMIUMS AND CREDIT SPREADS AND MACROECONOMIC PERFORMANCE

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS</td>
<td>-0.140* (0.023)</td>
<td>-0.096* (0.030)</td>
<td>-0.102* (0.029)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>NP</td>
<td>-0.120* (0.036)</td>
<td>-0.015 (0.035)</td>
<td>-0.019 (0.034)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RG</td>
<td>0.276* (0.071)</td>
<td>0.162* (0.059)</td>
<td>0.155* (0.059)</td>
<td>0.629* (0.198)</td>
<td>0.184</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEF</td>
<td>0.629* (0.198)</td>
<td>0.184 (0.168)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDO</td>
<td>-0.011* (0.439)</td>
<td>-0.355 (0.312)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>R-squared</td>
<td>0.51</td>
<td>0.24</td>
<td>0.30</td>
<td>0.22</td>
<td>0.11</td>
<td>0.62</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Dependent variable: Risk premium

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS</td>
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<td>-0.002* (0.001)</td>
<td>-0.002* (0.001)</td>
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<td></td>
<td></td>
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<tr>
<td>NP</td>
<td>-0.001 (0.001)</td>
<td>0.001 (0.001)</td>
<td>0.001 (0.001)</td>
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<td></td>
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<tr>
<td>RG</td>
<td>0.006* (0.001)</td>
<td>0.004* (0.001)</td>
<td>0.004* (0.001)</td>
<td>0.008* (0.004)</td>
<td>0.004 (0.004)</td>
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<tr>
<td>DEF</td>
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<td>0.004 (0.004)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CDO</td>
<td>-0.025* (0.009)</td>
<td>-0.018* (0.007)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>0.24</td>
<td>0.04</td>
<td>0.32</td>
<td>0.11</td>
<td>0.20</td>
<td>0.44</td>
<td>0.51</td>
</tr>
</tbody>
</table>

Dependent variable: Price of default risk

1 Based on aggregate index measures at one-year horizon, in basis points. * indicates significance at 5% level. Standard errors are in parentheses. 2 HS: housing starts (in thousands); NP: non-farm payrolls (change, in thousands); RG: real policy rate gap (in basis points); DEF: high-yield default rate (in basis points); CDO: global funded and unfunded synthetic CDO issuance (in billions of US dollars). RG is defined as the real federal funds rate less the natural rate of interest, where the real rate is the nominal rate adjusted for four-quarter consumer price inflation and the natural rate is defined as the average real rate (1985–2003) plus four-quarter growth in potential output less its long-term average. Monthly values are linearly interpolated from quarterly averages. See BIS (2004, Chapter IV).

Sources: Bloomberg; JPMorgan Chase; Markit; Moody’s; Moody’s KMV; BIS calculations.

**F. Both Domestic and International Markets are Already Discounting RMBS, and CDO’s**

So far we have seen many of these expectations play out in markets already. Ratings agencies continue to say that the worst is over, only to revise their assumptions downward over and over. By late March, S&P was raising their loss assumptions on 2006 vintage subprime loans another 125 basis points, to 7.75 percent overall. At the same time, S&P continued to maintain in reports that most investment-grade bonds originated last year would remain protected, even as underlying loan performance would be the worst in history. “Most” can only be
interpreted in today’s environment to mean more than 50 percent, since S&P admitted the revision may have a “material” impact on the ratings of collateralized debt obligations. After much hand-wringing by some sources following our earlier draft, S&P admitted that residential mortgage bonds made up an average 73.8 percent of CDOs of asset-backed securities collateralized by mezzanine structured finance tranches last year, up from 42 percent in 2003.162

By late April, however, many were tiring of the ratings agencies “updates,” creating a reputation dilemma for the agencies just prior to their earnings announcement dates. Earnings at both Moody’s and S&P were expected to be low due to fewer bonds to rate in the housing slowdown and the reputational risk they have suffered in the continuing mortgage mess, wherein the market value of many subprime-mortgage-backed bonds continues to fall in anticipation of further severe increases in defaults.163

While S&P and Moody’s continue to say “most” of these bonds are well-cushioned from losses, on April 20, Moody’s again announced that losses among 2006 subprime-loan pools “will be somewhat higher than our initial expectations.” Moody’s also said it expects more ratings volatility on weaker subprime-mortgage bonds.

The ratings agencies both say they have been adapting their models to the environment. But the repeated erosion in agency forecasts "throws up a red flag," says Christian Stracke, an analyst at independent debt-research firm CreditSights. The agencies are tacitly admitting that the scenarios they have been peddling were unrealistically positive.164

At the same time, the problems refuse to remain contained in the “narrow subprime sector,” as predicted by many industry experts. While many still deny the trends, defaults continue to rise in the alt-A mortgage segment,165 commercial mortgages,166 and commercial loans.167 All of those sources are documenting the loan products sold to subprime borrowers are staples of the overall market.

Others have noted that mortgage lending has replaced traditional auto and credit card lending through home equity loans and home equity lines of credit, upsetting the traditional view that borrowers will default on those obligations first providing a “canary in the coal mine” to warn of impending risk. In fact, there is little difference between defaulting on a credit card and a second-lien home equity loan: often the “equity” in the second lien is too small to fight over in foreclosure, so the lender has little choice but to treat the exposure as unsecured. In a recent report, Alan Greenspan estimated that cash-out refinancing

164. Id.
and home equity lending boosted consumption expenditures by as much as 3 percent during 2006.168

Faced with the kind of spikes in credit spreads in mortgage-backed securities and corporate debt markets of all types represented in Figure 35, it is hard to deny that markets are pricing risk again.

**FIGURE 35: MORTGAGE-BACKED SECURITY SPREADS, RISK PREMIA, AND EURODOLLAR FUTURES**

The IMF now attributes the March mini-crisis to a “…response to perceived risks in the U.S. outlook. U.S., Japanese, and European equities fell in tandem as the increase in economic uncertainty was reflected in lower equity prices and the rise in equity volatility. Shares of financial companies declined on concerns over potential exposure to credit markets.”169

All the while, however, Federal Reserve Monetary Policy is backed against a wall. Inflation risk remains, though perhaps only in a manner similar to the worries of the Federal Reserve in the early- to mid-1930s, before tightened reserve requirements created the recession of 1937 before recovery from the Great Depression was complete. That said, even if the FOMC wanted to lower rates they do not have much room to do so. So monetary policy remains stagnant.

Congress wants to legislate a solution, but that process will be long, costly, and fundamentally meaningless in the end. Furthermore, the process will not be revenue neutral, which means that it will drive up inflation. While that may not happen through conscious decision of policymakers, we argue that the process has already begun.

As evidence, the mortgage mess is already showing up in exchange rates and analyst forecasts. Since the FOMC is holding interest rates constant, something else must move. So far, the dollar already is down 3 percent from a year earlier. Although such movement should help U.S. exports, the Conference Board most recently reported that U.S. consumer confidence is now beginning to lag. Job growth is the only element that is propping up the economy and even that may now be weakening.170

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We see the kind of developments illustrated in Figure 36 as the carry trade unwinds. Neil Mellor, currency strategist at Bank of New York, maintained that after a brief period of improvement in sentiment for risky assets, the second phase of the deleveraging process has duly arrived.171

**FIGURE 36: EXCHANGE RATES FOR SELECTED MAJOR INDUSTRIAL COUNTRIES**


In essence, then, the chosen policy approach is evidently to allow exchange rate movements create the inflation that the Fed will not or cannot create with monetary policy. Inflation relative to world exchange rates will deflate U.S. prices and help the country remain competitive with the rest of the world. Or perhaps the U.S. will become just another affordable playground for the global rich.

In summary, the structural changes in mortgage origination and servicing have interacted with complex RMBS and highly volatile CDO funding structures to place the U.S. housing market at risk. Equally as important, however, is that housing market weaknesses feed back through financial markets to further weaken financial instruments backing today’s CDOs. Decreased housing starts

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that will result from lower liquidity in the RMBS sector will further weaken credit spreads and depress CDO and RMBS issuance. This feedback mechanism can create imbalances in the U.S. economy that, if left unchecked, could lead to prolonged domestic economic implications for U.S. standing in the world economic order.

VIII. POLICY IMPLICATIONS

The potential for prolonged economic difficulties that also interfere with home ownership in the United States raises significant public policy concerns. Already we are witnessing restructurings and layoffs at top financial institutions. More importantly, however, is the need to provide stable funding sources for economic growth. The biggest obstacle that we have identified is lack of transparency. The structural changes noted in our previous draft largely went unnoticed by RMBS investors until only recently. We argue that those changes went unnoticed largely because of the existing complexity and valuation difficulties underlying today’s RMBS markets.

But policymakers and ratings agencies are still reluctant to examine some of the key frictions that have caused the present mortgage mess. Congress is calling for increased loan mitigation without thought to the vast heterogeneity in mitigation standards existing in today’s market nor a sound analysis of best practices in the field.

While the mortgage industry is pulling back from high LTV products, which makes perfect sense in an economic climate with little home price appreciation, legislators are pushing to expand the high-LTV sector, even with little hope of owners building equity to incentivize repayment, much less any limit to limit cash-out refinancing that arbitrage the mortgage interest tax deduction and erode the buildup of equity on government-insured mortgage products.

Some are even proposing bailouts for overextended borrowers, ignoring the approximately half of U.S. homeowners who own their homes outright through their own sweat, perspicacity, and prudence.

And there is still no focus on monitoring bank funding markets. The feared outcome is nothing less than a 21st century bank run, this time from CDO investors rather than depositors. High yields in RMBS in the past several years led to a massive infusion of CDO “hot money” into the RMBS sector in an environment similar to that of the thrift crisis of the late 1980s. Like the thrift crisis and its aftermath, therefore, recent events not only threaten these institutions, but also threaten the U.S. consumer and taxpayer as well. Indeed, current estimates of losses due to the mortgage mess are on par with the thrift crisis.

Perhaps of greater concern is the reputational risk posed to the U.S. capital markets—markets that have historically been viewed as among the most transparent, efficient, and well regulated in the world. The economic value of mortgage securitization and the risk transfer value of CDO issuance support their further use. However, there should be significant resources allocated to building the regulatory framework surrounding their structuring, issuance, ratings, sales, and valuation. We believe that efforts to provide transparency to these new product areas can foster stability while maintaining liquidity to the underlying collateral sectors and supporting further meaningful financial innovation and capital deepening.
At present, however, even financial regulators are hampered by the opacity of over-the-counter CDO and RMBS markets, where only “qualified investors” may peruse the deal documents and performance reports. Currently none of the bank regulatory agencies (OCC, Federal Reserve, or FDIC) are deemed “qualified investors.” Even after that designation, however, those regulators must receive permission from each issuer to view their deal performance data and prospectus in order to monitor the sector. Nonetheless, we have shown that it is not necessary to be a rocket scientist to understand many of the fundamental risks of RMBS and CDOs.

Significant increases in public access to performance reports, CDO and RMBS product standardization, and CDO and RMBS securities ownership registration can help decrease the existing over-reliance on ratings agency inputs to rate and ultimately value the securities and reducing the valuation errors inherent in “marked-to-model” (rather than marked-to-market) portfolios. SEC Regulation AB was a (late) start for ABS and RMBS. Overall, however, the U.S. economy needs an efficient public CDO market that allows transparent open-market pricing of market risk and outside research into new securities and funding arrangements. U.S. homeowners and consumers deserve stable and efficient funding to support their pursuit of the American dream.
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