

Structured Products

Asset-Backed Securities: Opportunities Resulting from Systematic Mispricing

August 2008

Introduction

Asset-backed securities (“ABS”) in their broadest sense have become an increasingly important part of the credit markets in the last two decades. For most of that period, these “structured securities,” whether mortgages or other securitized debt, were a somewhat esoteric part of the financial markets, familiar to those who specialized in the area, but not seriously followed by most in the financial industry, never mind the mainstream media and most individual investors.

That situation ended in 2007 with the onset of a credit “crisis” largely sparked by default problems in the lower-quality subprime mortgage sector. Subsequently, investors worldwide have paid more attention to formerly abstruse acronyms such as RMBS, CMBS, and ABS (residential mortgage-backed securities, commercial mortgage-backed securities, and asset-backed securities, respectively). The phrase “subprime” has become, at least temporarily, a symbol of fear to many participants in stock and bond markets. As frequently happens when investors perceive a crisis, there is a tendency to “throw the baby out with the bathwater” and avoid any securities that appear to have even a slight connection with that “fear-inducing” sector. In this case, subprime has made investors wary not only of low-rated mortgages, but of asset-backed securities of all kinds. Value investors generally see this as a potential opportunity by combining detailed fundamental research to identify mispriced securities with the perseverance to buy these even when public opinion is overwhelmingly negative.

This paper sets out to show that the “boom-bust” cycle of subprime mortgages may be just the latest of a series of opportunity-generating situations, given the characteristics of sectors within the structured securities markets. This paper also examines the influence of the credit-rating system, especially given the broad market assumption that any given rating has a similar meaning across corporate bonds, asset-backed securities, or any other fixed income security. This paper examines the evidence and seeks to show how perceptions about credit ratings may be both a risk and an opportunity.

Background: Origins in Mortgage Securities

Mortgage-backed securities grew to become an established part of the U.S. financial landscape starting in the early 1970s. About a decade later, collateralized mortgage obligations (“CMOs”) were introduced as a way to reduce or eliminate some of the uncertainty investors faced when purchasing mortgage-backed securities. With traditional mortgage-backed securities, investors face the possibility that the mortgages underlying their security will be paid off early, sold, or refinanced. Each of these events may affect the certainty of cash flows from the security. Generally, such uncertainty reduces the comfort of institutional investors and thus impacts both price and liquidity. The creation of CMOs helped to address this uncertainty.

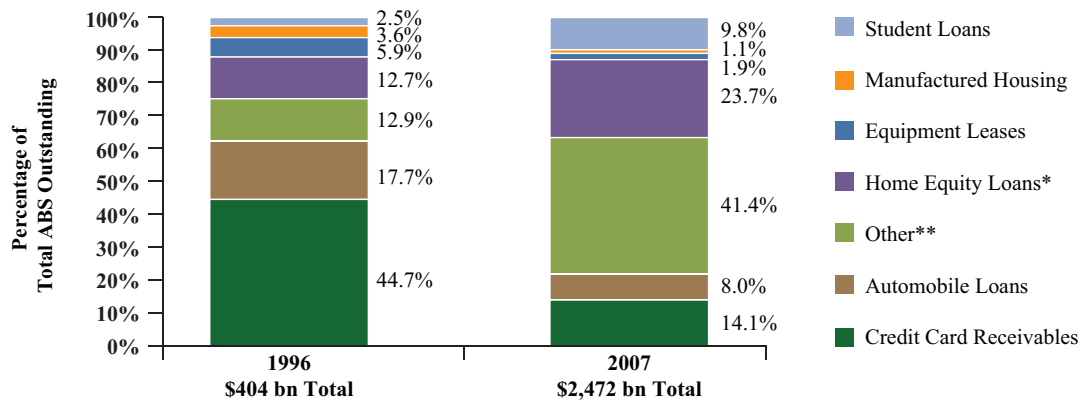
By issuing classes of bonds (also called tranches) against a pool of mortgages, CMOs were structured to generate more predictable interest payments and more predictable maturities. Because many of the mortgages in CMOs were backed by a federal agency such as the Government National Mortgage Association (“GNMA”), the Federal National Mortgage Association (“FNMA”), or the Federal Home Loan Mortgage Corporation (“FHLMC”), the securities typically carried high ratings. In subsequent years, investment banks realized that there was an increasing appetite from investors for securities whose credit rankings were supported by underlying pools of financial assets. The concept was to take the same techniques used to securitize mortgages and apply them to other assets where pooling a variety of individual financial contracts (loans or leases) could create a range of securities whose credit quality could be determined (or at least estimated) by detailed statistical analysis of the underlying assets. Such pooled securities were first introduced in the second half of the 1980s, but the real growth started in the 1990s.

The difference in the new asset-backed sector was that, unlike the mortgage-backed sector whose credit risk was largely government-backed, asset-backed securities lacked explicit or implicit guarantees. While the technology used to develop the sector was based on the existing mortgage-backed securities sector, the two sectors emerged as different markets, with credit analysis being key to valuing asset-backed in a way that had been seen as unnecessary in the mortgage-backed market. With credit analysis as our focus, the remainder of this research therefore looks specifically at the asset-backed sector.

Evolution of the Asset-Backed Market

Since the inception of asset-backed securities through 2007, securitization has grown and the structured product (or asset-backed) market now includes a number of distinct and sizeable sectors. See Exhibit 1.

Exhibit 1: Evolution of Sectors Within the Asset-Backed Market



Source: Securities Industry and Financial Markets Association, as of 3/21/08

*Home equity loans include both first liens to subprime borrowers and second liens on all borrowers. The proportion of subprime to the home equity loan category had exceeded 80% by 2005, according to the following report: Gjaja, Ivan M., Mary E. King, and Marc Carnahan. Citigroup U.S. Fixed Income Research, "Introduction to the Home Equity Loan Market." October 20, 2005, Page 13. Thus, home equity loans in this context are a suitable proxy for subprime and are used interchangeably in this context. They should not be confused with the colloquial use of home equity primarily as a home owner's second mortgage providing a line of credit.

**"Other" category consists primarily of CDOs (collateralized debt obligations).

In 1996, the ABS sector was dominated by credit card receivables and auto loans, representing over 50% of total issuance. Since then, the growth of newer sectors has eclipsed these two sectors, which now represent less than a quarter of outstanding issues. However, these more mature sectors provide more data over a longer timeframe for analysis, and not coincidentally, their recent credit history exhibits much more stability than newer sectors of the market. For example, Moody's measures the average downgrade rate (the percentage of issues downgraded in a year) at 0.4% for the auto loan sector, and 0.7% for the credit card receivable sector, over the 1998-2007 period. Newer sectors posted much higher numbers over this period: the home equity loan sector had a downgrade rate for 1998-2007 of 3.0% and CDOs (collateralized debt obligations) of 6.6%.

Each sector of this market relies on different underlying assets, but the development process for each sector has been quite similar. Typically, spreads (or the difference in yield between these products compared with U.S. Treasury bonds of similar maturity) have been significant in the early years of a new product's development. There are a number of factors that we believe typically have driven this effect. In the early years of a new sector, underwriters and issuers are motivated to attract new investors. The limited historical data generally looks good, as defaults have yet to appear. Given the limited history, investors tend to rely significantly on ratings from credit rating agencies such as S&P, Moody's, and Fitch, to evaluate the investment merit of these products.

It is worth considering how the agencies determine these ratings, given that they too are limited by the lack of history. Typically, to justify a high quality rating, the rating agency requires the security to have a significant "buffer" in the shape of subordinate debt and/or cash reserves (for example, up to 30% of the issue) that would be impacted first in the event of a problem. When there's a lack of history, these subordinated tranches or cash reserve requirements typically would be increased (for example, to 50%) to provide an increased safety buffer. Known as "credit enhancement," this technique clearly does provide an additional margin of security. However, investors should note that the resulting rating is not based on the usual tests over a full market cycle (as the data generally does not yet exist). We believe that it's significant that these early stage ratings have not been subjected to the stress-testing that would be possible for assets with a longer history. As a result, it is harder for investors to make a reasoned judgment of how the security will behave in difficult conditions. In theory, the reassurance of the "credit enhanced" rating is that when those difficult conditions do occur, there likely would be an increased number of others who would feel the financial pain first. Additional credit enhancements typically are used when long-term historic data is limited or unavailable: effectively, the less data available, the more credit enhancement is needed. When market conditions deteriorate, if the underlying model assumptions turn out to have been too optimistic, even highly rated structured securities may suffer from unexpected price volatility and liquidity problems.

As a result of this process, we believe there are two systematic ways in which the creditworthiness of these securities tends to decline over time. First, as it becomes clear that there is a market for securities in any new sub-sector, more issuers are attracted by the tighter spreads. The second step is that underwriters compete more aggressively for the increased volume of new business. One way in which they compete is to demonstrate to potential issuers that they can sell their securities with less credit enhancement (hence reducing the cost to the issuer). The consequence is that the level of credit protection for investors tends to decline. Why then would investors accept this? We believe this is generally because the investors who have made early commitments to the new sector not only have profits on their holdings, but also have an economic interest in seeing the sector remain attractive to new entrants, and are therefore prepared to accept the gradual tightening of spreads. The problem is that this is not a process that can continue indefinitely.

The effect of this process can be seen in the larger sectors of this market, although as we show later, they can be more pronounced in some of the smaller ones. This also may explain the pattern that can be seen in many sectors of the structured product market in their developmental years. The three largest sectors of the consumer ABS market are subprime (home equity loans), auto loans, and credit card receivables. The total outstanding amount of these structured products has grown approximately six-fold between 1996 and 2007 as noted in Exhibit 1, and for those three large sectors a pattern was evident. In general, a period when the OAS¹ (option-adjusted spread) was wide was followed by growth in the amount of securities issued. Following growth in security issuance, there

¹OAS reflects the application of option pricing techniques to value a fixed income security's embedded option risk, such as credit risk and put/call risk. The OAS helps investors evaluate bonds with varying embedded option risks.

tended to be a period when the excess returns (defined throughout this paper as the excess over the Lehman Brothers U.S. Aggregate Index) in that sector dropped sharply, or even turned negative.

In summary, we believe this is a cyclical pattern driven by the underlying commerce of the financial industry. Underwriters broadened the scope of their offerings to bring new investors into the sector. This broadening also suited the interests of issuers and rating agencies, as capital raising and the associated fees also climbed. At some point, diminishing returns set in, either from a tapering off of the rate of increase, or a more precipitate decline may have occurred if the underlying assumptions and projections of the underwriters, issuers, and agencies were too optimistic.

Exhibit 2: History of Selected Sectors: Excess Returns, Spreads, and Issuance, 1992-2007

	Auto Loans			Credit Card Receivables			Home Equity		
	Excess Return	OAS	Issued (\$ Bil)	Excess Return	OAS	Issued (\$ Bil)	Excess Return	OAS	Issued (\$ Bil)
1992	-0.30	1.10	*	1.60	0.85	*	-2.02	1.78	*
1993	0.72	0.59	*	1.44	0.55	*	1.78	1.14	*
1994	0.51	0.50	\$15	0.63	0.48	\$34	-0.64	0.98	\$11
1995	0.03	0.52	\$25	0.69	0.43	\$52	-1.16	1.21	\$17
1996	0.73	0.37	\$33	0.67	0.36	\$52	2.83	0.55	\$39
1997	0.05	0.49	\$35	-0.14	0.48	\$43	0.19	0.78	\$67
1998	0.02	0.79	\$42	-0.87	0.90	\$42	-0.37	1.50	\$83
1999	1.16	0.71	\$51	1.18	0.74	\$43	4.43	1.21	\$72
2000	0.52	0.81	\$72	0.63	0.88	\$65	0.63	1.48	\$65
2001	1.28	0.95	\$80	1.06	0.66	\$68	1.46	1.65	\$102
2002	1.11	0.61	\$96	1.21	0.76	\$69	-0.21	2.01	\$174
2003	0.87	0.47	\$86	1.37	0.53	\$67	1.67	1.03	\$247
2004	0.56	0.43	\$71	0.88	0.44	\$51	2.71	0.83	\$463
2005	0.16	0.52	\$101	0.18	0.49	\$66	0.79	1.01	\$558
2006	0.51	0.43	\$86	0.80	0.39	\$66	1.45	0.86	\$555
2007	-2.04	2.14	\$64	-3.40	1.62	\$91	-17.07	4.78	\$224

Sources: Lehman Brothers LehmanLive; JP Morgan; IGM Structured Finance Watch; Bloomberg, as of 3/19/08

*data not available

Sector Example: Manufactured Housing

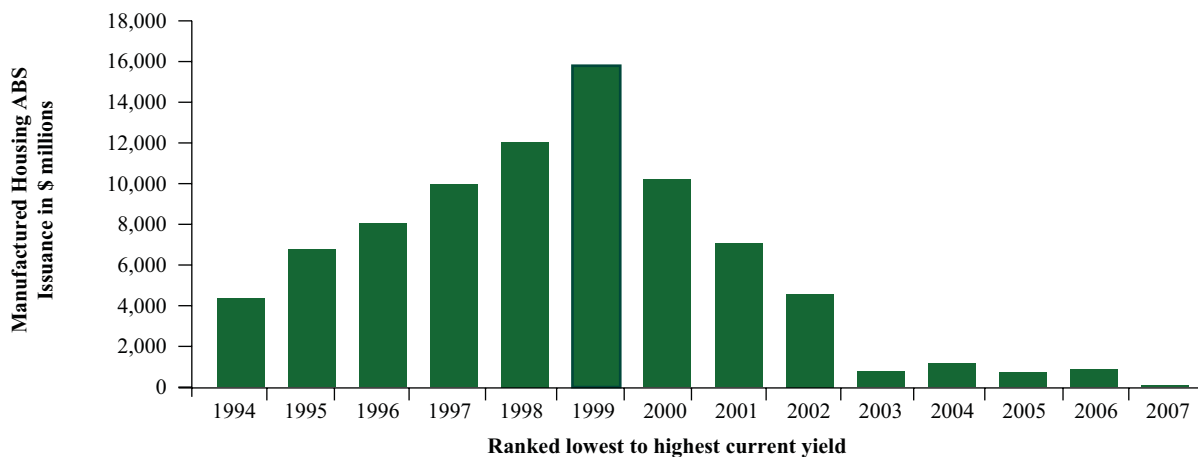
The manufactured housing sector provides an illustrative example of the cycle referenced in the previous paragraph.² Manufactured housing consists of factory-built homes that are transported to the building site. Such houses are materially cheaper than conventionally built houses and appeal to lower-income home owners.

²All data for this example is from: Michael Koss. Lehman Brothers Fixed Income Research: "Manufactured Housing ABS," published February 9, 2005, pages 6-8, unless otherwise stated.

In the early 1990s, the few lenders operating in this segment of the mortgage market were traditional mortgage lenders conducting business in an environment with low competition and high spreads. The typical spread at origination of a loan was close to 350 basis points (“bps”) in 1992. Annual securitization volume did not surpass \$2 billion until 1992, but then the ABS market grew rapidly. Between 1994 and 1999, several well-capitalized companies entered the lending market, and as competition grew, underwriting standards were relaxed and origination spreads dropped below 200 bps in 1996-1997. During this 1992 to 1999 period, while issuance had expanded significantly, the quality of the underlying loans had deteriorated, with the average credit score associated with the loans declining from 640 in 1992 to 600 in 1999.

Nevertheless, the perceived growth prospects and attractiveness of this new ABS sector allowed securitization volume to pass \$15 billion by 1999. This marked the peak of the issuance boom, and excess returns fell sharply in the several years that followed. After excess returns of 3.2% in 1999, the equivalent number in 2000 was negative 0.7%, and after a modest bounce in 2001, 2002 saw excess returns drop to negative 9.3%. Incidentally, that number was the nadir for any sector in the asset-backed industry until the subprime crisis hit in 2007.

Exhibit 3: Manufactured Housing ABS Issuance, 1994-2007



Source: JPMorgan, IGM Structured Finance Watch, Bloomberg, as of 3/19/08

The post-1999 period was painful for manufactured home owners, lenders, underwriters, and rating agencies. Repossessions grew to a peak of \$1.3 billion at the end of 2002. A number of the mid-1990s entrants to the lending business exited after 1999, including at least two major bankruptcies, and by 2003, securitization volume was below its levels of 1990. Rating agencies saw a sharp increase in downgrades. Fewer than 300 manufactured housing issues had been downgraded by Moody’s in the 10 years to 2001. More than 500 downgrades occurred during 2002-2003, a significant number even with the growth in total issue amount.

By 2002, the year when excess returns had reached their nadir, underwriting margins at origination were close to 500 bps (more than double the low of 1996-1997). By that time the pace of issuance was collapsing, and excess returns (as measured by option-adjusted spreads versus equivalent maturity U.S. Treasuries) surged in 2002 and 2003, averaging over 400 bps in those two years.

The lesson for investors from the manufactured housing ABS cycle of the mid-1990s to the mid-2000s suggests being cautious when issuance is high and spreads are compressed compared to historical levels. But for the fundamental investor, there also may be a longer-term opportunity when the cycle is working through a severe contraction. For manufactured housing, the contraction has been so severe that it may take some time before issuance picks up significantly again. Other, more broadly based sectors may not see such a complete collapse in issuance, but the cyclical effect may still be evident.

Subprime Loans: Following the Pattern?

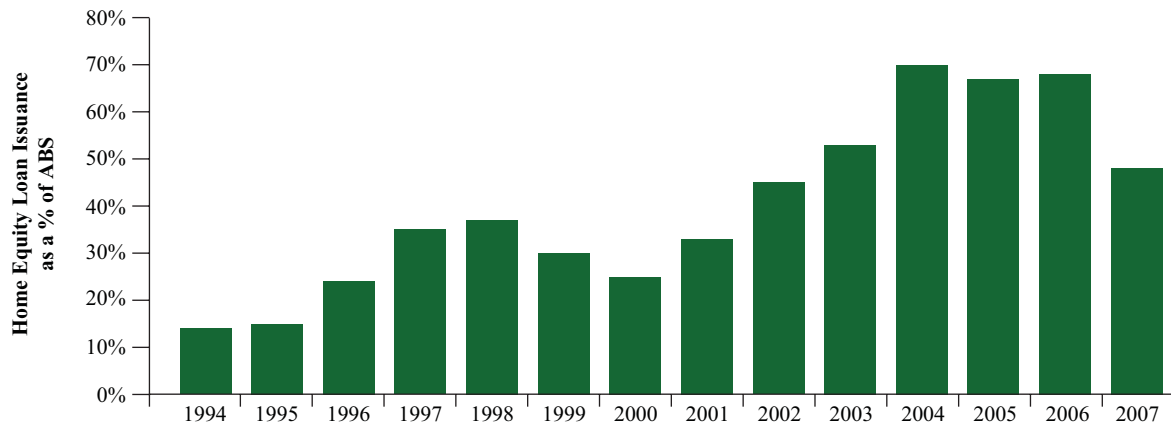
It is possible that there is a systemic pattern in the development of newer sub-sectors in the ABS market which may favor early adopters but, in due course, can lead to extensive losses by all participants – and then potential opportunities as the cycle progresses. Manufactured housing was possibly the most extreme example, but other sectors which have experienced similar development problems include franchise loans, collateralized debt obligations (CDOs), and aircraft ABS. Another sizeable sector that has begun to exhibit similar warning signs, starting in late 2007, has been the CMBS sector, which may therefore bear watching by investors.

Each of these sectors saw high spreads in their early years. As deals were placed and more issuers became involved, spreads started to fall. Traditional total return bond investors were alerted to this positive performance and noted the growing issuance. Underwriters and investment banks supported the market activity, and in fact investors who had been “early adopters” then had a motivation to encourage others to participate. Market emphasis focused on the recent positive history, and all participants benefited from more trading and increased issuance. The result was a period of improving liquidity and falling risk premiums. All of these factors tended to boost short-term results.

While each sector had its own specific characteristics, the common factor was that eventually spreads no longer reflected an appropriate premium for uncertainty with regard to potential behavior of the collateral. At some point, the business cycle turned, whether due to business or financial reasons. After that turning point, the performance of the collateral typically fared worse than the agency ratings and recent default history had suggested. Security prices became more volatile, ratings were downgraded, and issuers defaulted, consolidated, or just disappeared.

In most respects, the subprime sector has followed this pattern during the current cycle. Although the development of a securitized subprime mortgage sector started in the early 1990s, the rapid development of this sector did not start until the latter part of the decade. (See Exhibit 1.) In 1996, this sector represented only 13% of all outstanding asset-backed securities, but by 2005, it peaked at 28%. In fact, during 2004-2006, the sector was responsible for almost 70% of all ABS issuance, effectively dominating this market.

Exhibit 4: Home Equity Loan Issuance as a Proportion of ABS*



Source: JP Morgan; IGM Structured Finance Watch; Bloomberg, as of 3/19/08

*Total ABS issuance excludes collateralized debt obligations ("CDOs")

The recent history has been well-documented in the financial media and so it will not be repeated in detail here. However, it is worth noting the similarities between the rapid expansion of the subprime sector and the boom-bust cycles of other sectors of the market that had preceded it, particularly in the way in which the underlying quality of collateral declined as issuance surged. As shown in Exhibit 2, the trough of issuance in the past cycle was in 2000. From 2000 to 2007, the proportion of interest-only loans had grown from zero to 20%, the total "loan-to-value" ratio had increased from 79% to 87%, and the proportion of loans originated in the wholesale market was up from 52% to 89%.³ All of these indicators suggest a sharp deterioration in the quality of the underlying collateral for the sector.

While similar to other ABS cycles, the subprime sector's recent woes have had greater effects on the U.S. financial system. Why? There may be two reasons:

- First, with over \$1 trillion issued in 2005-2006 (see Exhibit 2), the size of the securitized assets involved in subprime has been an order of magnitude greater than in any previous sub-sector of the asset-backed market. In addition, the growth and development of the leveraged financial products industry, including CDOs and hedge funds, may have exacerbated the problems associated with size.
- Second, subprime problems have directly or indirectly affected a broad range of the population through their home ownership. The issues are relatively straightforward to understand, and the personal-level effects provide good story material not only for the financial press, but also for the general media.

³ Each of these statistics is according to information obtained on April 24, 2008 at Lehman Brothers' www.lehman.live.com website. Information at this site is available only to subscribers.

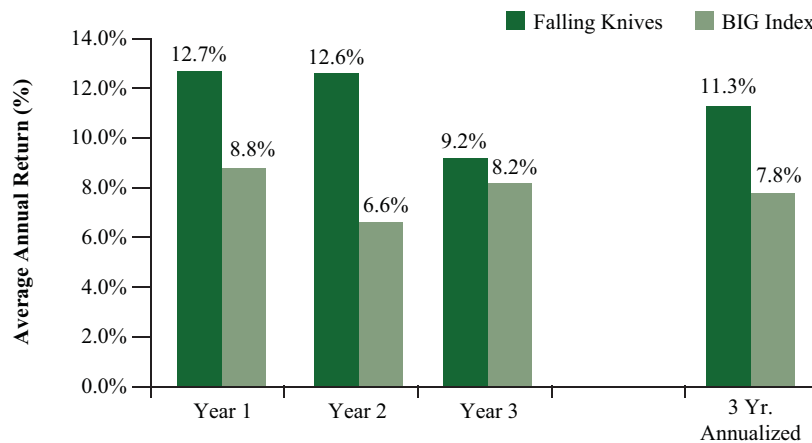
In assessing the impact of the widespread media coverage, this may well be different from other ABS sub-sectors, in that the behavioral effects may be significantly more pronounced in this instance. We would draw attention to two other pieces of research that relate to the speed and magnitude of recovery when investors exhibit “panicky” behavior.

Lehman Brothers looked at 12 “panics” that influenced fixed income markets between 1973 and 2007 and measured the extent and speed of each recovery.⁴ The research noted that on average, 45% of the recovery in the spread of investment grade bonds against U.S. Treasuries occurred in the first month of the recovery. This suggests that not only would a strategy of trying to time the bottom have been very difficult, but also that investors who waited until “normality” had resumed would have missed a substantial proportion of the potential gains from that recovery.

Separately, the Brandes Institute, a division of Brandes Investment Partners, has shown the behavioral impact on returns of individual securities can be substantial and long lasting. A number of Brandes Institute research reports have focused on the tendency of investors to avoid securities whose prices fell sharply in a short period. While perceived as “risky,” these securities, in aggregate, generated significant subsequent excess returns vs. the relevant benchmarks.

Research on this topic covered both equity and fixed income securities, but we draw attention specifically to the “Fixed Income Falling Knives” research paper, published in October 2006 at www.brandes.com/institute. This paper focused on investment grade U.S. corporate bonds whose option-adjusted spreads widened 100 basis points or more, relative to the spread of the market, within any 3-month period between December 31, 1989 and December 31, 2005. The study found that 3-year annualized returns for these “falling knives” after their fall were 3.5% in excess of the Citigroup U.S. Broad Investment Grade Corporate Bond Index (“BIG”). Thus, where investors may perceive only risk, there has been the potential for competitive reward. While the results for these fixed income falling knives, in aggregate, were compelling, issue selection would have proved vital. See Exhibit 5.

Exhibit 5: Fixed Income “Falling Knives” Average Annual Performance, Post Fall, 1990-2005



Source: Citigroup U.S. Broad Investment Grade Corporate Bond Index; FactSet; the Brandes Institute, as of 12/31/05

⁴ This research obtained at the 2008 Global Relative Value Conference, hosted in Chicago by Lehman Brothers Fixed Income Research on 1/17/07. These facts are drawn from the Jack Malvey, CFA presentation, “The First Neo-Modern Credit Market Correction: Cyclical Second Wind or Road to U.S. Recession.”

We believe that the same behavioral factors affect structured product securities, and that these factors may result in similar opportunities for investors able to focus on fundamental data and the investment merits of a security, setting aside the business and client-related risk of owning these “risky” securities. At times when market liquidity is low, the behavioral effects may be especially pronounced, as this illiquidity can add even more uncertainty to investors’ perceptions of current prices. Of course, issue selection, conservative analysis, and purchasing such securities within a diversified portfolio remain important considerations for practitioners.

It is important to note that the behavioral effects that drive these value opportunities do not generally pay off instantaneously. Distortions in market prices may extend for some time, given that market participants may be influenced by emotions rather than analysis during crisis periods. This was evident in the recent subprime crisis. Given the uncertainty surrounding the underlying assets and lack of liquidity, market price correlations among all subprime issues appeared to converge toward one, regardless of underlying credit quality.

Summarizing the research in this paper so far, we suggest that developments in the subprime/structured products crisis during 2007 and 2008 should not lead investors to automatically abandon this area of the securities markets. The rise and fall of the subprime sector is similar to the structural pattern seen previously in the development cycle of other asset-backed sectors. The difference this time is the sheer size of the subprime sector and its visibility in the public eye. The impact of the resulting behavioral effects also may be very sizeable, but this may present a significant opportunity to those who are able to analyze these securities effectively. The next sections of this research paper focus on the extent to which such analysis is possible, given the available data.

Credit Ratings: the Basics

The starting point for most investors in assessing the potential risk and return in fixed income securities is the rating system provided by the credit rating agencies, such as S&P, Moody’s, and Fitch. Some investors may never go past this starting point and use those ratings as a substitute for further credit analysis. Others incorporate the ratings into guidelines for their investment managers to provide a “failsafe” regarding the maximum level of risk that they are willing to bear. While this does not rule out the opportunity for positive performance in the bond markets, in our view the results would be suboptimal.

To some extent, these approaches to “credit analysis” may not be designed to generate superior returns, but to prevent major losses, and for extended periods they may do just that. However, the result of this reliance on published ratings may lead to investor errors precisely in the stressful times when detailed analysis is most needed.⁵ In short, the use of credit ratings as an investment tool may “work right up until it doesn’t work.”

⁵Of course, there are varying degrees of “reliance” on credit ratings. Some investors may adopt an absolute minimum rating for each issue in their portfolios; others may establish an average credit rating across all issues. Some investors may implement “guidelines” rather than hard-and-fast rules so the fixed income managers that they hire retain some discretion for purchase and sell decisions among lower-rated issues. Also, the reliance on credit ratings may differ among U.S. and non-U.S. investors and their managers. For more information on some of these issues, see Cantor, Richard, Owain A Gwilym, and Stephen Thomas. “The Use of Credit Ratings in Investment Management in the U.S. and Europe.” *The Journal of Fixed Income*. Fall 2007. Pages 13-26.

We have observed that many investors, both institutional and individual, continue to hold some erroneous perceptions about ratings and the agencies that provide them. Investors who believe the two statements below may be setting themselves up for expensive mistakes in their portfolios:

1. Credit ratings are supervised and regulated by the government and the credit rating agencies are required to provide impartial ratings guidance to investors.
2. An identical rating for a corporate bond and a structured security (e.g. a mortgage-backed or asset-backed security) means that the rating agency expects a similar probability of default or impairment for both securities.

Neither statement is true. In subsequent sections, we will provide more detail, but the point of raising these topics in advance is that differences in perception on these basic concepts can lead to significant differences in how fixed income securities could be valued.

The Credit Rating Process

“Past performance is no guarantee of future results.” This phrase is second nature to most participants in the investment business. However, when it comes to building the models that drive credit rating assessments, there is little alternative to using the available past data, whether extensive or more limited. The primary inputs to rating calculations are this historical data, plus predictive models and any qualitative adjustments that a rating agency sees as appropriate. A full description of rating agency methodology is beyond the scope of this paper, but some explanation of the process may be helpful, particularly focusing on structured securities (the mortgage- and asset-backed sectors).

As we noted earlier in this paper, there generally are limitations on the amount of available data for newer sectors in the structured securities market (although in the residential mortgage sector, extensive data is available). The predictive models tend to include the assumption that independent events are normally distributed (resulting in a typical bell curve). However, some recent publications, including Nassim Taleb’s book *The Black Swan*,⁶ argue that extreme market conditions may occur more frequently than a normal curve would predict.

Specifically, the agencies first determine an expected lifetime loss on each pool of loans. This is done by developing a quantitative loan-by-loan analysis that compares each loan against a standard pool of similar loans for which historical default frequency and loss severity have been observed, and then carrying out a qualitative analysis of the lender and/or servicer based on a review of their underwriting and servicing and on a review of their portfolio of securitization performance. For securities with a limited history, the rating agency assigns credit enhancement targets based on its assessment of a security’s expected lifetime loss, which are related to subordination and size of the tranche to develop its ratings. Each rating is designed to withstand a multiple of its expected base case losses. For an explanation of credit enhancement, see the section subtitled “Background” earlier in this report. The rating that emerges from this process is designed to indicate both the chance of a default, plus the potential impact of that default. To quote from Moody’s Rating Symbols & Definitions⁷:

“Expected loss comprises an assessment of probability of default as well as expectation of loss in the event of default. It is Moody’s intention that the expected loss rate associated with a given rating symbol and time horizon be the same across obligations and issuers rated on the Global Scale.”

⁶Taleb, Nassim Nicholas. *The Black Swan: The Impact of the Highly Improbable*. New York: Random House, 2007.

⁷*Moody’s Rating Symbols & Definitions*. Published by Moody’s Investors Service. March 2007. Page 6.

Moody's "Global Scale" is the rating system for both corporate bonds and structured products. The key to understanding the ratings, in our view, is in the disaggregation of these two elements: the probability of a default and the loss severity if such a default does occur. Because the two elements are grouped together in the rating system, it may be easy to overlook the very different characteristics of corporate and structured securities in this context. Here, we address the implications in more detail.

The objective of this paper is not to criticize the rating agencies or their work. Instead, the objective here is to show how the underlying dynamics of the industry require an understanding of the analysis and process behind the conclusions, as opposed to accepting the ratings unquestioningly.

The rating agencies receive their fees primarily from issuers, not from investors, and as such, there is a systematic incentive for them to meet the needs of those issuers. This is not dissimilar to a more familiar example: a house-buyer generally knows that the real estate agent's commission is paid by the seller, and so may take the glowing description of the property with a "grain of salt."

The home buying analogy can be extended a little further. The rating agencies are in frequent and detailed contact with the issuers and underwriters in each sector, just as real estate agents constantly keep tabs on sellers, mortgage companies, and other service providers. However, the rating agencies enjoy one advantage that real estate agents are denied. The barriers to entry in the business remain high. In 2008, only seven firms qualified as Nationally Recognized Statistical Rating Organizations ("NRSRO"), the official designation of a credit rating agency registered with the U.S. Securities and Exchange Commission ("SEC").⁸ While the Credit Rating Agency Reform Act of 2006 provided the SEC with authority to oversee NRSROs, it prohibited the SEC from regulating the substance of credit ratings or the procedures and methodologies by which any NRSRO determines credit ratings.

It is beyond the scope of this paper to detail the full history of the rating agency industry, but we note that the industry has an unusual structure, with the leading providers having an oligopoly not only on revenue, but on access to certain amounts of detailed industry information (e.g., pool and loan level data on new issues) needed to do full analysis on some securities.

For investors prepared to do their own "homework," it is necessary to sort the industry into two segments. First, there are indeed securities where there is just not enough information to perform any reasonable independent analysis. For example, we believe this segment would include securities of the privately issued Structured Investment Vehicles (SIVs) used extensively by the banking industry in recent years but now in decline for a lack of transparency. Importantly, there is another substantial segment where data is provided by issuers and underwriters in sufficient quantity and quality to enable investors to develop independent analysis. This would include most issues in the more mature sectors of the market, including home equity loans, auto loans, credit cards, and CMBS.

⁸Reynolds, Glenn and Louise Purtle. "Ratings on the Run, Part One: If Only They Knew Then What They Know Now." Published at subscription website www.creditsights.com. Nov. 12, 2007.

Are Ratings Really Equivalent Across Corporate Bonds and Structured Products?

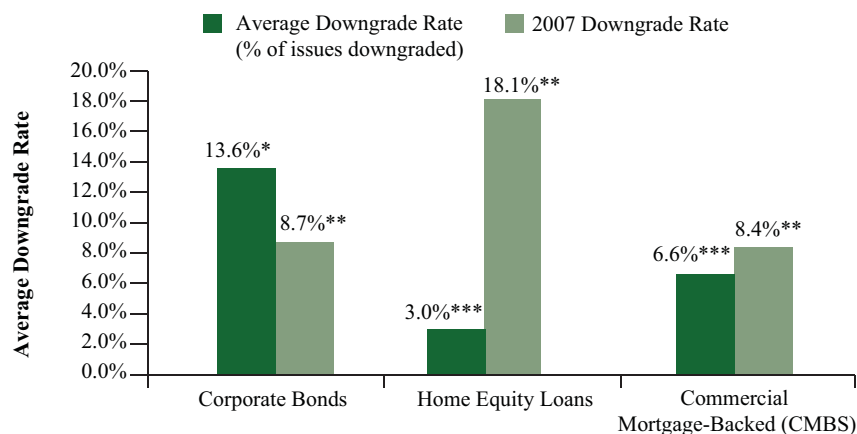
As noted in the last section on the credit rating process, ratings are a function of the probability of default and the probable recovered amount. In practice, the experience of corporate and structured securities has been quite distinct for each of these two elements. Default rates on corporate bonds can be observed over extended periods, but the same is less true for structured securities. So when trying to assess the investment implications for structured securities, there are two key questions to be considered:

- How reliable is the historic data on structured securities as an indicator of what to expect in the future?
- What has been the actual experience of loss and loss recovery for each sector of the market, and to the extent they are different, is this consistent with what might have been expected from the ratings?

Aspects of that first question were addressed in earlier sections of this paper. Based on the rating methodologies previously described, the ratings may be less accurate whenever the agency's loss projections are based on limited data, or when the available data covers only a period of extremely good historical performance by the sector (or both). For example, in the subprime sector, the historical data went back only as far as the early 1990s, and the associated performance was based on an era of generally strong house price appreciation and an abundance of available credit.

Recent history does suggest that relying heavily on the stability of ratings for structured securities may be a mistake. Superficially, it is notable that over the long term, corporate bonds have exhibited a higher frequency of downgrades than most sectors of the structured securities market. In fact, in 2007 the downgrade rate for corporate bonds was below its average between 1984 and 2007. See Exhibit 6. Investors might have been reassured that the HEL (home equity loan) sector had enjoyed a relatively low frequency of downgrades prior to 2007. In 2007, the downgrade rate moved up sharply, and may increase further in 2008. Separate from the outlook for any specific sector, the data underlying Exhibit 6 suggests that structured securities may diverge sharply from their previously positive experience when under stress, much more so than would corporate bonds. In particular, there now appears to be greater concern among investors about uncertainty in the higher-rated tranches, which previously were regarded as unlikely to be impaired. That uncertainty has contributed to the volatility of pricing in these tranches, providing another opportunity for careful analysts.

Exhibit 6: Rating Downgrade History



Source: Tung, Julia. "Structured Finance Rating Transitions 1983-2007." Published by Moody's Credit Policy. February 2008. Available at subscription website: www.moodys.com
 *1984-2007, **2007, ***1998-2007

Turning to the second question (differences in default and recovery experience), we can compare the default and loss recovery experience for corporate and structured securities.

**Exhibit 7: Differences in Average Default Rates Over Rolling,⁹
5-Year Periods: Corporate and Structured Securities (ABS)**

Ratings	Corporate Bonds Average Default Rates (1982-2006)*	ABS Average Default Rates (1993-2006)**
Aaa	0.1%	0.9%
Aa	0.2%	6.0%
A	0.5%	5.0%
Baa	2.1%	20.8%
Ba	11.3%	48.0%
B	27.3%	58.1%
Caa	50.9%	82.8%
Investment Grade	0.9%	7.0%
Non-Investment Grade	22.1%	52.6%
All Rated	7.3%	9.9%

Source: Moody's as of 3/19/08

*This data shows issuer-weighted historical average default rates by rating category over various investment horizons. This data was generated by Moody's by averaging the multi-year default rates of cohorts formed at monthly intervals. In addition to being statements of historical fact, this data also serves as useful proxies for expected default rates.

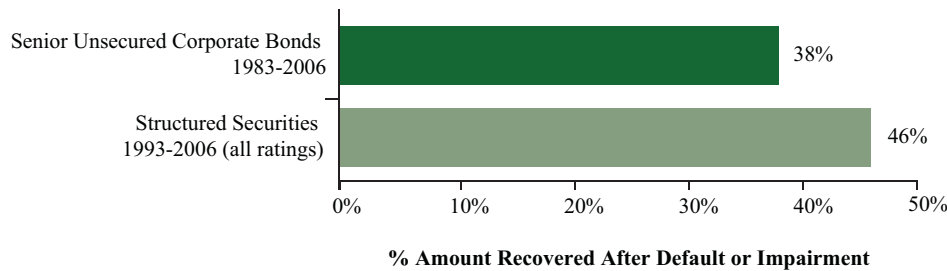
For example, over a 5-year period, a portfolio of B-rated issuers defaulted at a 27.3% average rate between 1983 and 2006.

**ABS includes securities backed by home equity loans (HEL) and both traditional asset types such as auto loans, credit receivables, student loans, and manufactured housing loans, and non-traditional asset types such as mutual fund fees, tax liens, tobacco settlement payments, and intellectual property. Structured finance securities are defined as being in material impairment if they have sustained a payment shortfall that remained uncured or been downgraded to Ca or C. Data in this exhibit reflects multi-year cumulative impairment rates by cohort rating between 1993-2006.

Securitized ABS default rates over a 5-year horizon were materially higher than the equivalent rating for corporate bonds (note that the technical term for defaulting asset-backed securities is “impairment,” and we use that term interchangeably with default in this context). This difference in default rates was evident for each rating in Exhibit 7. The Baa rating is highlighted as it marks the delineation between investment and speculative grades. The default experience for Baa-rated ABS has been approximately 10 times that of similar-rated corporate bonds. We note that the comparison is not strictly “apples-to-apples,” as the corporate data spans 1983-2006, while the structured product data was not available prior to 1993 (five years after the inception of most types of structured securities) and so covers only 1993-2006. However, average corporate default rates for 1982-1992 were broadly similar to the averages from 1993-2005, based on Moody's annual issuer-weighted global corporate default rate data, so we believe that the data in Exhibit 7 is pertinent (as is the related comparison in Exhibit 9 later in the paper).

⁹Rolling periods represent a series of overlapping, smaller time periods within a single, longer-term period. A hypothetical example is the 20-year period from 12/31/82 through 12/31/02. This long-term period consists of 16 smaller, 5-year “rolling” segments. The first segment is the 5-year period from 12/31/82 to 12/31/87. The next rolling segment is the 5-year period from 12/31/83 to 12/31/88, and so on.

Exhibit 8: Long-Term Recovery Rates,* Through 2006



*Bond recovery based on 30-day post-default market prices.

Source: Moody's, as of 2/29/08

Recovery rates¹⁰ differ between corporate and structured securities, as would be expected given that equivalence in ratings implies that the rating agencies are aiming to equalize the probability of default times the amount of loss in the event of default. (The same caveat applies to Exhibit 8 as to Exhibit 7, in that the periods aren't identical.) We note that structured securities tend to experience much more volatility in their recovery rates due to their layered characteristics when impairment does occur, which is also illustrated in the downgrade statistics featured in Exhibit 6.

To summarize so far, structured securities appear to be more likely to default than corporate bonds, but may experience greater recoveries after the default has occurred. If indeed the ratings "scale" is equivalent, so that a "Baa" is a "Baa" whether it is a corporate or a structured security, we need to look at whether these two factors offset each other to leave the combined loss ratios identical.

In Exhibit 9, a quick glance shows the weighted average combined loss rate (the probability of a default multiplied by the loss severity) for corporate bonds at 4.1% and for structured securities a not dissimilar 4.9%. However, a more detailed line-by-line comparison shows that, at each rating, the differences were significant, and loss rates were generally more favorable for corporate bonds. If the question is whether the same rating associated with either a corporate or structured security means the same thing in experienced loss rates, the evidence from Exhibit 9 is a clear "no." (Note that due to limits on availability, this data runs through 2006, and hence does not factor in the market developments starting in 2007. Also note that the most recent corporate bond data was available beginning in 1983 but that structured product data was not available prior to 1993. While we use different time periods for corporate bonds and ABS in Exhibit 9, we believe this remains a valid comparison because we have captured the greatest amount of data for each sector over the most recent, comparable periods for which data is available.) The data presented in Exhibit 6 on trends in downgrades in 2007 suggests that the loss rate difference between corporate and structured securities may widen rather than narrow as the current market cycle unfolds.

¹⁰A recovery rate generally refers to the amount that a creditor receives on a defaulted bond. Often, it is stated as a percentage of the security's par value. It also may be expressed as a percentage of the security's market value. In this paper, we use the former definition.

Exhibit 9: Differences in Average Loss Rates Over Rolling¹¹ 5-Year Periods: Corporate and Structured Securities (ABS)

Ratings	Corporate Bonds Average Default Rates (1983-2006)*	ABS Average Default Rates (1993-2006)**
Aaa	0.0%	0.1%
Aaa	0.1%	3.1%
Aa	0.3%	2.7%
A	1.2%	9.1%
Baa	6.4%	26.5%
Ba	15.7%	31.8%
B	34.6%	29.1%
Caa	0.5%	3.2%
Investment Grade	12.7%	28.6%
Non-Investment Grade	4.1%	4.9%

Source: Moody's, as of 3/19/08

*Data reflects the average cumulative corporate credit loss rates by letter rating between 1983-2006. Corporate bond data in percent based on issuer-weighted average default rate and on issuer-weighted average senior unsecured bond recovery rates.

**Data reflects multi-year cumulative loss rates by cohort rating between 1993-2006. (Moody's defines a cohort as a pool of issuers formed on the basis of the rating held on a given calendar date or set of dates.) Historical average loss rates are calculated by Moody's by multiplying average multi-year cumulative principal impairment rates and multi-year loss given default ("LGD") rates for each rating and time horizon. The final LGD rates of unresolved and principal-impaired tranches are estimated. The average multi-year LGD rates by rating are based on a combined sample of both resolved and unresolved principal impairments. These LGD rates can be found by dividing the average multi-year loss rates by the average multi-year cumulative principal impairment rates. The number of impaired securities in certain rating buckets and at some longer time horizons is very small (some are less than five). As a result, the average LGD rates are subject to small sample variations. The average LGD rates are generally lower, and sometimes substantially lower, over long horizons than over short horizons because of discounting and principal amortization.

Referring back to the Introduction of this paper, does this mean that investors should indeed “throw the baby out with the bathwater” and take the easy route of avoiding all structured securities? We believe the answer to that question is also a clear “no.” In any sector of the market, if data is available that enables detailed fundamental analysis, then, in our opinion, general investor misperceptions provide attractive investment opportunities.

How widely are investor misperceptions held? The decisions on how much exposure is appropriate to structured securities often are made by trustees, consultants, and advisors who may not have great day-to-day familiarity with the topic (which is one of the reasons we are publishing this research). In order to get an assessment of how familiar fiduciaries are with these issues, a Brandes Institute survey is currently underway on this topic. While results are not published in this paper, preliminary indications suggest that respondents do believe that corporate bonds and structured securities have generally similar default characteristics, and hence underestimate the probability for default of structured securities.

¹¹Rolling periods represent a series of overlapping, smaller time periods within a single, longer-term period. A hypothetical example is the 20-year period from 12/31/82 through 12/31/02. This long-term period consists of 16 smaller, 5-year “rolling” segments. The first segment is the 5-year period from 12/21/82 to 12/31/87. The next rolling segment is the 5-year period from 12/31/83 to 12/31/88, and so on.

Implications for Investors

Whenever there are misperceptions in financial markets, we believe there are both opportunities and risks, and this paper has sought to highlight these in the context of the structured securities market. For institutional investors, one implication of the way the market has evolved is that unquestioning acceptance of information provided by issuers, underwriters, and rating agencies may lead to risky allocation and timing decisions.

Keep in mind that, generally, the only newly established asset-backed sectors that gather attention and assets will have been coming out of a good performance period for the underlying collateral. If this weren't the case, the issues from these sectors likely would fail to raise any interest from investors. Thus, these securities typically are being evaluated based upon a limited – and favorable – performance history.

We believe these factors may warrant prudent investors holding back from making major commitments to these new sectors of the structured securities market during their early development phase. In our opinion, investment without adequate information becomes speculation. For longer-term investors, we believe that fundamental analysis requires adequate amounts of historical data, and when that data does not exist, it may be prudent to wait until enough time has passed to generate that data. While it may be tempting to participate in new sectors on the basis of “model” assumptions, the evidence suggests that such models tend to be systematically overoptimistic.

As these new sectors work through a market cycle and as fear replaces greed as the market's primary emotion, we believe there may then be more opportunities. Typically these occur when early investors in the sector are bailing out and general market sentiment is negative. At this stage, fundamental value investors may find that two important conditions are in place to take advantage of opportunities: sufficient data may now be available for rational analysis and conclusions, and prices may be materially below the underlying values generated by that analysis due to negative market sentiment. With regard to the subprime crisis, another consideration is the potential for greater government involvement through closer oversight or the introduction of specific legislation that may “change the rules” for defaults and loss recoveries. Such legislation would not be unprecedented. In the wake of highly publicized incidents of corporate malfeasance in 2002, new legislation was introduced in the United States that changed reporting requirements and may have contributed to altering investor perceptions of risk. Today, investors may be well served to factor the possibility of legislative changes into their valuation analysis by demanding a higher margin of safety where appropriate.

In short, we believe that an issue-specific investment discipline based on real data and fundamental value analysis is an appropriate strategy. For new sectors of the structured securities market, this generally helps investors avoid the boom/bust cycle that we believe typifies the early development stages, and allows them to identify attractive candidates that have appreciation potential once those sectors have become more “seasoned.”

Summary and Conclusions

Structured securities are a relatively recent component of the financial markets, first becoming established in the late 1980s, with most of their growth in assets taking place in the period since the mid-1990s. As such they generally may be less understood by investors compared to more established sectors such as corporate bonds.

Within sectors of the structured security industry, a recurrent pattern has been evident, as the interests of issuers, underwriters, rating agencies, and early investors typically have combined to support a cycle of initially attractive results, followed by narrowing spreads, increased issuance, and a subsequent fall in investor returns. This pattern certainly has been evident within the subprime sector.

Yet the subprime crisis would be no more than a typical market cycle but for two factors. First, the size and scope of the problems have contributed to panic spreading throughout markets beyond the sector itself, and secondly, investor misperceptions of structured securities may lead to substantial mispricing within the sector. We believe that a contributory factor to those misperceptions may be investors' understanding (or lack of it) of how these securities are rated, and the level of assurance that a rating should convey.

In our view, there are three areas where investor understanding has been lacking:

First, structured securities generally are “packaged” in tranches or layers, so that in the event that the underlying pool of collateral is impaired, then the junior credit tranches may lose all of their principal before the tranches above them in seniority are affected. This is a fundamental difference from corporate bonds, and while we believe it always has been well known within the fixed income industry, it is only now becoming better understood by more investors.

Second, structured securities' ratings generally are treated as having the same meaning as the equivalent rating assigned to a corporate bond. In fact, rating agencies assert that they aim for such equivalence. The data suggests otherwise, with differences in loss experience not only between corporate and structured securities, but even between different structured securities sectors. A given rating is based on a calculation that combines the probability of default or impairment, with the potential impact of that default or impairment. However, a comparative examination of the historical outcomes for corporate bonds and structured securities suggests that the actual loss experience of the two types of securities have been quite distinct, with structured securities having exhibited a higher loss experience than corporates at almost every rating level. We believe that one underlying cause of this discrepancy is that while rating agencies have extensive data on past corporate experience, there is only a limited amount of history available on structured securities, and very little of this has been “stress-tested” in a real world situation. We believe this is much less understood by investors than the first point above.

Third, as a result of the other two points noted above, we believe that in any market, the combination of investor misperception and extreme emotion are likely to produce material mispricing. This is a fundamental of behavioral finance and value investing. In such situations, investors who can access the underlying data and who are able to analyze the fundamentals of each security may find significant opportunities to earn favorable returns.

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The Citigroup U.S. Broad Investment Grade ("BIG") Corporate Bond Index is an unmanaged index that tracks the performance of bonds issued in the U.S. investment-grade bond market and as such does not include U.S. Treasury, government-sponsored, mortgage, and asset-backed securities. It includes the reinvestment of income but does not reflect fees, brokerage commissions, withholding taxes, or other expenses of investing.

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