Understanding Structured Credit:

Perspectives for Insurance Capital Requirements

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I. Executive Summary

Change is a constant, and change in the financial markets is no exception. The 2008 financial crisis resulted in profound changes in many aspects of financial markets. Investors and rating agencies demanded wholesale changes in securitization. The result of those changes is that today's structured credit products bear little resemblance to the risky, highly-levered, undiversified structured credit products that played a role in the 2008 crisis. Structured credit products now provide investors better diversification, credit enhancement, and structural protections. As banks have pulled back from lending to U.S. businesses and consumers, these new, safer forms of securitization have provided the necessary financing for credit cards, cars, homes, commercial real estate, consumer loans, and small and medium sized businesses.

At the same time, corporate bonds have become more levered, illiquid, and exposed to idiosyncratic risks. Accelerating macro trends like technological disruption, climate change, geopolitical tension, pandemics, and demographic change have increased the idiosyncratic risk to a particular company or industry. These trends have threatened previously unassailable corporate titans, subjecting creditors to loss. Amazon and internet shopping have disrupted Sears, JCPenney, Circuit City, and RadioShack. Netflix has disrupted Blockbuster. In the past decade, BlackBerry, General Electric, JCPenney, Kmart, Macy's, and PG&E have all experienced significant credit dislocations or bankruptcy. The average lifespan of a company in the S&P 500 is half of what it was in the 1960s.[1] In this context, previously held assumptions about corporate debt need to be challenged. Prudent investors are considering whether the pace of change from macro trends is accelerating and are rightfully recognizing the increasing benefits of diversification offered by structured credit.

Today, three key features mean investment grade ("IG") structured credit offers *safer credit risk* than comparably rated corporate credit: (i) diversification, (ii) credit enhancement, and (iii) structural protections that divert cash from lower quality tranches to support IG debt tranches in periods of stress. Over the last decade, no IG debt issued by a collateralized loan obligation ("CLO") or other asset-backed security ("ABS") has defaulted, compared to annualized default rates of 0.08% for BBB corporate debt.[2] In 2021, BlackRock ran the aggregate assets of U.S. insurers through the Federal Reserve's Severely Adverse CCAR scenario, and modelled projected losses of 0.2% for CLOs, 0.3% for ABS, and *7.0%* for investment grade corporate holdings.[3]

Despite being safer credit risk, IG structured credit can provide incremental yield over equivalently rated corporate debt because it is *more complex* to appraise and may be *less liquid*. An investor requires greater expertise and resources to appraise the credit risk in structured credit because of the diverse underlying collateral pools and unique security waterfalls. This additional complexity reduces the buyer base and, hence, liquidity. Together, these attributes can mean that structured credit can experience greater price volatility than corporate credit in stress, *even though it is safer credit risk*. Experienced investors with the expertise to understand the complexity and long-dated, stable funding to withstand illiquidity and price volatility can capture incremental yield without taking on incremental credit risk.

[1] Innosight 2021 corporate longevity forecasts, available here.

[2] Average default rate of U.S. securities. Source: Moody's Annual Default Study (February 2022). S&P Annual Global Structured Finance Default and Rating Transition Study (May 2021). Moody's Impairment and loss rates of Global CLOs (June 2021).

[3] BlackRock risk analysis on Life Insurance Industry holdings as of December 31, 2020. The Severely Adverse macro-economic scenario is defined to align with the Federal Reserve's 2020 supervisory scenarios that the Board will use in its bank holding company stress tests (i.e., CCAR). Loss is expressed as percentage of public fixed income for which discounted cash flows were generated. Sources: Q12020 GDP U.S. Bureau of Economic Analysis, Apr 2020 Unemployment and Apr 2020 CPI – U.S. Bureau of Labor Statistics (series LNS14000000, CUSR0000SA0).

II. What is a Structured Security?

Securitization is the process of pooling a group of financial assets in a "special purpose vehicle" ("SPV") that issues debt and equity to finance the acquisition of those assets. SPVs are newly established companies created solely to own a portfolio of assets. Securitization SPVs do not have ongoing operations, employees, property, plants, or equipment. They are not exposed to changes in a management team, operational blunders, or poor business strategy.

Investors purchasing the debt issued by securitization SPVs are attracted to the secured nature of the cashflows earned from the asset portfolio. While corporate debt is typically unsecured and includes only a "promise to pay" from the corporate issuer, securitization SPVs hold assets that serve as collateral. The cashflows earned from the collateral assets are used to pay both interest and principal on the securitization debt.

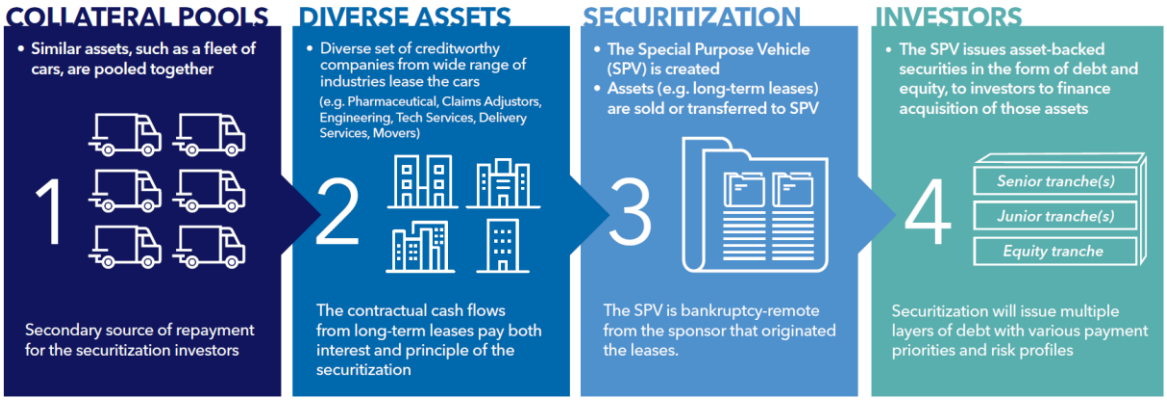
Securitizations generally contain strict rules setting out what types of assets are permissible for them to own and define a clear priority of payments (the cashflow "waterfall"). Assets in securitizations can include contracts to pay from a diverse set of credit worthy companies, e.g., leases on fleets of cars from a wide variety of companies, repayment of loans from multiple corporate borrowers, and cashflows from restaurant franchises. Securitizations are closed systems that include strict limits on, or prohibitions against, incremental debt incurrence, asset stripping, or cashflow leakage (e.g., special dividends). As securitizations are not operating companies, there is no management team that can change direction and deviate from those rules. Securitizations include "self-correcting" mechanisms whereby if assets in the securitization portfolio underperform, cashflows that might otherwise be available to distribute to the equity or sponsor are trapped and used to repay the debt. Unlike a corporation, it is exceptionally difficult for a securitization to engage in fraud or other bad acts, as the rules of the securitization are set at issuance and are largely immune to outside influence. Securitization SPVs are transparent: a third-party trustee (such as Bank of New York Mellon, US Bank, or Wells Fargo) is required to prepare and distribute collateral reports on a monthly and/or quarterly basis. Like most corporations, securitizations are audited annually.

The debt issued by the SPV has a maturity that matches the maturity of the underlying pool of collateral assets, a structural requirement known as "self-amortization" or being "maturity matched." In contrast, an operating company (e.g., Pepsi or IBM) issuing a bond must typically find cash from its balance sheet or issue new debt to refinance its existing corporate debt when it comes due.

Securitizations are "bankruptcy remote," which means that the fate of the securitization is disassociated from the credit performance of the corporate sponsor that set up the securitization. If, for example, General Motors issues a securitization of a portfolio of its auto loans and later files for bankruptcy (as occurred in 2009), there would be no impact on the securitization. Each retail auto loan borrower would continue to be required to pay their monthly payment, and the collection of all such payments would serve as the cashflow used to pay interest and principal on the auto loan securitization debt. As another example, Hertz's fleet-lease securitization debt experienced no impairments when Hertz declared bankruptcy during the COVID-19 shutdown in 2020.

Often, a securitization will issue multiple layers ("tranches" from the French word for "slice") of debt with various payment priorities and risk profiles. Senior debt is the lowest risk tranche and will earn the lowest yield. Junior debt is riskier and therefore earns a higher yield. Securitizations also include an equity piece, which has a claim on all residual cashflows earned from the assets after the debt is paid interest and principal in full. The equity tranche receives the highest yield, but also has the most risk as it is the first to incur losses. Exhibit 1 illustrates an example securitization of leases of vehicle fleets to businesses.

Exhibit 1: Illustration of Securitization from Fleet Finance



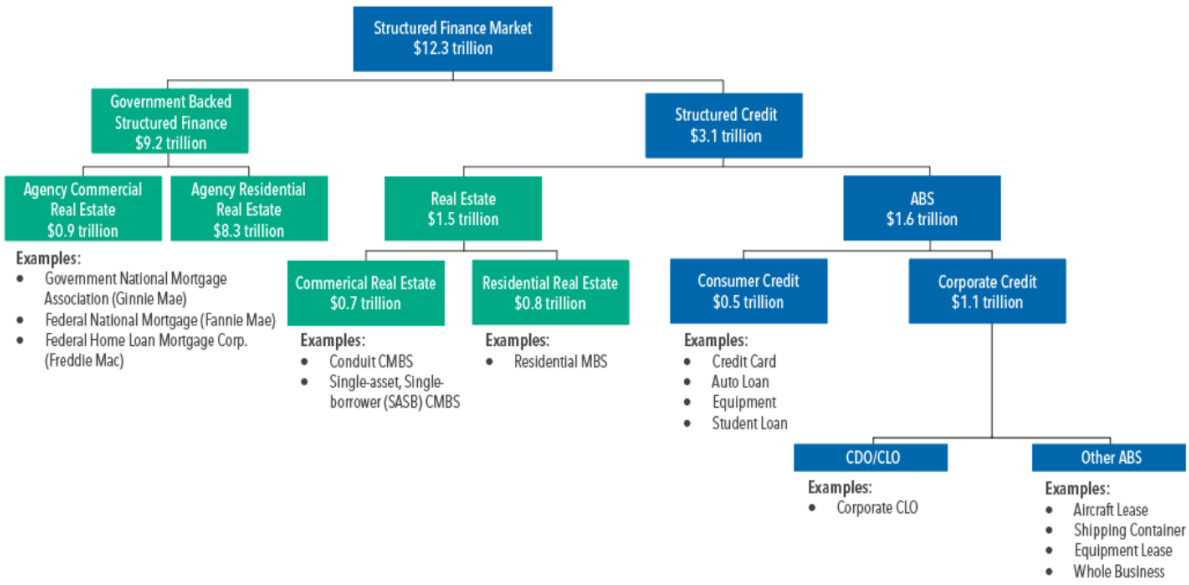
Who Engages in Securitizations and Why do Securitizations Exist?

Securitization facilitates the democratization of credit, allowing a broader set of investors to participate in the financing of particular parts of the economy. The key benefit of "tranching" is that investors can target the risk profile that comports with their risk tolerance. That permits securitization sponsors to achieve access to a wide pool of capital standing ready – collectively – to lend them money against a discrete pool of financial assets. Because a broader set of investors can participate in the financing, there is a greater supply of capital that can help drive down the cost of financing for the sponsor and ultimately consumers and businesses.

Different types of organizations might sponsor a securitization, including an auto finance company providing loans on new and used auto sales; a government or private organization issuing student loans; a lender to small and middle market U.S. employers; and a mortgage originator lending money to Americans buying homes. Each of these entities will originate a portfolio of loans and sell them to an SPV that issues debt to the capital markets backed by the interest and principal paid by each underlying borrower.

There are many different types of securitizations, each with unique characteristics. For instance, the structured finance market covers government-backed mortgage-backed securities, private label residential mortgage-backed securities, commercial mortgage-backed securities, collateralized loan obligations backed by corporate loans (typically referred to as "CLOs"), and structured credit backed by consumer and commercial receivables (typically referred to as "Asset Backed Securities" or "ABS"). Exhibit 2 below shows the types of securitizations that exist today. Additional detail on the different types of securitizations is included in Appendix A.

Exhibit 2: Taxonomy of Asset Backed Securities[4]



Securitization provides borrowers with a few key advantages, including (i) non-recourse financing that may not count as corporate debt, (ii) financing that is matched to the tenor of assets and reduces refinancing risk, and (iii) increased diversification of funding sources.

Without securitization, corporate balance sheets would be burdened by existing assets and likely subject to higher funding costs from a narrower funding base. For example, Ford's balance sheet would be bloated by loans made to retail consumers to buy cars. Ford's financial performance would be driven largely by these loans, much like a bank, making credit and equity investors hesitant to fund new business initiatives and growth.

III. IG Structured Credit Offers Safer Credit Risk than Equivalently Rated Corporate Credit

Three key features mean that IG structured credits offer *safer credit risk* than comparably rated corporate credit: (i) diversification, (ii) credit enhancement, and (iii) structural protections that divert cash from lower quality tranches to support IG debt tranches in periods of stress.

1. *Diversification of Underlying Credit Risk*

Asset portfolio theory dictates that a diversified pool of assets is likely to present more stable returns than an equivalently sized investment in a single asset. The Basel Committee on Banking Supervision has observed that "concentration of credit portfolios is an important aspect of credit risk" and has also attempted to quantify the appropriate capital charge for banks with concentrated portfolios.[5] For "a typical commercial

[4] Source: Source: SIFMA, JPM (Agency Commercial RE) and Urban Institute (Agency Residential RE). Data as of December 31, 2021, for US markets only; market size represents total amount outstanding.
[5] Basel Committee on Banking Supervision: Studies on credit risk concentration available here.

bank with a medium to large size loan portfolio…name concentration could add anywhere between 2% and 8% to the credit value-at-risk while sector concentration can increase economic capital by 20-40%." The table below, which presents the results of the Basel Committee's analysis, shows the credit value-at-risk at the specified level of confidence expressed as a fraction of the total portfolio exposure. Moving from left to right, diversification reduces modelled expected losses.

Exhibit 3: Basel Committee's Stylized Example of Effect of Diversification on Portfolio Risk[6]

Number of loans	10	50	100	500	1,000	2,000	3,000
VaR(95%)	5.26%	5.08%	4.59%	3.93%	3.86%	3.78%	3.89%
VaR(99%)	52.63%	16.95%	10.09%	7.86%	7.73%	7.62%	7.58%
VaR(99.9%)	52.63%	18.64%	12.84%	9.82%	9.71%	9.50%	9.47%

Note: Credit VaR at the specified level of confidence expressed as a fraction of total portfolio exposure. The calculations assume Probability of Default=1% and asset correlation of 20%.

The diversification benefit achieved through asset securitization is akin to the concept of liability "risk pooling" that underpins insurance. As Dr. Robert W. Klein, a former Associate Professor of Risk Management and Insurance Director of the Center of Risk Management and Insurance Research at Georgia State University, has explained:

> *Individuals and firms can reduce the pure risks they face through insurance mechanisms designed to transfer and diversify risk across a wider base of exposures and/or over time. This is accomplished by pooling losses for a group of individuals or firms in some manner… Uncertainty and the law of large numbers make insurance valuable, as well as feasible. As the number of members of an insurance pool increases, the random or uncertain aspect of the occurrence of accidents and claims for benefits is reduced, and there is greater certainty about the total losses that the pool will suffer… As the size of a pool increases, its actual losses will tend to come closer to its expected or predicted losses based on the risk levels of its members.*[7]

Securitizations likewise benefit from diversification across underlying individual credits, making it easier to predict potential losses. Risk pooling makes structured credit less exposed to the idiosyncratic risk associated with a single corporate borrower or with any specific industry.

In fact, rating agencies and investors require every CLO to maintain a high level of diversity within its portfolio. CLOs include formal "single name limits," that limit any single borrower exposure (e.g., 1-2% max per obligor) and "industry limits" that prevent one industry from representing too great a concentration (e.g., 10-12%, sometimes with exceptions up to 15%) of underlying assets.

[6] *Id.*
[7] Source: Robert Klein, "A Regulator's Introduction to the Insurance Industry," National Association of Insurance Commissioners, available here.

Consider the example from a representative USD broadly syndicated loan CLO portfolio shown in Exhibit 4 below.[8] In the example, the top five industries account for 48% of the portfolio and the top ten industries account for 70%. This representative transaction owns loans in 29 distinct corporate sectors, which is typical of today's broadly syndicated loan CLOs.

Exhibit 4: Diversification in a Representative USD Broadly Syndicated Loan CLO

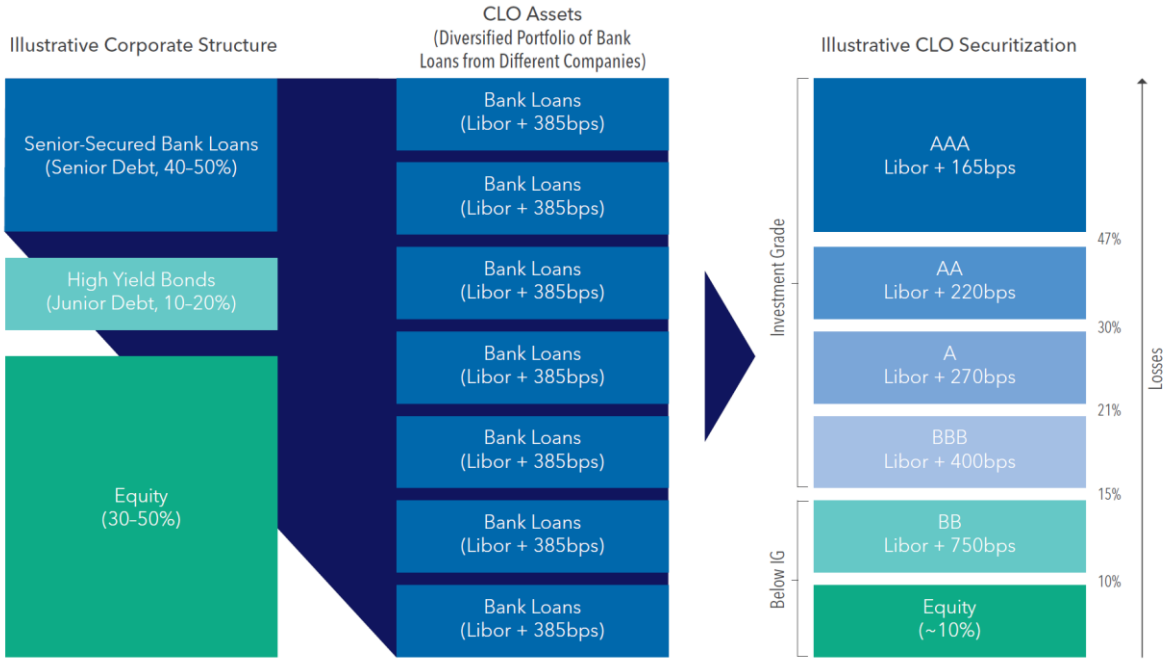
No.	Moody's Industry	% Exposure	Cumulative
1	High Tech Industries	14%	14%
2	Services: Business	10%	24%
3	Healthcare & Pharmaceuticals	10%	34%
4	Banking, Finance, Insurance & Real Estate	9%	42%
5	Construction & Building	6%	48%
6	Capital Equipment	5%	53%
7	Media: Broadcasting & Subscription	5%	58%
8	Consumer goods: Durable	5%	63%
9	Telecommunications	5%	67%
10	Hotel, Gaming & Leisure	3%	70%

2. *Credit Enhancement and Tranching of Risk*

Senior, investment grade securitization tranches are repaid first from the underlying cashflows produced by the assets and have priority in claims for repayment. In this way, IG tranches benefit from "hard" credit enhancement from the excess of the asset portfolio balance over the liability balance. In the illustrative CLO capital structure depicted in Exhibit 5 below, the BBB rated tranche benefits from 15% credit enhancement, which means the asset portfolio must incur realized losses in excess of 15% before the BBB rated tranche will begin to impair. Thus, if the securitization's underlying assets recover 50% upon default, 30% of the portfolio must default to cause any impairment to the BBB rated tranche.

[8] The representative CLO is Ares 65 Ltd.

Exhibit 5: Credit Enhancement in a Recent CLO



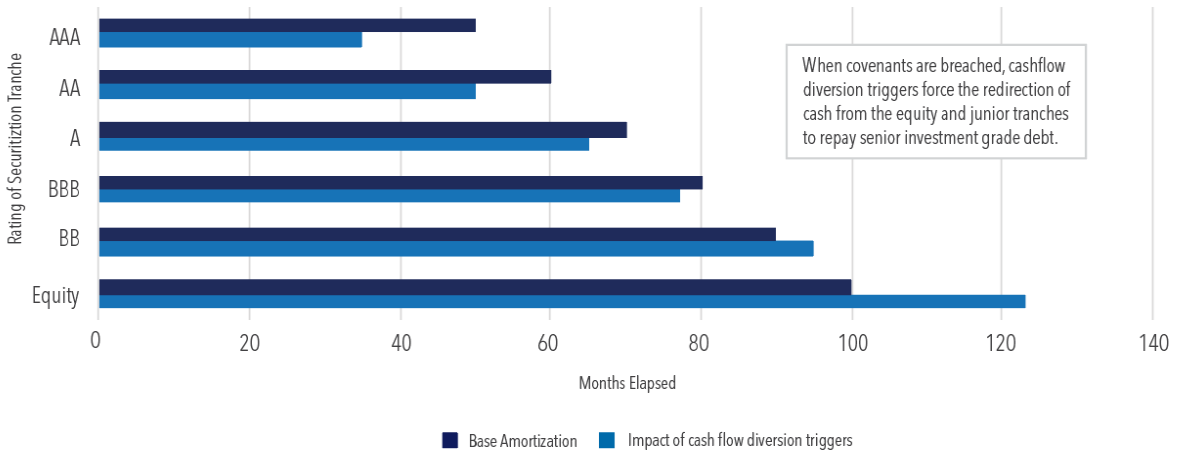
In addition to hard credit enhancement, securitizations benefit from "excess spread." A securitization's excess spread is the amount of interest income earned by the assets that exceeds the funding costs (including fees and expenses) on its debt. In periods of credit stress, excess spread is used as an immediate source of credit support for the securitization's debt tranches. Taking our example above, this means a BBB rated tranche would require much more than 30% of the portfolio to default before experiencing loss because securitizations are hard-wired to redirect cashflow to protect the debt when under stress.

3. *Structural Protections*

Securitizations include cashflow diversion triggers that work together in periods of stress to add incremental credit support for the IG securitization tranches. In contrast, when a corporation suffers stress in its business, there are fewer means to prevent the company's management from continuing to pay a dividend or from buying back stock.

Cashflow Diversion Triggers: Securitizations include protective financial covenants that require measurement of the ongoing credit quality of the asset portfolio. When such a covenant is breached (i.e., credit quality has declined), cashflow that would otherwise be distributed to the equity (e.g., a dividend), or used to pay interest on junior debt, is instead diverted to repay senior, IG debt. This is sometimes referred to as "turbo" or "rapid" amortization. CLOs include a par value coverage test that compares the par value of the assets (subject to certain adjustments for distressed or defaulted loans) to the par value owed on the CLO's liabilities. Mortgage securitizations include debt service coverage ratio and delinquency covenants. Aircraft ABS include debt service coverage ratio covenants that can breach when aircraft lease income declines. Whole Business securitizations include "systemwide sales" and leverage covenants that can breach if performance of the underlying business declines. These are just a few examples; each securitization contains multiple protective covenants that trap and redirect cashflow to protect IG debt.

Exhibit 6: Illustration of Cashflow Diversion Triggers



Active Management (primarily for CLOs): CLO managers are asset managers with teams of portfolio managers, traders, credit analysts, risk managers, and operations personnel. Several the largest CLO managers are owned by, or affiliated with, insurance companies. A CLO manager may purchase new assets with proceeds received from the prepayment or scheduled amortization of loans in the existing portfolio, which are subject to strict eligibility criteria and collateral quality tests. This active management helps to maintain or improve the credit quality of the portfolio. Collateral quality tests restrict the manager from buying loans with too long a maturity or with too low an average rating. The tests require the portfolio to maintain a certain level of diversity and accrue a minimum rate of interest to ensure there is sufficient interest income available to pay interest on the CLO's liabilities. Unlike cashflow diversion triggers, breaches of these collateral quality tests do not redirect cashflow. Instead, a breach requires the manager to maintain or improve the status quo in its future trading and investment activities.

There is strong alignment of interests between CLO managers and investors, as CLO managers face strong incentives to manage the loan portfolio to maximize risk-adjusted return. Management and incentive fees are junior in the capital structure and only paid if a CLO is performing. CLO managers are also raising an increasing amount of capital to sponsor the equity in their own transactions (in Europe, risk retention rules actually require it). Successful active management by a professional manager can improve credit enhancement levels by "building par" via trading gains or reinvestment of available proceeds into loans issued at a discount. A CLO manager will perform detailed credit analyses—through reviewing financial metrics, business prospects, competitive position, management team, and the macro environment—of the corporate loans available for inclusion in their CLO's asset portfolio. Credit analysts regularly meet with the management teams of the underlying companies they lend to, and actively monitor those companies' financial performance.

While other types of securitizations and CLOs are typically not "actively managed", almost all securitizations are administered by a servicer with responsibilities that are similarly protective of the securitization debt. A residential mortgage servicer will advance funds to the securitization corresponding

to the interest and principal payable by delinquent mortgages and work to sell defaulted mortgages for the highest recovery value. A commercial mortgage "special servicer" is engaged when commercial mortgages default. The special servicer is responsible for determining the best path to recovery, be it a loan modification, workout, or sale. An Aircraft ABS servicer is responsible for remarketing aircraft that have come off lease or arranging for the sale of an aircraft in the terminal stages of its life. In short, no securitization is issued without professional oversight.

Three Key Benefits of Securitization Overlap and Reinforce Each Other

All IG securitizations benefit from structural benefits that make them safer credit risk than equivalently rated corporate credit. Some securitizations, including those with diversified asset pools, experience more benefits than other securitizations. However, the overlapping benefits inherent in securitizations also provide for safer credit risks even where one benefit is absent. A securitization that lacks diversification still benefits from the credit enhancement and structural protections. For instance, some securitizations may lack diversification because they do not have diverse cash flows or because they include assets from similar industries. Examples of such industries could include aircraft during COVID, as travel was limited during the pandemic; student loans, which are reliant on a single business line and subject to regulatory concerns; or whole-business securitization, which can depend on corporate brand. Regardless, undiversified securitizations *still* benefit from both credit enhancement and structural protections such as cash flow diversion triggers. Applying the aircraft example to this point, tranches of aircraft asset-backed securities continued to perform well during both COVID and the Russia-Ukraine conflict.

In Exhibit 7 below we illustrate which structural features benefit different types of securities.

Exhibit 7: Overlap of Structural Benefits of Structured Credit by Type

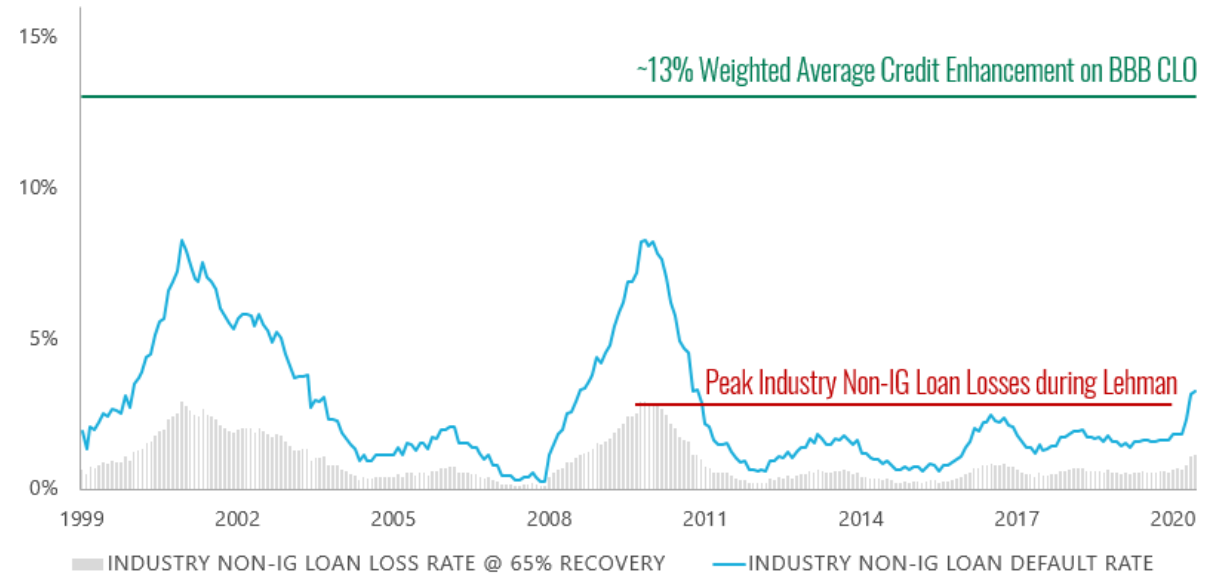
	Securitization of Diverse Asset Pool	Securitization of One Asset	Single IG Corporate Bond
Diversification Benefits	Yes	NA	NA
Credit Enhancement	Yes	Yes	NA
Structural Protections	Yes	Yes	NA

Appendix B illustrates a real world case study where the key benefits of securitization mean that an IG structured credit product clearly has safer credit risk than an equivalently rated corporate bond. This example compares unsecured corporate debt issued by a Business Development Company to IG debt issued by a CLO that benefits from diversification, credit enhancement, and structural protections but achieves the same rating.

The risk protection provided by the benefits of securitization are multiplicative, with the greatest benefits at the investment grade tranches. The probability of high levels of defaults are significantly reduced through diversification, which benefits all tranches. When coupled with the benefit of credit enhancement and structural protections, the potential losses in IG tranches becomes fractional. Equity and junior tranches absorb first losses, insulating senior, IG tranches from the higher-probability, idiosyncratic risk of single-name defaults. See Appendix C for a mathematical illustration of these compounded protections.

The benefits of securitization additionally mean unrealistic annual default rates on a CLO's underlying loan portfolio are needed to cause an impairment on IG CLO tranches. Our analysis shows that annual portfolio defaults of underlying loans must exceed 8% annually over the eight-year life of the CLO (almost 50% cumulatively) to cause impairment on CLO BBB debt.[9] For context, annualized default rates of corporate loans during the Global Financial Crisis ("GFC") peaked at about 8% annually for only *one quarter* in 2009 before falling towards a long-term corporate loan annual default rate of 2%. In modern history, only the Great Depression of the 1930s would come close to causing sufficient corporate defaults to trigger impairments on the lowest tranches of IG CLO debt. And in that environment, corporate IG debt would also be in serious trouble with cumulatively over 60% of IG corporates defaulting from 1929 to 1939.[10]

Exhibit 8: Historical Corporate High Yield Loan Default Loss Rates[11]



One Disadvantage of Structured Credit – "Thinner" Tranches

There is one known disadvantage of securitization debt compared to corporate debt. Some tranches of securitization debt are at risk of larger losses (as a percentage of par value outstanding) *if* the tranche suffers a default. Tranche "thickness" is used to describe the amount of loss each tranche can absorb before it is fully impaired. For example, if there is a junior mezzanine tranche of a securitization that attaches at 10% and detaches at 20% of the par value of the collateral pool, it starts to absorb losses once it exceeds 10% of the collateral. In a scenario where the collateral pool incurs 15% realized losses, the tranche incurs a 50% realized loss. We say this securitization tranche has limited "thickness," and while the probability of default is sufficiently low, the "loss given default" can exceed similarly rated corporate debt (as a percentage of par value outstanding). As we will see shortly, this potentially higher loss given default is outweighed by the lower probability of default given credit enhancement, diversification, and structural protections.

[9] This analysis assumes a stressed loan recovery of 40%
[10] Source: Moody's Annual Default Study (February 2022).
[11] Source: LCD, Intex, S&P, Moody's, Wells Fargo Securities.

Corporate Bonds Are More Exposed to Idiosyncratic Risks, Increasing Risk of Default

In the past decade, a series of accelerating macro trends have increased the idiosyncratic credit risk associated with any one company or sector of the economy. These trends include technological disruption, climate change, geopolitical instability, and demographic change. The average lifespan of a company in the S&P 500 is half what it was in the 1960s.[12] In a working paper for the National Bureau of Economic Research this year, John Campbell et al. measured over time the idiosyncratic volatility caused from risks associated with one particular company. They described idiosyncratic volatility as "an empirical proxy for the flow of firm-specific information and for the risk of human capital specialized to meet the needs of a particular firm, and it reflects the important corporate decisions, including leverage and diversification of project-level risk within corporations." They observed that idiosyncratic volatility has increased since the 1960s, despite the fact that the financial crisis in 2008 and the COVID-19 crisis in 2020 meant that broader market volatility has overshadowed idiosyncratic volatility in the minds of investors:

> *[A]verage idiosyncratic volatility increased relative to the volatility of a market index during July 1962 to December 1997. . . . The average value-weighted idiosyncratic volatility since 1997 is 28%, lower than the levels reached at the end of [our prior 1962 to 1997 sample] period but still slightly higher than the average of 26% during that period. . . . Firm-level volatility spiked during the financial crisis and has been rising towards the end for our sample in 2021. A main difference between volatility patterns today and those of the late 1990s is not that idiosyncratic volatility is lower, but that industry, and in particular market volatility are higher.*[13]

Consider the impact of COVID-19 in 2020, when the number of defaults was 198, an increase of 115% year-over-year. Historically, impacts from a pandemic may have been felt regionally across a broad set of industries and considered systemic. However, given automation and trends including urbanization, online shopping, and the globalization of commerce and travel, the heavy effects of the COVID pandemic were concentrated in a few industries, with the energy, service, and leisure sectors accounting for 65% of defaults.[14]

A series of accelerating macro trends are increasing idiosyncratic risks. New company models or technologies are disrupting established businesses. Samsung and Apple swept past the cellphone business models of companies such as Nokia and BlackBerry. Cellphone camera capabilities destroyed the film and camera business of companies such as Kodak and Polaroid. Amazon and internet shopping disrupted Sears, JCPenney, Circuit City, and RadioShack. Netflix and other video streaming platforms disrupted the Blockbuster video rental store model. VRBO, Airbnb, and other less regulated technology companies focused on vacation rentals are challenging traditional hotels and resorts. Deregulation of the airline industry in the 1970s provided opportunities for new carriers such as Southwest to take market share from larger carriers like Pan Am. COVID-19 accelerated changes already occurring in retail due to technology and demographic shifts, straining traditional fine clothing retailers like Brooks Brothers. As office attire fell out of favor, the online sales of casualwear boosted revenues of firms like Lululemon. In the past decade, BlackBerry, General Electric, JCPenney, Kmart, Macy's, and PG&E have all experienced significant credit dislocations or bankruptcy.

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[12] Innosight 2021 corporate longevity forecasts, available here.

[13] John Y. Campbell, Martin Lettau, Burton G. Malkiel, and Yexiao Xu, Idiosyncratic Equity Risk Two Decades Later, NBER Working Paper no. 29916 (April 2022), available here.

[14] Source: S&P Global, Default, Transition, and Recovery: 2020 Annual Global Corporate Default And Rating Transition Study available here.

Exhibit 9: Accelerating Macro Trends Have Increased Idiosyncratic Risk

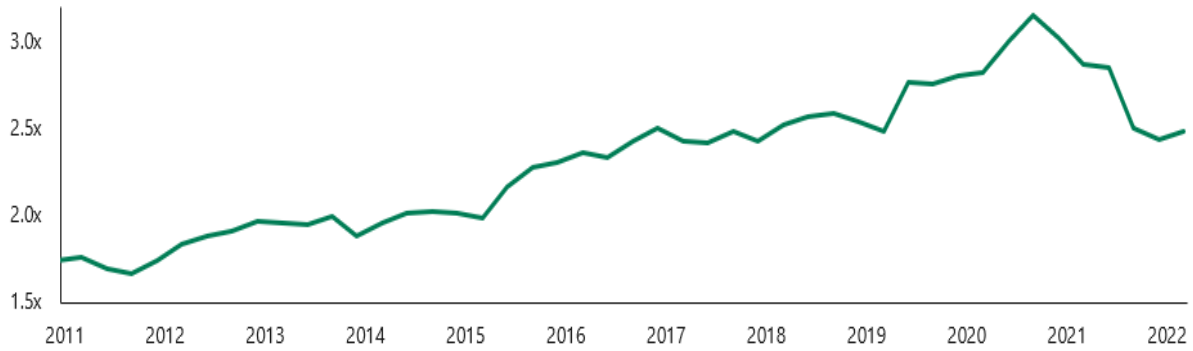
Prudent investors are beginning to consider whether the pace of change of macro trends is increasing, creating greater idiosyncratic and industry risk. As a result, investors are increasingly valuing the diversification offered by structured credit.

Corporate Issuers Are More Levered Since the Global Financial Crisis ("GFC")

To compound matters for investors, credit quality has decreased in the public corporate bond market. The gross debt-to-EBIDTA ratio for all corporate issuers has increased by more than 50% in the last decade.[15] The net debt-to-EBIDTA ratio for non-financial investment grade issuers has risen from 1.7x in 2011 to north of 2.5x today.

[15] FactSet: Analysts' Dire Predictions for Fallen Angels Failed to Materialize in 2020, January 26, 2021. Russell 3000 - Total Debt/EBITDA (last 12 months) available here.

Exhibit 10: US Investment Grade Corporate Leverage Ratios (Net Debt/EBITDA)[16]

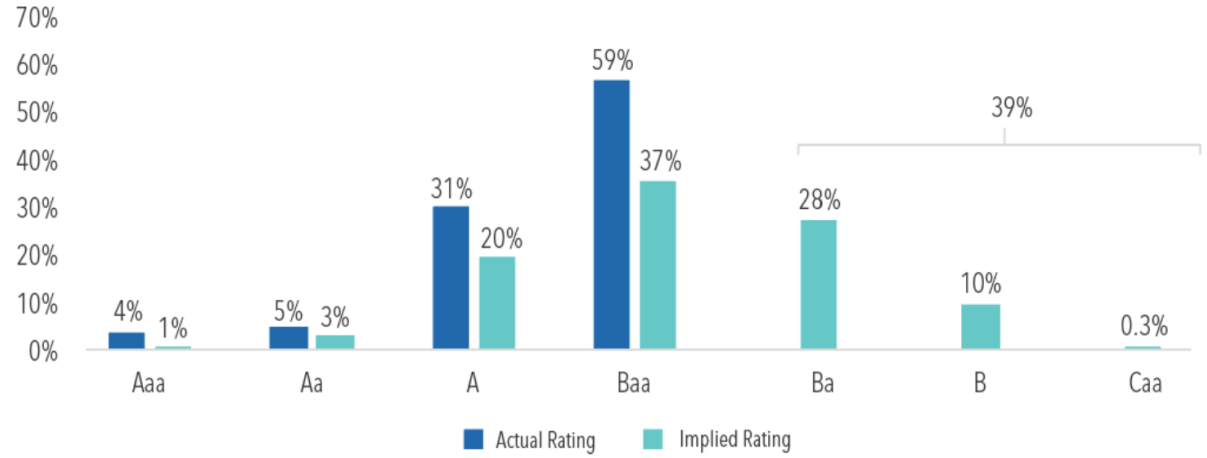


The *Wall Street Journal* reported in 2021 that "non-financial companies issued $1.7 trillion of bonds in the U.S. last year, nearly $600 billion more than the previous high…That torrent of inexpensive money has benefited all types of businesses...And it permitted companies that were struggling before the pandemic to ease the threat of bankruptcy."[17] One potential consequence of persistently low interest rates is that it might keep unproductive firms alive. With rising rates, the cost of debt and the probability of default increases, especially with highly levered business models struggling with the pace of change.

In 2020, Osterweis noted that "[t]he amount of leverage within each rating grade cohort remains elevated…. A full 39% of the investment grade market would be rated high yield using historical leverage ratings metrics."[18]

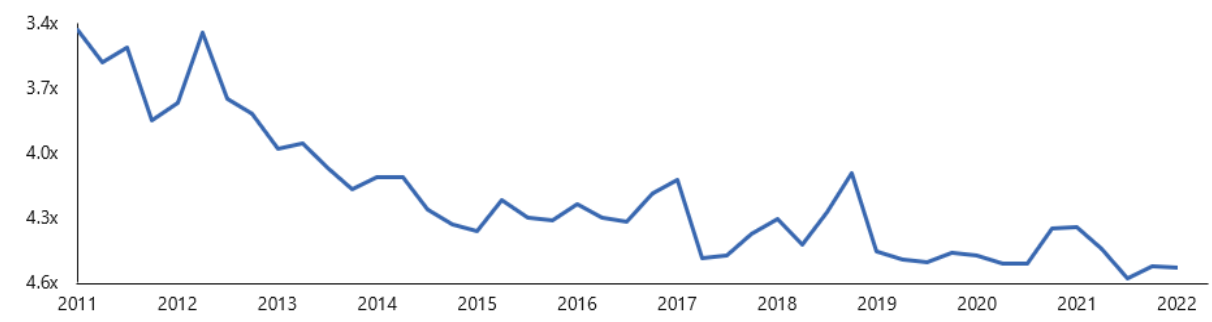
[16] Bloomberg, ICE BAML US Investment Grade Corporate Index Net Leverage Ratios (Debt/EBITDA)
[17] The Wall Street Journal, Pandemic Hangover: $11 Trillion in Corporate Debt (June 14, 2021) available here.
[18] Osterweis Capital Management, 2020 Investment Grade Credit Outlook: Take a Scalpel, Not an Axe (Jan. 13, 2020), available here.

Exhibit 11: Actual Ratings vs Implied Ratings
Using Current Leverage Applied to Historical Ratings Leverage Ratios[19]



At the same time, "covenant" packages in corporate debt have deteriorated. Covenants refer to legal provisions in bond documents that prevent management from taking actions that could adversely affect investors. The Moody's Covenant Quality Index measured its record-worst reading ever in the third quarter of 2021.[20]

Exhibit 12: Moody's Covenant Quality Indicator (CQI) – Quarterly Average



Many of these looser credit agreements permit equity investors to "strip assets." That is, the equity investors could transfer collateral (e.g., a business unit, real estate, or intellectual property), from a borrower to a newly created entity, which leaves existing lenders with a second priority claim on the stripped asset and a weaker collateral package. For example, in late 2016, JCrew moved a majority interest in its brand into an unrestricted subsidiary through the use of a "trapdoor" investment basket. This example highlights the risks

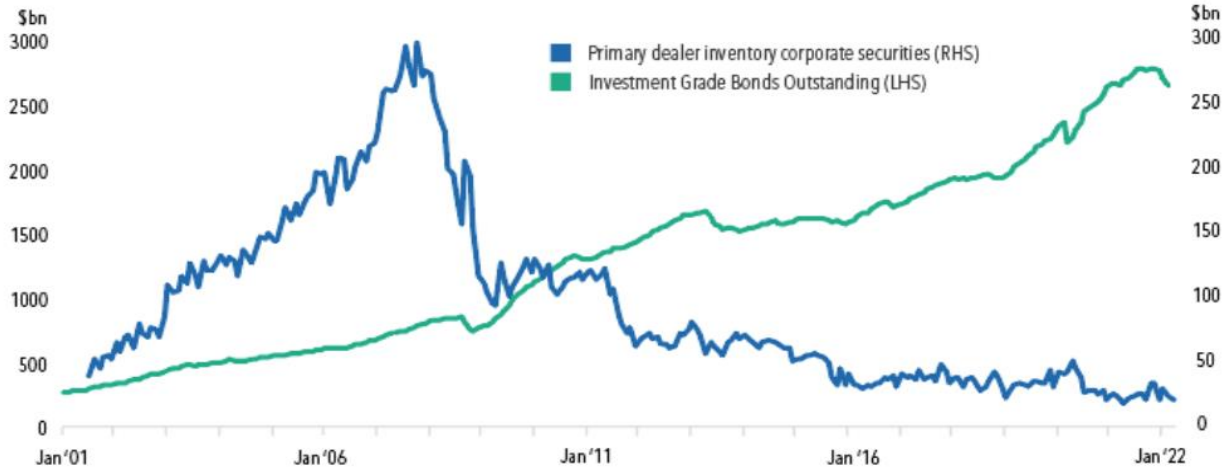
[19] *Id.*
[20] Moody's Covenant Quality Indicator (CQI) is a quarterly indicator of the average covenant quality score for all bonds priced in a given quarter. A higher CQI score denotes weaker covenant quality on Moody's scale from 1.0 to 5.0: Strong (1.0 to <1.8), Good (1.8 to <2.6), Moderate (2.6 to <3.4), Weak (3.4 to <4.2), Weakest (4.2-5.0) with High-yield-lite bonds receiving the weakest possible CQ score of 5.0. CQI reflects all high-yield bonds, including high-yield lite. High-yield-lite bonds lack a debt incurrence and/or a restricted payments covenant and automatically receive the weakest possible CQI score of 5.0.

to corporate lenders of a borrower's ability to transfer valuable collateral away from lenders. Securitization documents do not permit such activity to occur.

Liquidity in IG Corporate Bond Markets Has Become an Illusion

Post-GFC regulatory changes like the Dodd-Frank Act, Volcker Rule, and Basel III have accelerated the decline in corporate bond liquidity. In 2021, the ratio of fixed income mutual fund assets to dealer inventory exceeded 140:1, compared to 3:1 prior to the 2008 financial crisis. Today, there is less cushion to absorb redemptions and less broker-dealer liquidity in public corporate credit. Dealer inventories of IG corporate bonds averaged just $3.3 billion this year through April 13, according to data from the Federal Reserve Bank of New York. These figures have been broadly falling for years, and 2022 levels are nearly 50% below the 2015-2021 average.

Exhibit 13: Liquidity in Corporate Debt[21]



Many insurers overvalue the perceived liquidity of public IG corporate bonds. That liquidity has become an illusion. Especially during market stress, liquidity in the corporate bond market becomes scarce and it can be uneconomical to sell even IG bonds. BlackRock estimated that during the peak of COVID in March 2020, the cost to liquidate a corporate bond was 58bps, 4x greater than what it was during a normal market at the beginning of 2020.[22] Rather than relying on illusory liquidity from the public bond markets, insurers are better served by appropriately matching creditworthy assets to stable liabilities to minimize their potential need to sell bonds to generate liquidity in stress.

Structured Credit is "Safer" Than Corporate Debt of Comparable Ratings

Certain structured credit products have had lower loss rates than similarly rated IG corporates. The securitization features designed to protect debt investors have lowered losses on structured credit since 2008. No IG CLO nor other ABS debt has experienced principal impairment in the last decade.

[21] Source: Haver Analytics, ICI, New York Federal Reserve; data as of February 28, 2022.
[22] BlackRock Aladdin Transaction Cost Model estimate of average liquidation cost of bonds in the Bloomberg Corporate Index for December 31, 2019 and March 31, 2020.

Exhibit 14: Historical Credit Impairments Pre / Post 2008 by Type[23]

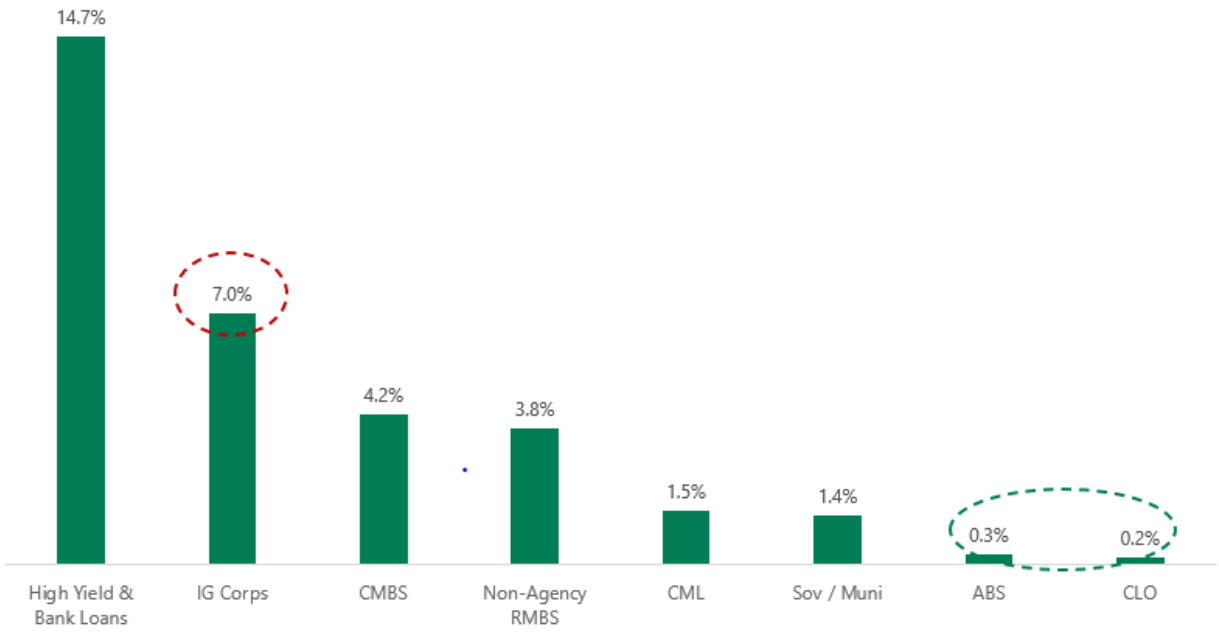
Rating	Corporates	CLO	Other ABS	RMBS	CMBS
Pre-Crisis (2001-2010)					
AAA	0.00%	0.00%	0.00%	0.04%	0.03%
AA	0.05%	0.00%	0.03%	0.29%	0.08%
A	0.11%	0.02%	0.08%	0.76%	0.08%
BBB	0.32%	0.22%	0.63%	1.82%	0.45%
BB	0.85%	0.31%	2.57%	3.17%	1.46%
B	3.00%	1.60%	9.75%	5.09%	3.78%
Post-Crisis (2011-2020)					
AAA	0.00%	0.00%	0.00%	0.02%	0.00%
AA	0.02%	0.00%	0.00%	0.19%	0.05%
A	0.02%	0.00%	0.00%	0.13%	0.05%
BBB	0.08%	0.00%	0.00%	0.36%	0.15%
BB	0.21%	0.13%	0.10%	0.51%	1.58%
B	1.28%	0.66%	0.77%	0.82%	7.15%

In 2021, BlackRock ran the aggregate assets of U.S. insurers through the Federal Reserve's Severely Adverse CCAR scenario and modeled losses of 0.2% for CLOs, 0.3% for ABS, and *7.0%* for IG corporate holdings.[24] These dynamics are not surprising given that BlackRock considers the various credit enhancements and risk mitigants embedded in CLOs and other structured assets.

[23] Represents the average annual default rate of U.S. products for all categories, except CLOs. CLOs represent the average of US CLO trailing 12-month impairment rate. However, 2001-2010 CLO B impairments were based the average of Moody's trailing 12-month impairments rates from Feb 2010-Dec 2010 as 12-month impairment data was not available prior to Feb 2010. 2001 - 2010 includes a discounted buyback of a pre-GFC CLO tranche (current CLO documents prohibit such activity); the related CLO transaction performed as expected and repaid all of its debt at par with no underlying impairment. Source: Moody's Annual Default Study (February 2022). S&P Annual Global Structured Finance Default and Rating Transition Study (May 2021). Moody's Impairment and loss rates of Global CLOs (June 2021).

[24] BlackRock risk analysis on Life Insurance Industry holdings as of December 31, 2020. The Severely Adverse macro-economic scenario is defined to align with the Federal Reserve's 2020 supervisory scenarios that the Board will use in its bank holding company stress tests (i.e., CCAR). Loss is expressed as percentage of public fixed income and CML for which discounted cash flows were generated Sources: Q12020 G DP U.S. Bureau of Economic Analysis, Apr 2020 Unemployment and Apr 2020 CPI – U.S. Bureau of Labor Statistics (series LNS14000000, CUSR0000SA0)

Exhibit 15: BlackRock's Projected Losses for U.S. Life Insurance Holdings Under Fed's CCAR Severely Adverse Scenario[25]



While corporate bond leverage, illiquidity, and idiosyncratic risk have increased over the last decade, investors have not been compensated for this increased risk. Corporate credit spreads have hardly changed. In 2007 the average credit spread over risk free for A rated corporates was 1.2%, compared to 0.7% in 2021 and 1.0% in 2022.[26] The market does not offer incremental yield for the idiosyncratic risk inherent in single corporate bonds. This is in part because of the substantial increase in passively managed credit funds, which primarily track the performance of broad indices and are inherently diversified. Over the last decade, passively managed funds have increased from approximately 16% of the public credit markets to 32%.[27] This has made it increasingly difficult to earn a higher return for taking idiosyncratic risk in particular corporate bonds. In contrast, we will see in Section V that investors in structured credit are compensated for incremental illiquidity and complexity premia. As a result, investors in structured credit can choose to trade off idiosyncratic risk (for which they are not paid) for illiquidity and complexity risk and earn incremental yield.

IV. Securitization Markets Have Experienced a Wholesale Change Since 2008

The types of assets underlying securitization have changed significantly since the 2008 financial crisis. The collateral in structured credit issued today is considerably more diverse than the relatively concentrated

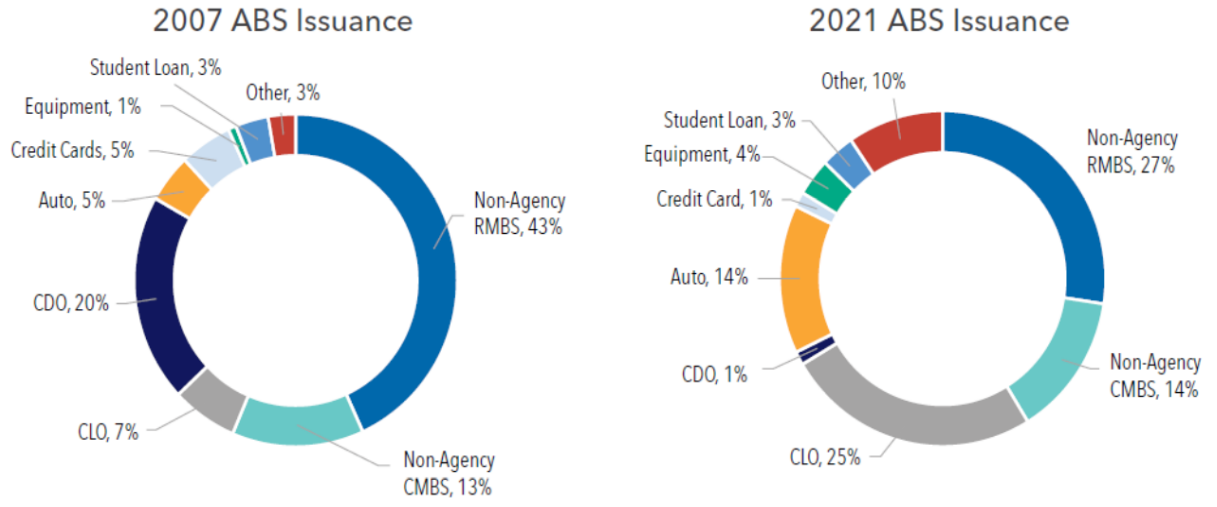
[25] BlackRock risk analysis on Life Insurance Industry holdings as of December 31, 2020. The Severely Adverse macro-economic scenario is defined to align with the Federal Reserve's 2020 supervisory scenarios that the Board will use in its bank holding company stress tests (i.e., CCAR). Loss is expressed as percentage of public fixed income and CML for which discounted cash flows were generated Sources: Q12020 G DP U.S. Bureau of Economic Analysis, Apr 2020 Unemployment and Apr 2020 CPI – U.S. Bureau of Labor Statistics (series LNS14000000, CUSR0000SA0).

[26] ICE BofA Single-A US Corporate Index Option Adjusted Spread as reported by the St. Louis Federal Reserve available here.

[27] Bloomberg and Apollo's Chief Economist. Data is based on estimates from a sample of 8,789 funds.

residential real estate securitizations that played a significant role in causing the 2008 financial crisis. In 2007, Collateralized Debt Obligations ("CDOs") comprised almost 20% of all issuances and were primarily composed of securitizations of debt from other riskier asset types, including non-agency residential mortgage-backed securities ("RMBS"), commercial mortgage-backed securities ("CMBS"), and other CDOs. Today, CDOs represent only 1% of issuances.

Exhibit 16: ABS Issuances 2007 vs. 2021[28]



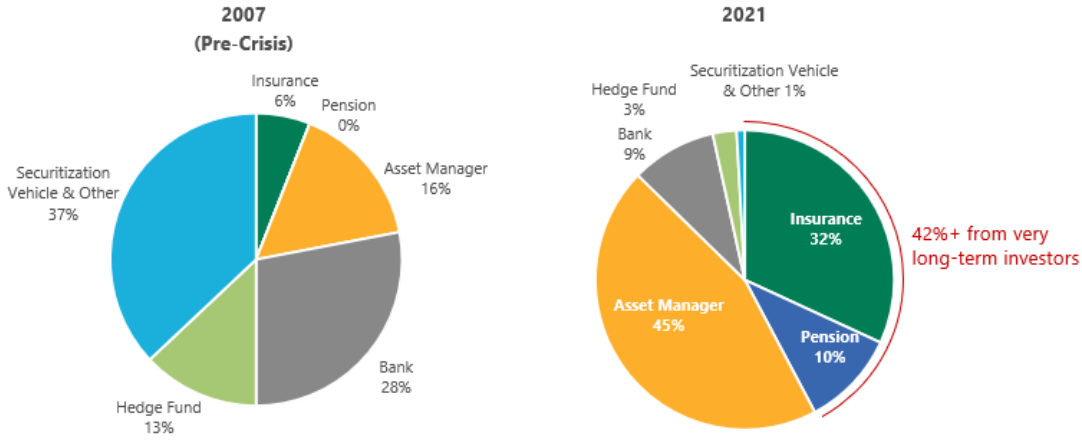
Before 2008, there were many assets originated for which the *only* buyers were securitization vehicles. Securitization was a *necessary condition* for these assets to be originated, rather than just one alternative means of financing. This created a vicious cycle where if securitizations had to sell assets, there were no other natural buyers. Mortgage securitizations bought mortgages originated under an "originate-to-distribute" model, whereby the originator only cared about making the loan, without ensuring its credit quality was sound. "Liar loans" abounded, whereby borrowers would self-report their income, assets, other debt burdens. Mortgage loans with low teaser rates for two years were abundant and commercial mortgages in securitizations often took advantage of "pro-forma underwriting," through which the property owner would get credit for what they believed would happen to the property (lower vacancies, higher rental rates), rather than what the property's financials looked like at the time of underwriting. Today, these more troublesome types of collateral have all but disappeared from the market. There are now natural buyers for all main types of securitization collateral beyond the securitization market.

The investor base for structured credit itself has also matured. In 2007, 37% of structured credit was purchased by other securitizations and other SPVs. Another 28% was bought by banks that often funded the purchases with shorter-dated retail deposits and commercial paper. Prior to 2008, regulation around securitization was light and many rating agencies were using deeply flawed methodologies for securitized credit. Investment bankers were incentivized to create new, and ever more aggressive, securitization structures backed by increasingly risky collateral. As the market and economy expanded, delinquencies and defaults were near zero, and as the rating agencies used recent history as a proxy for future performance.

[28] SIFMA Research. Excludes Agency Mortgage-Backed Securities. "Other" includes ABS securitizations of consumer, franchise, timeshare, insurance, and receivables. Breakout of CLO/CDO reflects Apollo Analysts' estimates. Non-agency RMBS issuance was primarily in nonprime (Alt-A and subprime) through 2008, but since the GFC issuance has been primarily in various prime categories.

IG ratings were easy to achieve in structures with minimal credit support and low IG tranches offered minimal thickness, often as low as 1%.[29] Tranches of one type of securitization (say, RMBS) were collected and served as the collateral for others (say, ABS CDOs). Tranches of ABS CDOs were then acquired and served as the collateral of "CDO squareds" (CDOs of CDOs). Today, regulations, rating agency criteria, and investor stipulations preclude securitizations from owning other securitizations. The investor base is increasingly composed of sophisticated, institutional buyers who have access to long-dated, stable funding. The portion of new issuances purchased by pension funds and insurers has increased from 6% in 2007 to over 42% today. The long-dated, stable liabilities of pension and insurance companies means that they are focused on fundamental credit rather than temporary mark-to-market swings in price. They can help stabilize the securitization market as willing buyers during market dislocation.

Exhibit 17: Comparison of Investor Base in ABS from 2007 to 2021[30]



Following the crisis, regulatory and political actions brought on new standards in the asset securitization space. Regulatory changes implemented through the U.S.'s Dodd-Frank Wall Street Reform and Consumer Protection Act and the international Basel III regulatory framework put new governance around bank structured credit lending; improved disclosure by requiring standardized, transparent collateral reporting; and tightened the methodologies utilized by rating agencies. In Europe, regulators prohibited the securitization of securitizations ("re-securitization"), including CDOs of ABS.

Regulatory action resulted in stronger, safer structured credit. Post-financial crisis, collateral support has been strengthened and structures include higher quality collateral. Market value triggers, which created liquidity issues and a vicious cycle of losses during the 2008 financial crisis, no longer exist.

[29] Thickness refers to how much loss a non-senior tranche can incur before being fully impaired. Some mezzanine, IG rated tranches of residential mortgage-backed securitizations pre-GFC could begin to take losses when the underlying pool of mortgages lost as little as 5%. Once losses reached 6% or 7%, the tranche would be fully impaired.

[30] Data specific to AA to BB rated CLO-issuance volumes tracked by JP Morgan and Citi.

Exhibit 18: Structured Credit Terms Pre and Post the Financial Crisis

	Pre-Crisis (1.0)	Post-Crisis (2.0/3.0)
Example	Pre-2008 Mortgage-Backed Securities	Collateralized Loan Obligations
Collateral	e.g. Subprime properties with de minimis values Potential to use 'synthetic' or 'derivatives' rather than holding the underlying bonds	Collateralized by first lien senior secured bank loans; always overcollateralized
Leverage on Leverage	Securitizations of securitizations (i.e. CDO^2)	More conservative, limited leverage
Event of Default Triggers	Market Value-based with limited buffer	Cash Flow or Par Value requiring significant impairment
Diversification	Concentrated, e.g. in highly cyclical residential real estate properties	Well diversified, 10% max per industry, and 1-2% max per obligor; forced diversification
Market Participants / Investor Base	High leveraged investors, including structured investment vehicles (SIVs), Wall Street balance sheets, and hedge funds	Stronger hands Long-term asset managers, insurance companies, and pension funds (i.e. 'real-money')
Asset Liability Management	Long term assets funded by short-term liabilities (e.g., commerical paper) creating roll risk	Funding sources matched to assets
Funding	Permitted greater leverage; in many cases 20x+ with fewer risk constraints	Documentation is much more investor friendly, shortening the trading period during which managers are able to actively manage the loan portfolio, thus limiting extension risk
Other	Relatively little direct diligence performed	CLOs are actively managed / diligenced by credit managers with real skin in the game

Case Study: CLOs After the 2008 Financial Crisis

Since 2008 financial crisis, CLOs have become considerably less complex. Newly originated collateral pools are now limited to corporate loans and bonds. CLOs no longer allow duration mismatch where liabilities are shorter than assets in the portfolio. Rating agencies and investors now demand greater credit enhancement at each ratings level, as shown in Exhibit 19 below. Under today's rating agency framework, a BBB rated tranche has an additional 5% credit enhancement. Under pre-crisis methodology, this is equivalent to the credit enhancement level of A rated tranches.

Exhibit 19: Increases in CLO Structural Protections Pre and Post the Financial Crisis[31]

Credit support, based on assets (%)	Pre-Crisis ("CLO 1.0")	Post-Crisis ("CLO 2.0")	Change
AAA	25%	36%	+11%
AA	19%	25%	+6%
A	13%	18%	+5%
BBB	8%	13%	+5%
BB	6%	8%	+2%
Collateral limits			
First Lien Senior Secured Collateral	80-85%	90-98%	
CLO bucket (e.g. debt of other CLOs)	5-10%	0-5%	
High-yield bucket	10%	0%	
Emerging market debt	10%	0%	
Other Provisions			
Reinvest period (years)	5-7	3-5	
Non-call period (years)	3-5	1-2	

Rating Agency Methodology Tightened Significantly and Competition has Increased

Recognizing the miscalculation and inappropriate methodologies that occurred before and during the 2008 financial crisis, rating agencies have modified their rating methodologies to require diversification, additional credit enhancement, and stronger underlying portfolio credit. For example, S&P, Moody's, and Fitch modified core inputs of their CLO ratings methodologies by either recalibrating the default probabilities or revising other model inputs to increase required hard credit enhancement at each rating level.

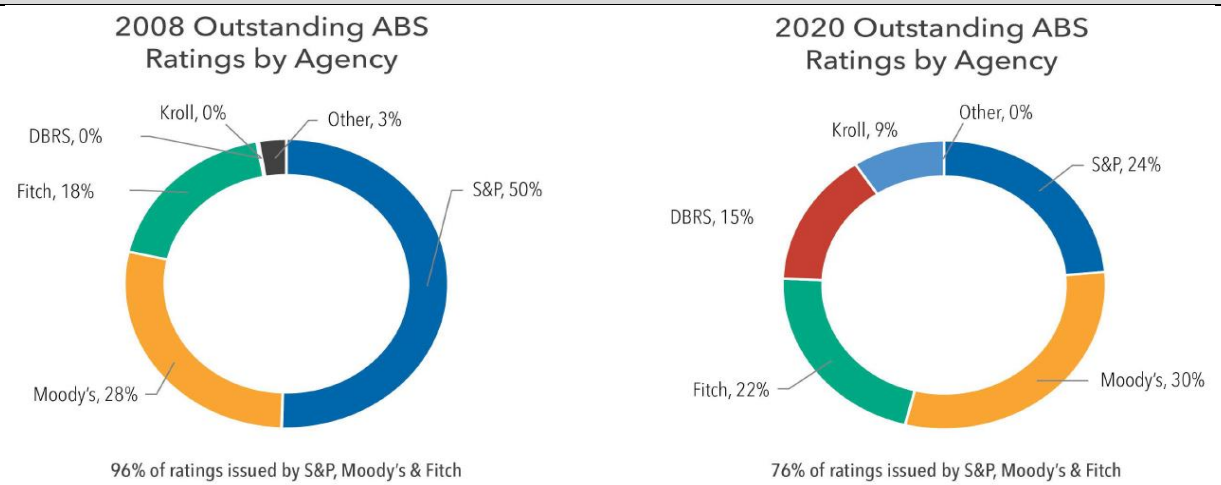
At the same time, federal regulation in the United States mandated that statistical rating organizations "enhance governance, protect against conflicts of interest, and increase transparency."[32] The Securities and Exchange Commission's Office of Credit Ratings is required to submit annual reports to the U.S. Congress since the Credit Rating Agency Reform Act of 2006. This has worked: rating agency expertise in securitized markets is increasingly democratized across Nationally Recognized Statistical Rating Organizations ("NRSROs"). Rating agencies like DBRS and Kroll have developed dedicated expertise in modern types of securitization, creating more healthy competition between NRSROs for structured credit.

Since 2008, the SEC has adopted rules designed to enhance competition among credit rating agencies. For example, the SEC created the "Rule 17g–5 Program" in 2009 to "improve the quality of credit ratings for structured products by making it possible for more NRSROs to rate structured finance products." Under the Rule 17g–5 Program, NRSROs that are not hired to rate structured finance products are able to access the same nonpublic information available to NRSROs that were hired to issue ratings, making it possible for the non-hired NRSROs to issue unsolicited ratings of those products. The SEC created this program to

[31] Source Wells Fargo Securities and Apollo Analysts.
[32] Securities and Exchange Commission, SEC Adopts Credit Rating Agency Reform Rules (Aug. 27, 2014) available here.

"advance the Rating Agency Act's goal of promoting competition in the credit rating industry by facilitating the issuance of credit ratings by NRSROs that are not hired by the arranger." The SEC believed "the resulting increase in the number of ratings extant for a given structured finance security or money market instrument will provide users of credit ratings with more views on the creditworthiness of the security or money market instrument."[33]

Exhibit 20: Rating Agency ABS Market Share 2008 vs. 2020[34]

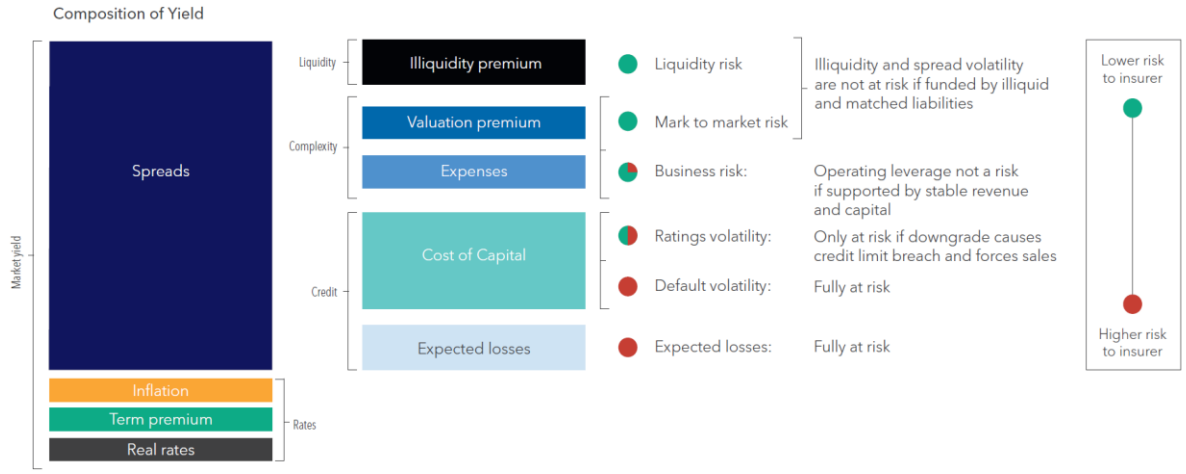


V. Why Does Structured Credit Yield More than Corporates? - Illiquidity & Complexity Premia

Structured credit can provide incremental yield over equivalently-rated corporate debt because it is *more complex* to appraise and may be *less liquid*, not because it represents incremental credit risk. An investor requires greater expertise and resources to appraise the credit risk in structured credit because of the diverse underlying collateral pools and unique security waterfalls. This additional complexity reduces the buyer base relative to traditional publicly traded corporate bonds and, hence, liquidity. Together, these attributes can mean that structured credit can experience greater price volatility than corporate credit in stress, *even though it is safer credit risk*. Experienced investors with the resources to understand the complexity and long-dated, stable funding to withstand illiquidity and price volatility can capture incremental yield without taking on incremental credit risk. We refer to this incremental yield as "illiquidity" and "complexity" premia.

[33] *Amendments to Rules for Nationally Recognized Statistical Rating Organizations*, Final Rules, 74 Fed. Reg. 63,832, 63,844, 63,851.(Dec. 4, 2009).
[34] SEC's Office of Credit Ratings Annual Staff Reports available here.

Exhibit 21: Decomposition of the Illiquidity and Complexity Premium



These concepts are not unique to structured credit, and the premia offered can be material. For example, Professor Schwert at Wharton has noted that "more than half of the typical [bank] loan spread is a premium in excess of the bond market price of credit risk."[35]

The process of securitization introduces complexity. The accumulation of assets in an SPV, and the tranching of those assets' cashflows for investors, adds structuring and documentation that require greater investment understanding and resources. This complexity creates a wider dispersion of valuation perceptions, increasing price volatility of structured credit in uncertain markets. The complexity premium is made up of two components: a valuation premium and expenses for required resources.

The Valuation Premium

Valuation premium refers to the incremental yield an investor can achieve if they have the expertise to value assets independently rather than through public markets and can withstand public market price volatility in periods of stress. The valuation premium is highly correlated to the illiquidity premium. Structured credit has greater price volatility in stressful markets for two reasons.

First, structured credit offers less price transparency than publicly traded corporate debt. It takes additional expertise to analyze the financial reporting of structured credit relative to traditional corporate bond issuers. Structured credit also generally trades "over the counter" and with less frequency than corporate credit. Structured credit instruments are less likely to be included in broader credit indices. In contrast, corporate bond trades are posted on TRACE for full price transparency. And there is an active market for credit default swaps referencing corporate obligors (both "single name" and "index"), which means market participants can easily assess valuation and hedge their exposure. Corporates are also easily financeable and pledge-able into repurchase agreements and prime brokerage financing arrangements. Structured credit typically lacks these market features. Average daily trading of structured credit reported on TRACE represents 0.09% of notional outstanding relative to 0.39% for corporate debt.[36] In this context, even small

[35] Michael Schwert, "Does Borrowing from Banks Cost More than Borrowing from the Market?" Journal of Finance, (April 2020), at, pp. 905-47.
[36] SIFMA Research. Structured credit excludes Agency Mortgage-Backed Securities.

trades, where prices are made public through TRACE or other services, can re-price entire structured credit markets.

Second, it is more difficult and time intensive to distill valuations of the diverse sets of collateral pools held by structured products, some of which might be challenging to analyze in times of stress. Underlying securitization assets might not have observable market prices and may require valuation models. For instance, during the early COVID period, the uncertainty in the aviation sector put a premium on the valuation performed on aircraft collateral pools, which required determining the amount of the underlying pool that flew international routes which were more adversely affected by government restrictions.

Out of expediency, investors typically extrapolate and characterize entire markets, generalizing and overstating the likelihood of risk after a shock. The impact of such extrapolations can be profound: AAA rated tranches of CLOs, for example, traded below 90% of par at the trough of the COVID-induced market volatility, even though the direst scenarios projected no cashflow impairment to those tranches. With around 40% credit enhancement and the prevalence of cashflow diversion triggers, more than 80% of the underlying loans would have to default with stressed recovery levels of 50% for an AAA rated CLO tranche to suffer principal impairment. As Ellington Management, a prominent credit hedge fund, noted in December 2021, "structured product investors earn a liquidity premium as compensation for the risk that mark-to-market prices fall below fundamental value when financial markets come under stress."[37]

The buyer base for structured credit has shifted, and continues to shift, towards stable, longer-term investors like insurance companies that are better suited to hold these securities through periods of stress. As this occurs, and the nature of structured credit is better understood, this valuation premium will likely shrink. We expect that this will take many years.

Expenses for Required Resources

Successful investors in structured credit need dedicated credit, trading, analytics, risk, and legal resources. They also need institutional knowledge and a disciplined process. This expertise is expensive, as it includes investments in people, data, technology, and processes that often take years to build.

For the proper valuation and risk assessment of structured credit an investor requires data, documentation, and expertise. The steps range from collection of documentation and selection and calibration of credit loss models through to running a multi-period simulation "on bottom up" collateral cashflow generation allocated with precise dependence on collateralized securities' waterfalls.[38]

While structured credit carries less credit risk, it takes greater expertise and resources to evaluate. The cost of developing that expertise is borne by the shareholders of the asset manager managing the insurance company's assets, not the policyholders. In contrast, the cost of additional credit risk is first borne by the policyholders. For this reason, regulators, whose primary obligation is to policyholders, should prefer that insurers invest in capabilities to tackle complexity risk (for which they earn yield) rather than taking on incremental credit risk.

Ratings Volatility

In the same way that complexity means it can take the market longer to price structured credit, it can also take rating agencies longer to determine the impact of market events on structured credit relative to

[37] The Cycle Repeats: Post-Crisis Opportunities in Structured Credit; Ellington Management, December 2021.
[38] "Relating Top-down with Bottom-up Approaches in the Evaluation of ABS with Large Collateral Pools"; Diener, Jarrow, Protter; 2011. "CMBS market efficiency: The crisis and the recovery"; Christopoulos, Jarrow; 2018. "Commercial Mortgage-Backed Securities (CMBS) and Market Efficiency with Respect to Costly Information"; Christopoulos, Jarrow, Yildirim; 2008.

corporate debt. As a buffer for uncertainty, some rating agencies have historically been more likely to downgrade structured credit in stress than equivalently rated corporates. This does not necessarily mean that structured credit represents worse credit risk; rather, it just means that it may be harder for the rating agency to determine that credit risk. Often, rating agencies will upgrade structured credit at higher frequency than corporate credit once the market stress subsides. For instance, in 2020, 3.0% of IG CLOs were downgraded by a rating agency compared to 2.5% of IG corporate debt.[39] However, there were no IG CLO impairments and subsequently there have been more CLO upgrades than the number of CLO downgrades in 2020.

Ratings downgrades of the underlying collateral can have implications for structured credit. Prior to the GFC, those implications were negative, as covenants could require the forced sale of assets if the average rating of collateral dropped below a certain level. This could cause securitizations to realize losses at inopportune times of market stress when prices were depressed. These types of ratings covenants are no longer common. Post GFC, downgrades of the underlying collateral can have a positive benefit for the IG securitization tranches as it can trigger the diversion of cashflow from equity or junior debt.

None of illiquidity, complexity, nor rating agency volatility premia is related to the credit worthiness of these securities. In order to capture these premia, an investor needs expertise (valuation premia), stable, long-dated liabilities matched to the duration of the assets (illiquidity premia), and a strong capital base (rating agency volatility). These are precisely the attributes of the best life and annuity insurers.

VI. Structured Credit in the Context of Insurers

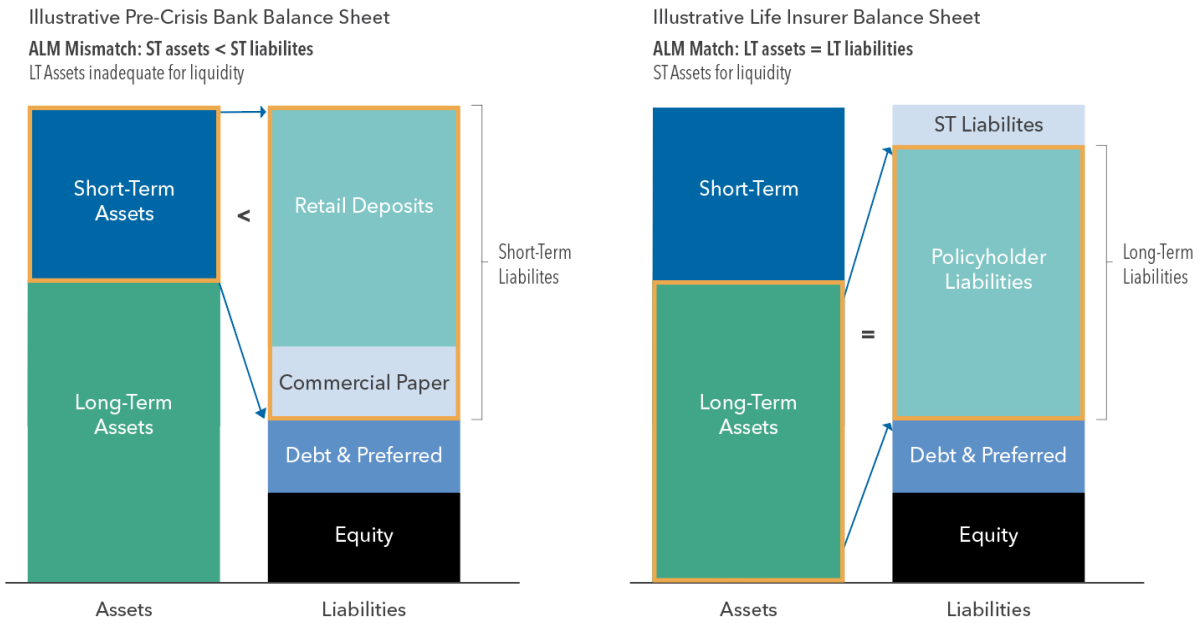
The portion of newly issued IG structured credit sold to insurers has increased from 6% in 2007 to 32% in 2021. The shift can be attributed to the fact that for the last few decades, persistently low interest rates and a substantial increase in passively managed assets such as exchange-traded funds, have made it increasingly difficult for life and annuity companies to meet the promises they made to their policyholders by investing in public corporate credit markets. Many life insurers are no longer able to offer attractive products and have had to exit business lines. The illiquidity and complexity premia offered by structured credit provides an attractive alternative to those insurers with the appropriate expertise, stable liabilities, and capital.

Why Participation in Structured Credit is a Good Match for Insurers

Traditional banking built its business on highly liquid deposit liabilities and shorter term commercial paper. These short-term liabilities are used to make long-term loans, incurring sizable liquidity and asset-liability risks. In contrast, insurers can match long-term loans with long-term, but largely predictable, liability profiles of insurance lenders.

[39] Source: JP Morgan.

Exhibit 22: Comparison of Insurance Company vs. Bank Balance Sheets



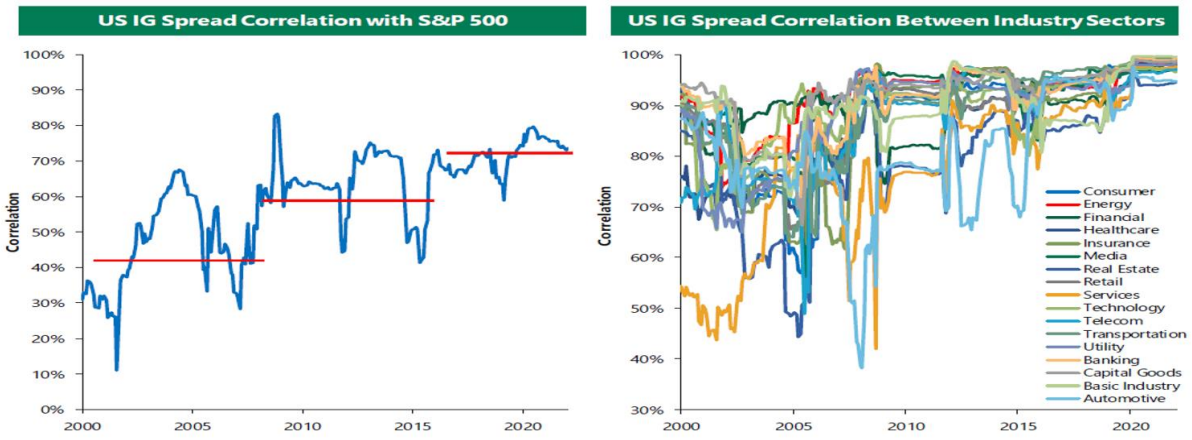
The European Commission acknowledged the prudence of this approach: "The diminished role of banks in long-term lending opens up new needs and opportunities for other financial institutions and market-based intermediation to channel financing to long-term investments. Given the longer time horizons of their business models, institutional investors—such as (life) insurance companies, pension funds, mutual funds, and endowments—represent suitable providers of long-term financing."[40]

Illiquidity Risk is One of the Few Ways to Diversify

Diversification has been harder to achieve in public credit markets as correlations across public asset classes and between different public corporate credit is at historic highs. The integration of global financial markets and the rising popularity of passive index products have driven higher correlations. This makes it harder to achieve diversification through public corporate credit alone. As such, it is prudent for life insurers to seek diversification of risks beyond public credit, including from "illiquidity" risk that they are very well positioned to take on given their long-dated, stable liabilities.

[40] European Commission, Green Paper, Long-Term Financing of the European Economy. Brussels, March 25, 2013, available here.

Exhibit 23: Correlation in Public Credit Markets[41]



The Insurance Industry is Highly Regulated and Transparent

Every asset on an insurance company's balance sheet is disclosed publicly in quarterly regulatory filings and submitted to focused, educated state regulators.

Insurer Risk Based Capital Appropriately Covers Each Risk

The core framework for calculating regulatory risk-based capital ("RBC") for U.S. insurers appropriately segregates the key risks, even though it fails to recognize some of the key benefits of structured credit. That is, the insurance RBC framework has distinct charges for credit risk, operational business risk, and the risk that assets are inappropriately matched to the duration of liabilities. This last risk is crucial because it means that any insurer that does not have appropriately long-dated, stable liabilities will be highly disincentivized to attempt to capture the illiquidity premia associated with longer-dated structured credit. An insurer that writes shorter-dated homeowners' or automobile insurance will be disincentivized from investing in less liquid structured credit.

Exhibit 24: Key Components of Insurer RBC

Life RBC	
C0:	Insurance affiliate investment and (non-derivative) off-balance sheet risk
C1cs:	Invested common stock asset risk
C1o:	Invested asset risk, plus reinsurance credit risk except for assets in C1cs
C2:	Insurance risk
C3a:	Interest rate risk
C3b:	Health provider credit risk
C4a:	Business risk – guaranty fund assessment and separate account risks
C4b:	Business risk – health administrative expense risk

Company action level RBC =
$C0 + [(C1o + C3a)^2 + (C1cs)^2 + (C2)^2 + (C3b)^2 + (C4b)^2]^{½} + C4a$

[41] Represents rolling 3 year correlation of monthly returns. Source: ICE, Apollo analysts.

Lower credit risk should mean lower C1 capital charges. The default experience for structured credit compares favorably to that of public corporate bonds, specifically for structured credit originated after the 2008 financial crisis.

Insurer balance sheets should be resistant to mark-to-market volatility if assets and liabilities are duration and cash flow matched. ALM mismatch is captured in C3 capital charges. Structured securities experience higher volatility than corporate bonds in stressed markets. Life insurance companies match long-term, predictable, liability cashflow profiles against these long-term assets. If ALM is matched and liquidity stress is appropriately modeled, life insurance companies should not be forced sellers of structured credit in times of mark-to-market volatility. Insurers therefore provide a source of stability to the broader economy in stress.

All business and execution risks show up in C4 capital charges. Successful investment in structured credit requires dedicated credit and structuring expertise, structuring and trading technology, legal resources, institutional knowledge, and a disciplined investment process with extensive quantitative risk capabilities. If an insurer lacks the appropriate investment and risk management expertise to manage investments in structured credit, they should be charged with an additional C4 capital charge.

There Are Some Bad Securitization Structures That Are Not Appropriate for Insurers

Some securitizations are inappropriate for an insurance company's balance sheets. In particular, some securitization investors stray from standard securitization capital structures to achieve IG ratings on risks that are primarily equity risk. Or an investor might collapse IG tranches into residual equity tranches and seek a rating that only assesses the probability of return of principal, not principal and interest (thus deemed a rating to "principal only"). This exposure is called a "combo note" as it combines tranches. As equity tranches provide high cash returns, the cashflows generated by the combo note are often enough to support IG ratings for the investor. But a material component of this exposure is equity risk. Well-capitalized insurance companies have no need to seek out investments in this type of financial over-engineering.

VII. Conclusion

Both the structured credit and corporate credit markets have changed materially since the 2008 financial crisis. IG structured credit has become less risky through increased diversification, credit enhancement, and structural protections that divert cash from junior tranches to support IG debt tranches in periods of stress. At the same time, IG corporate credit has become riskier as accelerating macro trends like technological disruption, climate change, pandemics, and geopolitical uncertainty increase the idiosyncratic credit risk associated with any one company or industry.

Given these secular changes, IG structured credit is a safer credit risk than equivalently rated corporate bonds. Regardless, IG structured credit often offers investors illiquid and complexity premia. Investors with the expertise to understand the complexity and long-dated, stable funding to withstand illiquidity and price volatility can capture incremental yield without taking on incremental credit risk. In this way, investors with long-dated, stable liabilities are incentivized to continue finance the economy through the investment grade structured credit markets.

Appendix A: Types of Structured Credit

There are multiple different types of structured credit. Real estate-backed instruments include securitizations backed by mortgages for residential properties, called residential mortgage-backed securities ("RMBS"), and those backed by mortgages for commercial properties, called commercial mortgage-backed securities ("CMBS").

Residential Real Estate securitized products include:

- **Agency RMBS** are securitized residential mortgages that exist under conforming terms set and insured by government-sponsored enterprises including GNMA ("Ginnie Mae"), FNMA ("Fannie Mae"), and FHLMC ("Freddie Mac").
- **Non-Agency RMBS** are securitized residential mortgages that do not conform to the government-sponsored enterprise's (GSE) credit specifications.
- **Single Family Home Rental** are securitized loans that are collateralized by a borrower's interest in single family rental properties.

Commercial Real Estate securitized products include:

- **CMBS** are a type of mortgage-backed security that is collateralized by pools of real estate loans secured by commercial properties that are not guaranteed by the U.S. government or any government-sponsored enterprise.
- **Single Asset Single Borrower (SASB) CMBS** are backed by a single first mortgage on one property or made to one borrower.
- **CRE collateralized loan obligations** are a type of CLO backed by commercial real estate loans, often backed by properties in some form of transition.
- **Agency CMBS** are bonds collateralized by pools of commercial real estate loans secured by properties that are issued or insured by a U.S. government-sponsored enterprise or federally chartered corporation, such as Fannie Mae, Freddie Mac, or Ginnie Mae.

Asset Backed Securities ("ABS")

At its inception in the mid-1980s, the non-mortgage ABS market first issued securitizations of automobile loans and credit card receivables. Since then, the sector has rapidly evolved into a highly diversified $1.5 trillion market, running the gamut of collateral types.

An ABS can be constructed in one of two ways: 1) securitizing a pool of many assets or 2) securitizing the cashflows or receivables from a single asset or whole enterprise. ABS collateral types can be grouped into four subsectors: corporate loan backed (CLOs), consumer ABS (consumer receivables), commercial ABS (commercial receivables), and whole business ABS (cashflows or receivables from a single enterprise):

- **Collateralized loan obligations (CLOs)** are backed by below investment grade corporate bank loans.
- **Commercial ABS** are constructed from pools of receivables, loans, or leases on assets, such as shipping containers, data centers, aircraft, and other commercial equipment. Other non-mortgage securitized assets include merchant credit card advances, oil and gas future production royalty agreements, commission agreements, drill-ship charter agreements, property assessed clean energy

loans, wireless tower leases, billboard leases, consumer wireless contracts, and wireless spectrum agreements.

- **Consumer ABS** are backed by cash flows from consumer financial assets, such as student loans, credit card receivables or auto loans.

Exhibit 25: Types of Structured Credit[42]

Level 1	Level 2	Level 3	ABS Type	Primary Payment Source	Payer	Payer type	Contingent Payment Source	Sponsor
ABS	Corporate	CLOs	CLOs	Bank Loans	Non-IG Corporations	Commercial	Proceeds from foreclosure on corporations	Credit Asset Manager Bank Owner and Manager
		Whole Business	Whole Business	Franchise & Royalty Agreements	Franchise	Commercial	IP and Enterprise Value	Brand Owner and Manager
		Other	Aircraft	Aircraft Lease Agreements Maintenance Agreements	Airline	Commercial	Aircraft Disposition Proceeds	Aircraft Leasing Company
			Equipment	Equipment Lease Agreements	Equipment Operator	Commercial	Equipment Disposition Proceeds	Equipment Leasing Company
			Railcar	Railcar Lease Agreements	Rail Operators	Commercial	Railcar Disposition Proceeds	Rail Leasing Company
			Royalty	Royalty and Licensing Agreements	Agreement Counterparty	Commercial	Sale Proceeds from intellectual Property	Royalty Acquirer
			Shipping Container	Container Lease Agreements	Shipping Line	Commercial	Container Sale Proceeds	Container Leasing Company
			Structured Settlement	Insurance Settlement Lottery Annuity	Insurance Company	Commercial		Structured Settlement Originator
			Diversified Payment Rights	Dollar wires and flows from U.S. or Europe destined for foreign bank	Originator of Dollar Flow	Commercial Consumer	Recourse to bank sponsor Sovereign (implied)	Foreign Bank
			Rate Reduction	Right to recoup expenses via utility bills	Local Business Residents	Commercial Consumer	Recourse	Utility
	Consumer		Auto Lease	Lease Agreements Automobile Residuals	Driver	Consumer	Automobile	Automobile Finance Company
			Auto Loan	Auto Loan	Auto Owner	Consumer	Automobile	Automobile Finance Company
			Credit card	Credit Card Receivables	Cardholder	Consumer	Bank Sponsor (implied)	Bank
			Marketplace Lending	Unsecured Consumer Loans	Borrower	Consumer	Individual Recourse	Online Lender
			Residential Solar	Solar Power Purchase Agreements Solar equipment Loans	Resident	Consumer	Individual Recourse Equipment/Fixture Filing	Solar Finance Company
			Student Loan	Student Loan	Borrower Guarantor/Parents	Consumer	Individual Recourse	Student Lender
			Timeshare	Timeshare Contracts	Resident	Consumer	Individual Recourse Fractional Unit Ownership	Timeshare Company
Real Estate	Residential Real Estate		Single Family Rental	Residential Rental Agreements	Tenants	Consumer	Real Estate	Single Family Owner/Operator
	Commerical Real Estate		CRE CLOs	Commerical Mortgage Loans	Real Estate Owners	Commercial	Real Estate	Commerical Mortgage Lender
			Triple Net Lease	Triple Net Lease Agreements	Business Operator	Commercial	Real Estate	Triple Net REIT

[42] Source: Apollo & Guggenheim: The ABCs of Asset-Backed Securities 2022.

Appendix B: Case Study Where IG Structured Credit Clearly Has Less Credit Risk than Corporate Debt of the Same Rating

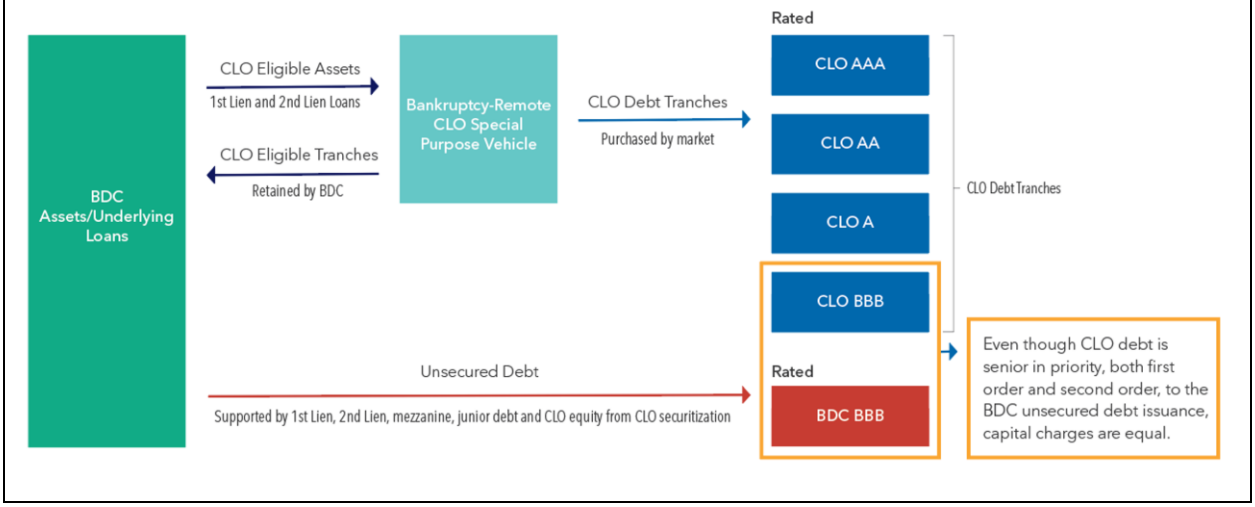
Comparison Between BBB rated debt issued by a Business Development Company and CLO

Business Development Companies ("BDCs") are corporations registered with the SEC that invest in the debt of other corporations according to specific rules. They may invest in first lien, unitranche (a more levered first lien that effectively combines first lien and second lien into a single loan), second lien, mezzanine, and junior debt of other corporations. The BDCs themselves then issue senior unsecured debt, typically BBB rated. The market, rating agencies, and regulators consider the debt issued by BDCs to be corporate debt rather than structured credit.

BDCs will often take their higher quality first lien or unitrache assets and sell them to a CLO in exchange for some of the equity in the CLO structure itself. In this way, the BDC keeps the highest-risk tranche of the CLO. The BDC's unsecured debt is now backed by its remaining first liens, second liens, mezzanine, junior debt, and CLO equity (the equity retained from the securitization).

In turn, the CLO itself might issue A or BBB rated structured credit that has a perfected security interest in the first lien loan assets in a bankruptcy-remote SPV. Credit enhancement from the riskier CLO equity held by the BDC means that the IG debt issued by the CLO has substantially *lower credit risk* than the equivalently rated BBB debt issued by the BDC. However, rating agencies and insurance regulators still apply the same capital charge when insurers invest in the BBB corporate debt issued by the BDC or the BBB structured credit debt issued by the CLO. See Exhibit 29 below illustrating the underappreciated credit enhancement securitization affords the CLO debt in this example.

Exhibit 26: Comparison Between BDC and CLO



Appendix C: Illustration of Multiplicative Benefits from Structured Credit

Consider a scenario where an investor holds one high yield loan and upon default 50% of the asset is assumed to be recovered.

Hold Single Loan

	1 Loan Defaults
Loss Given Default	50.0%

Instead of holding a single loan, an investor could hold 100 equally sized high yield loans. Assume each loan has a 3% probability of default and upon default 50% of the assets are recovered. For purposes of illustration, no correlation is assumed across the loans when calculating the "Probability of Event" below. This assumption is simplistic for illustration for understates the probability of multiple defaults occurring.

Hold a Basket of 100 Individual Loans

	2 Loans Default	10 Loans Default	31 Loans Default
Probability of Event	22.5%	0.07%	0.00%
Loss Given Default	1.0%	5.0%	15.5%

Further, investment could be made in a securitization of 100 loans. Credit Enhancement provides loss protection, with the greatest impact at senior, investment grade tranches. While not shown, structural protections provide additional loss protection for investment grade tranches.

Loss Given Default by Tranche for Basket of Loans Held in Securitization with Credit Enhancement

Attachment Points	Tranche	2 Loans Default	10 Loans Default	31 Loans Default
47%	AAA	0.0%	0.0%	0.0%
30%	AA	0.0%	0.0%	0.0%
21%	A	0.0%	0.0%	0.0%
15%	BBB	0.0%	0.0%	8.3%
10%	BB	0.0%	0.0%	100.0%
0%	Equity	10.0%	50.0%	100.0%

Combined, the benefits of securitization can transform high yield loans into investment grade lending opportunities where the credit risk premium is replaced by illiquidity/complexity premium. As demonstrated above, the benefits of securitization are multiplicative, whereby the loss given default drops from 50% on a single loan to 8.3% for the BBB rated tranche at just over 30% of the portfolio defaulting withing a securitization.