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US Corporate Credit, CLOs, and Software Research

Assessing AI Risk in Loans

We adapt the Moat & Journey framework developed by our Equity team and use AI-powered research tools to assess AI disruption risk within the leveraged loan universe. We identify 16% of software loans with high AI risk (Red), 49% with moderate risk (Amber), and 35% with low risk (Green).

Key Takeaways

- AI disruption risk varies considerably within software, more concentrated among weaker credits. Of the ~$250bn outstanding software loans, 16% fall into our highest-risk Red category, with 49% in Amber and 35% in Green. Roughly three-quarters of Red exposure is rated B-/CCC, highlighting an intersection of AI disruption risk and existing credit weakness.
- AI risk is increasingly reflected in valuations, while pricing dispersion remains substantial. Our regression analysis finds that AI risk scores provide statistically significant explanatory power for loan valuations beyond ratings and maturities. Since the initial sell-off earlier this year, repricing of AI risk has become evident. Loans in our Green category have led the rebound and now trade at a weighted-average bid of 97, vs 88 for Amber and 73 for Red. Dispersion also widens sharply with AI risk, potentially reflecting issuer-specific credit events and uncertainty around market assessment of AI risk.
- Refinancing markets remain open but increasingly selective. Successful refinancings and amend-and-extend transactions have eased concerns over market access but largely favored names that screen as lower-AI-risk, albeit often at wider spreads and with stronger lender protections. In contrast, higher-AI-risk borrowers face sharply higher costs, constraining market access, exacerbating default pressure and reinforcing performance dispersion, in our view.
- CLO portfolios have a more defensive AI risk profile than the broader loan market. Of the $133bn software loans held by CLOs in our covered universe, 12% fall into the Red category, vs 16% market-wide. The better quality mix is partly a result of the defensive positioning by CLO managers. Since February, managers collectively have rotated away from Red loans into Green loans, and away from 2028/29 maturities into out-year maturities.
- Quality matters more than quantity in assessing CLO software risk. The composition of software exposure provides greater differentiation than headline sector concentration alone. Deals with greater Red exposure tend to have lower BB MVOC and wider spreads, suggesting underlying AI disruption risk is increasingly relevant to CLO valuations. We remain cautious down the capital stack, emphasizing collateral quality assessment and manager selection.

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Executive Summary

Tech Diffusion

A Morgan Stanley Research Key Theme of 2026

AI disruption is increasingly driving performance tiering in credit. While the initial sell-off was relatively indiscriminate, subsequent rebound and refinancing outcomes suggest the market is becoming more discerning in pricing AI risk. With software representing the largest sector in leveraged loans and CLO portfolios, understanding single-name level exposure to AI disruption becomes key for credit selection.

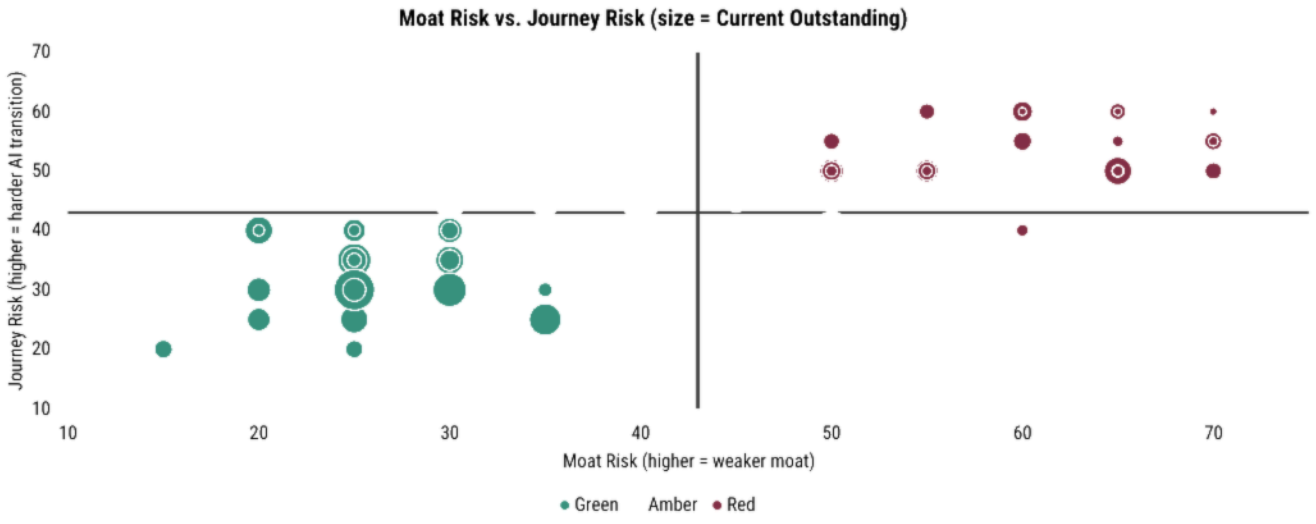
In this report, we adapt the Moat & Journey framework developed by our Software Equity Research colleagues to assess AI disruption risk across the leveraged loan universe. The framework evaluates two complementary dimensions: the durability of a company's existing competitive advantages (**Moat**) and its ability to adapt, innovate, and monetize AI (**Journey**). Given the predominantly private nature of leveraged loan issuers, we leverage AI-powered research tools to systematically assess our software & services universe and cross-validate the results with analysts in Research and in Trading. We acknowledge a few limitations of our assessment: 1) Our data source is limited to publicly available information and 2) PE sponsors' ability in managing their portfolio companies is not explicitly incorporated in the framework. Our objective is to provide a holistic assessment of AI disruption risk, complementing traditional credit fundamental analysis to identify where risks are concentrated across loans and CLO portfolios.

Key Takeaways

AI disruption risk varies considerably within software, with high risk concentrated among weaker credits

Within the $1.6 trillion leveraged loan market, $252 billion (~16%) are in Software and Services and $247 billion are in our mapped universe. **Among the software loans, 16% fall into our highest-risk Red category, 49% in Amber, and 35% in Green.**

Exhibit 1: $54bn (22%) of Software loans fall into the weak-Moat/weak-Journey (upper-right) quadrant



Source: Morningstar, Morgan Stanley Research. Quadrant cut-off at 42.5 the median between the Green cut-off (35) and Red cut-off (50)

Front Office Applications and IT & Tech-Enabled Services exhibit the highest exposure to AI disruption risk, while Back Office and Vertical Applications appear more resilient. Roughly three-quarters of Red exposure is concentrated in B-/CCC-rated loans, highlighting the intersection of AI disruption risk and existing credit weakness.

AI risk is increasingly reflected in loan valuations, but pricing dispersion remains substantial

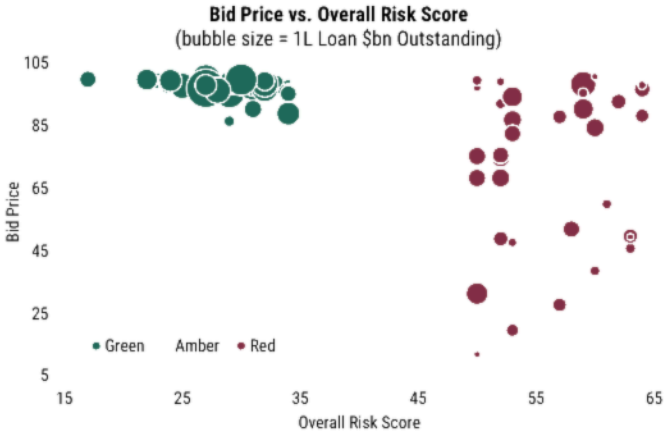
Our regression analysis finds that our AI risk scores provide statistically significant explanatory power for loan valuations. **A 10-point increase in our AI risk score is associated with approximately a 5-point decline in loan prices, controlling for ratings and maturities.** Since the initial sell-off earlier this year, market repricing of AI risk has become evident, with Green band loans leading the rebound and now trading at a weighted-average bid of 97 (as of Oct. 29). By comparison, loans in the Amber and Red bands have lagged at 88 and 73, respectively.

Price dispersion also widens sharply with AI risk. Green loans trade in a relatively tight range, with an interquartile range (IQR) of just 3pts, compared with 13pts for Amber and 45pts for Red, potentially a reflection of issuer-specific credit events and uncertainty around how to assess longer-term AI disruption for some names.

Refinancing markets remain accessible, but lender appetite is increasingly selective

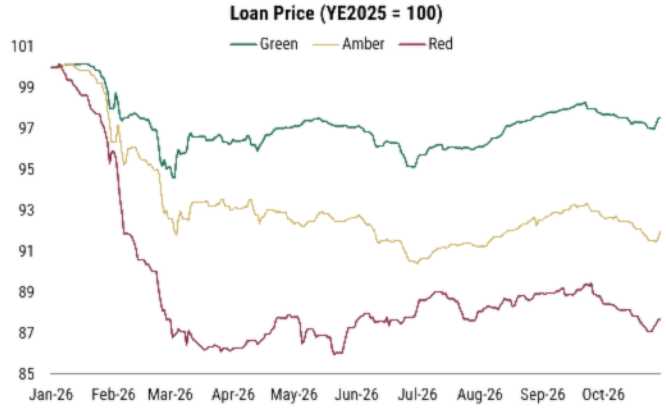
Successful refinancings and amend-and-extend transactions have been concentrated among issuers we categorize as lower AI risk, albeit often at the cost of wider spreads and tighter lender protections. By contrast, borrowers we see as higher-AI-risk face substantially more challenging refinancing economics. **We estimate that Red-band low-B/CCC issuers could face coupon step-ups of roughly 550–1,000bp if they were to refinance near-term maturities today.** With 75% of Red exposure maturing in 2027–29, refinancing pressure could accelerate credit deterioration before AI disruption becomes fully visible in reported earnings.

Exhibit 2: We see greater price dispersion in the higher risk (higher overall score) Software loans.



Source: Morningstar, Morgan Stanley Research

Exhibit 3: The least disruptable (Green) Software names have retraced much of their loss YTD.



Source: Morningstar, Morgan Stanley Research

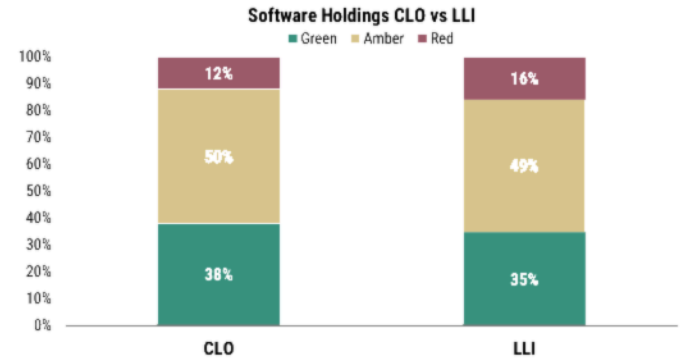
CLO portfolios have a more defensive AI risk profile than the broader loan market

Of the $133 billion of software loans held by CLOs in our covered universe, 12% fall into the Red category, compared with 16% of outstanding software loans. The better quality mix is partly a result of the defensive positioning CLO managers have taken in portfolio management. Since February, managers have collectively net bought Green and Amber loans and net sold Red loans. They have also rotated away from 2028–29 maturities toward longer-dated collateral. In short, they are rotating up in credit quality within software, though potentially at the cost of par erosion.

Quality matters more than quantity in assessing CLO software risk

The composition of software exposure provides greater differentiation than headline sector concentration alone. **Deals with greater Red exposure tend to have lower BB MVOC and wider secondary spreads,** suggesting that underlying AI disruption risk is increasingly relevant to CLO valuations. We see potential for greater loan price volatility as borrowers' ability to manage AI disruption and execute refinancings is tested.

Exhibit 4: CLOs hold a more defensive software mix than the broader loan market



Source: Intex, PitchBook | LCD, Morgan Stanley Research

Exhibit 5: Within software holdings, wider-spread BBs have a higher share in the Red cohort

Spread Quintile	Software (%)	Green (%)	Amber (%)	Red (%)
1st Quintile (525 bp)	11.9%	44.7%	47.8%	7.1%
2nd Quintile (564 bp)	11.9%	41.1%	49.1%	8.2%
3rd Quintile (620 bp)	12.0%	41.1%	50.3%	9.4%
4th Quintile (707 bp)	12.4%	37.6%	50.8%	11.3%
5th Quintile (811 bp)	13.7%	35.1%	50.1%	13.8%

Source: Intex, PitchBook | LCD, Morgan Stanley Research

Looking ahead, we expect AI disruption risk to reinforce performance dispersion across both loans and CLOs.

Given recent refinancing transactions, risks skew toward a better default outcome than we had expected earlier this year. Looking ahead, we see the highest default risk among lower-quality issuers with near-term maturities and elevated AI exposure. Over the medium term, business-model durability, AI execution, and financial flexibility should become increasingly important differentiators.

We favor a more granular assessment of AI risk that looks beyond headline software allocations to the quality, valuations, and maturity profiles of underlying borrowers. For CLOs, we remain cautious down the capital stack, with an emphasis on collateral quality assessment and deal/manager selection. While the aggregate exposure appears manageable, the dispersion in underlying software quality, and the ability of CLO managers to respond without sacrificing collateral value, should drive performance tiering, especially down the capital stack.

The Moat & Journey Framework

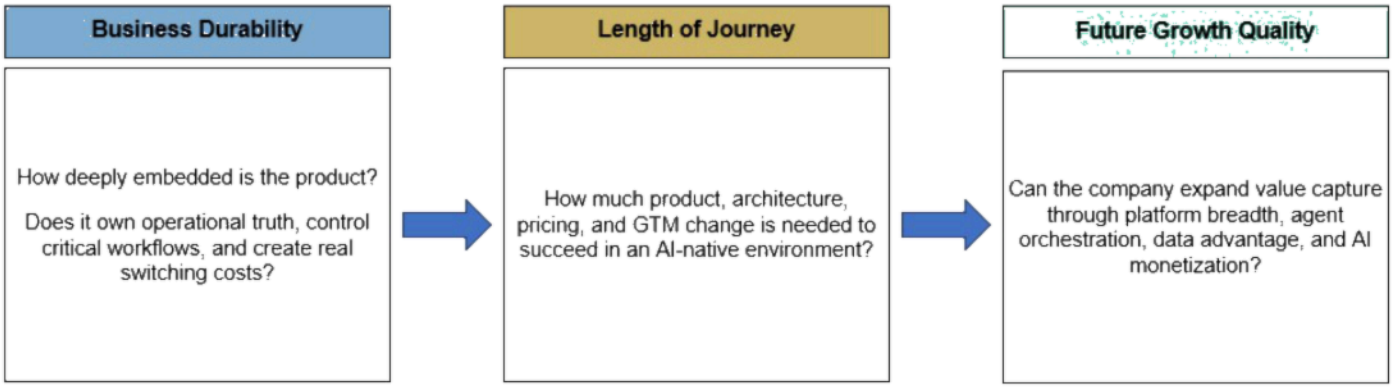
Introducing the Framework

To tackle the difficult question of how much the perceived AI disruption is grounded in fundamental business risk, we turned to the work of our Software equity research colleagues. In July, they published The Moat & The Journey – Assessing Software Durability + Growth in the Age of AI, introducing a framework for evaluating software companies in an AI-driven world. At its core, the framework argues that successfully navigating AI disruption requires two distinct but equally important attributes: a highly defensible and durable business model (the "Moat") and the ability to adapt, innovate, and harness AI to drive future growth (the "Journey").

The framework distinguishes between a company's existing competitive durability and the effort required to position itself for attractive growth in the next cycle. In other words, it is not enough for a software business to be difficult to displace today; it must also be capable of evolving alongside AI and leveraging the technology to strengthen its competitive position over time. **Ultimately, the framework seeks to identify companies that are not only well protected against disruption, but also best positioned to compound value as AI reshapes the industry.**

To systematically evaluate these characteristics, our colleagues developed a proprietary scorecard assessing software companies, with scores capturing both the durability of the existing franchise and its readiness for the next phase of software evolution. **The resulting analysis provides a more differentiated view of AI-related risks and opportunities, distinguishing companies with defensible existing businesses from those with the ability to translate AI adoption into sustained future growth.**

Exhibit 6: The Moat and Journey time line



Source: Morgan Stanley Research

Moat – Assessing Current Business Durability and Defensibility

The Moat measures the durability of a company's existing competitive position, assessing how deeply embedded its products are in mission-critical workflows and how difficult they would be to displace, replicate, or price-compete against, even as AI lowers the cost of software development. Importantly, the analysis distinguishes

between software that serves as a system of record or controls critical business processes and more substitutable point solutions or user-interface-driven applications.

The assessment incorporates a range of factors like **system-of-record strength, workflow criticality, replication difficulty, regulatory/compliance/legal gravity, proprietary data and context, distribution and installed base, domain expertise, network effects, engineering/scale/latency complexity, and pricing power.** Together, these factors capture the degree to which a company's competitive advantages are reinforced by switching costs, proprietary data, operational complexity, customer relationships, and the ability to sustain pricing.

Companies with the strongest Moats typically own operationally critical systems, benefit from substantial data gravity and complex integrations, and operate in environments where trust, accuracy, and regulatory requirements make replacement particularly difficult. Conversely, businesses offering relatively simple, workflow-adjacent functionality with limited proprietary data or switching costs may be more exposed to AI-native competition. **A strong Moat therefore provides protection against disruption, but does not necessarily imply that a company is well positioned to capture the incremental growth opportunity created by AI.**

Journey – Assessing Future Adaptability and AI-Driven Growth Potential

The Journey evaluates how well positioned a company is to benefit from the next phase of software evolution, focusing on the extent of product, architectural, pricing, and go-to-market changes required to compete and grow in an AI-native environment. Whereas the Moat assesses how difficult a business is to disrupt today, the Journey considers whether that business can successfully adapt its operating model and competitive positioning as software becomes increasingly agentic, API-driven, and oriented toward consumption and outcomes rather than traditional user seats.

The assessment incorporates factors such as **pricing model transition, platform versus point-solution positioning, technical debt status, R&D velocity and quality, agent/headless/API strategy, agent orchestration rights, responsiveness to prior platform changes, proprietary AI model and data advantages, financial position, and agentic AI roadmap maturity.** These factors collectively assess the company's capacity to innovate, modernize its technology stack, expand its platform offering, capture value from AI-driven workflows, and fund the investments required to remain competitive.

Companies with stronger Journey scores generally possess modern architectures, broad platform capabilities, effective R&D organizations, and credible strategies to monetize AI through consumption, workflow automation, or outcome-based pricing. Importantly, they are not simply incorporating AI features into existing products, but positioning themselves to capture a greater share of customer value as AI expands the scope of work software can perform. Conversely, companies with significant technical debt, slower innovation cycles, limited platform breadth, or greater dependence on legacy seat-based pricing may face a longer and more challenging transition before AI contributes meaningfully to growth.

Taken together, the Moat and Journey provide a framework for distinguishing businesses that are merely protected by their existing competitive advantages from those capable of sustaining and potentially accelerating growth through the AI

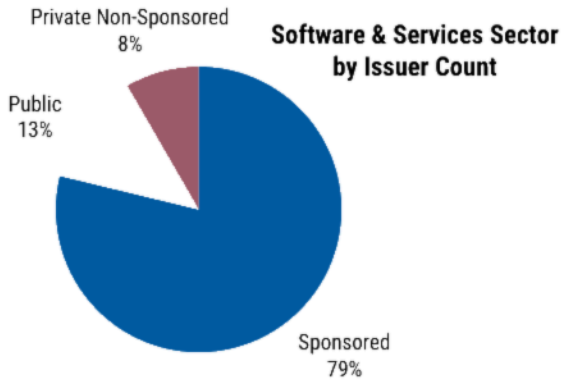
transition. The most attractive companies combine strong defensibility today with a relatively short Journey toward AI monetization, while companies with strong Moats but longer Journeys may remain fundamentally durable despite facing a more extended path to growth reacceleration.

Applying the Framework to Software Loans

While the fundamental risks facing Software businesses are no different in the leveraged loan and equity markets, the availability of information is. As of October, 131 issuers in the leveraged loan index are classified by PitchBook within the Software & Services sector. Of these, just 13% are publicly traded, with the remaining issuers privately held and predominantly sponsor-backed.

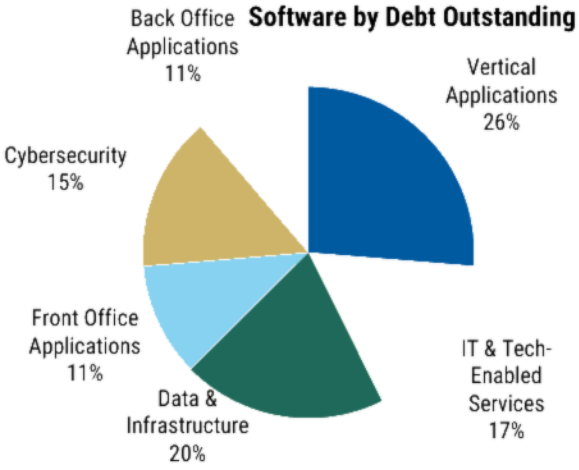
This limited disclosure presents a unique challenge in applying an equity-oriented framework to the loan market. **Our model therefore adapts the underlying "Moat and Journey" considerations to account for this structurally narrower information set, placing greater emphasis on business models and qualitative competitive characteristics while reducing reliance on financial metrics that are often unavailable for private issuers.**

Exhibit 7: Only 13% of Software loan issuers are publicly traded



Source: Bloomberg, Morgan Stanley Research

Exhibit 8: Vertical Applications is the largest subsector in the Software & Services sector, followed by Data & Infrastructure



Source: Bloomberg, Morgan Stanley Research

To translate the "Moat and Journey" framework into a structured scoring model, we drew on our Software equity research team's analysis and key debates to break each of the two overarching pillars into five distinct subpillars. Each subpillar is designed to assess a specific dimension of an issuer's exposure to AI disruption, guided by the following key questions:

Moat - *How durable are the existing business's defenses when AI makes software easier to build, access, automate or substitute?*

- Workflow & System-of-Record Embeddedness
  - *Does the product own essential operational truth and workflows that remain necessary even when agents replace the human interface?*

- Replication Barriers, Domain Expertise & Engineering
  - *Can a credible AI-enabled competitor reproduce the complete domain-specific production service, not merely its code or visible features?*
- Proprietary Data, Trust & Regulatory Gravity
  - *Do usable proprietary context and genuine trust, governance, or compliance requirements protect a role that alternatives cannot readily bypass?*
- Distribution, Installed Base & Network Effects
  - *Do established customer access, deployment and genuine ecosystem effects materially impede AI-enabled displacement?*
- Pricing Power & Value Capture
  - *Can the incumbent retain a defensible share of customer value as functionality, interfaces and competitive alternatives change?*

Journey - *How much change is needed, and how credible is the company's ability to complete that change before AI pressure materially erodes the existing business?*

- Pricing, Monetization & AI Adoption
  - *Can the company preserve monetization and convert the AI capabilities it actually needs into useful, paid and economically relevant adoption before the core is cannibalized?*
- Platform Position, Agent Access & Orchestration
  - *Does the company have a viable position in the agentic software stack, including agent access, platform participation and an economically durable orchestration or specialist role?*
- Technical Architecture & AI/Data Readiness
  - *Can its technology and usable data support the required AI response without an impractical rebuild, migration or dependency?*
- Innovation, Execution & Change Responsiveness
  - *Can the organization execute the required product, commercial and internal operating changes reliably and fast enough?*
- Financial Capacity & Sustainable AI Economics
  - *Can the financed business fund the necessary transition and sustain cash-generating economics as AI serving, verification and reinvestment costs evolve?*

We scored each issuer on each subpillar, with 1 being the least risky and 5 being the most at risk. We then averaged the subpillar scores and then combined the two themes, giving 60% to Moat and 40% to Journey. We assign a slightly higher weight to Moat because it better captures near- to medium-term disruption risks and the direct feeds-through to credit fundamentals, whereas the journey reflects a company's position through the AI adoption cycle, which is more relevant over the medium to long term and inherently more dynamic as corporate strategies evolve.

We take a weighted average of the two subpillar scores to reach a composite score per issuer, rescaling it into 0-100. We then bucket into 3 risk bands: Green (low risk) for scores below 35, Amber (modest risk) for scores of 35-50, and Red (high risk) for scores above 50. Note that these thresholds are somewhat arbitrary. Loosely speaking, a composite score below 35 corresponds to scores of 2 or below across most subpillars. A score over 50 generally implies most subpillar scores of 3 or higher.

Methodology and Caveats

Given the breadth of our universe of 131 issuers, the limited disclosure available for many private companies, and the fact that we are not single-name credit analysts, we leveraged AI-powered research tools to systematically assess and score each issuer. We developed a detailed, standardized prompt incorporating the framework and scoring criteria outlined above, directing the AI models to gather relevant issuer-level evidence, consolidate findings, evaluate each business against the five subpillars, and ultimately assign risk scores.

The underlying evidence was sourced from SEC filings wherever available, supplemented by company websites, press releases, news coverage, and third-party articles. Importantly, we explicitly distinguished between company-reported AI initiatives and independently demonstrated capabilities, treating management commentary on AI adoption as an input to the assessment rather than accepting such claims at face value.

We also deliberately limited the use of rating agency reports in constructing our scores. While valuable for assessing near-term , these reports tend to emphasize liquidity, maturity walls, and refinancing risk rather than the medium- to long-term structural vulnerabilities that are the focus of this exercise. Indeed, we found that relying too heavily on rating agency commentary introduced a bias toward issuers facing immediate credit pressures, potentially conflating financial distress with underlying business model disruption risk.

To validate the model's outputs, we cross-referenced issuer-level AI risk scores and classifications with the views of internal analysts across Equity and Fixed Income Research, as well as our Credit Trading desk. The broad alignment between the model's assessments and independently formed views on individual credits provides additional confidence in the framework's ability to capture relative exposure to AI disruption and differentiate risk across issuers.

Finally, given the high concentration of sponsor-backed businesses in our universe, we highlight that sponsors' strategy, their resources and operational expertise could play a meaningful role in shaping outcomes. Sponsors may be able to leverage experience, technology, and best practices from other companies within their portfolios to accelerate AI adoption, improve operational efficiency, or reposition businesses facing greater disruption risk. Our scores should be viewed as a snapshot of each issuer's current structural vulnerability rather than a static assessment of its long-term prospects. **As AI capabilities continue to evolve and companies invest in adapting their products and business models, an issuer's relative exposure to disruption could change meaningfully over time.**

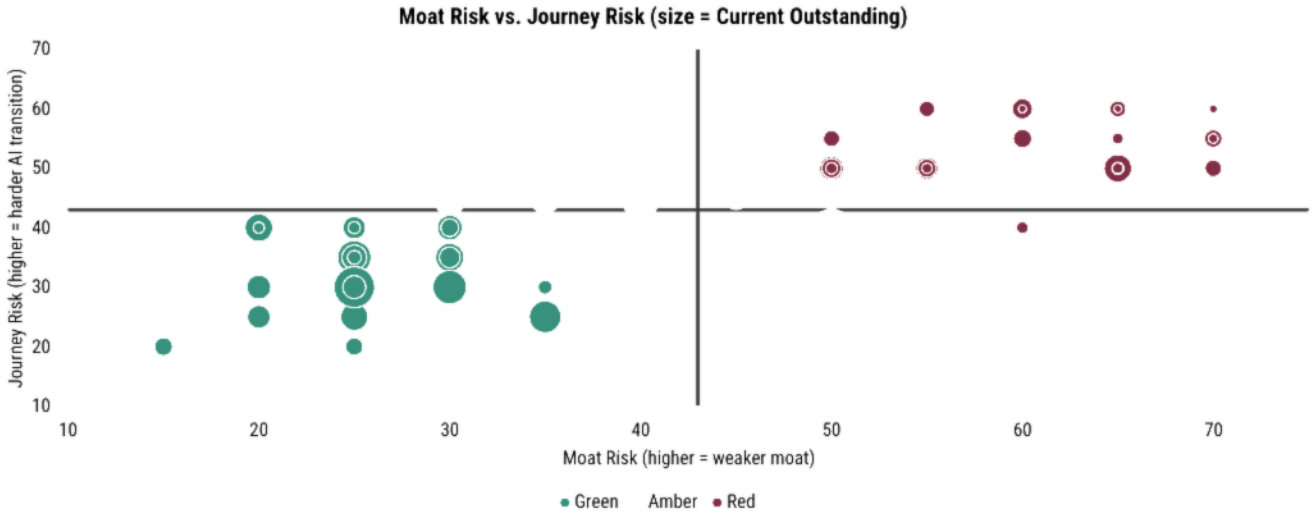
AI Risk Assessment Results

Red (16%), Amber (49%), Green (35%) within Software Loans

Based on the aforementioned framework, we assign a composite score (0-100) to each software name and bucket them into Red, Amber and Green AI risk bands. Of the 131 issuers in the Software & Services sector, as defined by PitchBook LCD, we identified 29 as facing high AI-disruption risk (Red), 67 with moderate exposure (Amber), and 35 as relatively well-positioned to withstand AI disruption (Green). **By outstanding par, 16% of software debt falls into Red, compared with 49% into Amber and 35% into Green.**

There is tight correlation between Moat and Journey scores. Red names typically score high on both dimensions. The reverse holds for Green names. Amber names, however, tend to score as higher risk in either Moat or Journey pillar.

Exhibit 9: $54bn (22%) of Software loans fall into the weak-Moat/weak-Journey (upper-right) quadrant



Source: Morningstar, Morgan Stanley Research. Quadrant cut-off at 42.5 the median between the Green cut-off (35) and Red cutoff (50)

AI Risk Composition Varies Across Subsectors

Looking under the hood, we assess AI vulnerability across business lines within software. Specifically, we break down Software & Services into 6 business archetypes, mirroring the list of subsectors tracked by our Equity research colleagues. These archetypes are defined as follows.

- **Cybersecurity (19 companies)**: Companies primarily focused on protecting networks, systems, identities, applications and data from cyber threats, including security software, identity management and data protection platforms.
- **Data & Infrastructure (19):** Providers of foundational software and platforms used to operate, manage, connect and analyze IT infrastructure, including data management, cloud infrastructure, DevOps and IT operations tools.
- **Vertical Applications (39):** Providers of industry-specific software and technology platforms designed to address specialized workflows, regulatory requirements and

operational needs within particular sectors, including financial services, insurance, real estate and healthcare.

- **Front Office Applications (19):** Providers of horizontal software supporting customer-facing functions, including sales, marketing, customer engagement, communications and e-commerce.
- **Back Office Applications (13):** Providers of enterprise software supporting internal business operations, including ERP, HR, payroll, finance, procurement and workflow automation, often characterized by high switching costs and deeply embedded systems of record.
- **IT & Tech-Enabled Services (22):** Companies primarily generating revenue through IT consulting, systems integration, managed services, outsourcing and other technology-enabled services rather than proprietary software licensing.

We found that *Front Office Applications* and *IT & Tech-Enabled Services* carry the most AI risk. *Front Office Applications* also has the largest Red share, at 32% of outstanding (vs 16% for overall). Many names in the archetype are providers of horizontal software, in line with the market perception that such business models are more prone to AI disruption. *IT & Tech-Enable Services* is rather bifurcated, with high shares of both Red and Green loans.

In contrast, ***Back Office* and *Vertical Applications* look the most AI resilient,** with the lowest risk scores (40 and 37, respectively). *Vertical Applications* screens the lowest in both Moat risk and Journey risk and has relatively defensible business model, with regulated systems of record, multi-sided networks, proprietary data and payment anchors, while the AI journey for many names is relatively short. *Back Office Applications* scores second lowest as many companies own strong system-of-record and compliance moats, and pricing model transition is already in place.

Exhibit 10: IT & Tech-Enabled Services and Front Office Apps have the highest risk of being disrupted by AI according to our Framework, with Front Office having the highest % of loans in the Red risk band

Archetype	# Issuers	Outstanding ($bn)	Avg Moat Risk	Avg Journey Risk	Wtd Avg Overall Risk	Wtd Avg Bid	% Out. Distressed	% Out. Red	% Out. Maturing ≤2029
Vertical Applications	39	$64.9	33	41	37	91	10%	11%	42%
IT & Tech-Enabled Services	22	$40.4	45	47	46	94	5%	15%	33%
Data & Infrastructure	19	$48.2	42	45	43	83	23%	13%	40%
Front Office Applications	19	$28.7	48	44	46	89	16%	32%	28%
Cybersecurity	19	$36.7	41	41	41	87	25%	20%	51%
Back Office Applications	13	$27.8	38	42	40	90	19%	12%	24%
Total / Sector	**131**	**247**	**41**	**43**	**42**	**89**	**16%**	**16%**	**38%**

Source: Morgan Stanley Research

Higher AI Risk Concentrated Among Lower-Rated Loans and Near-Term Maturities

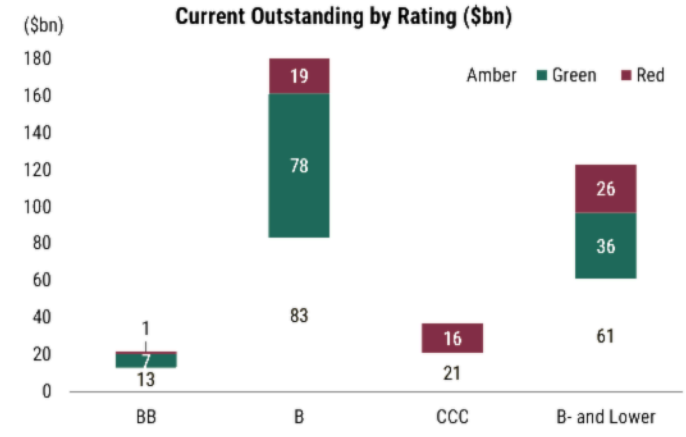
AI risk is ly concentrated among lower-rated software borrowers. Red-band loans account for ~40% of the $37 billion CCC-rated cohort, compared with just 7% of BB and 11% of B-rated loans. Notably, there are no Green loans in the CCC cohort. Overall, $26 billion, or 72% of the $37 billion Red cohort with ratings are rated B- or lower, underscoring the sizable overlap between structural AI vulnerability and existing credit weakness.

The maturity profile further compounds these risks. Of the $39 billion of Red-band

loans, $30 billion (~75%) mature in 2027–29, compared with just 38% of the broader software universe. **The pressure point is 2028–29.** These two years account for $90 billion of maturities, where $28 billion (31%) are labeled as Red, highlighting the refinancing burden facing higher-risk issuers.

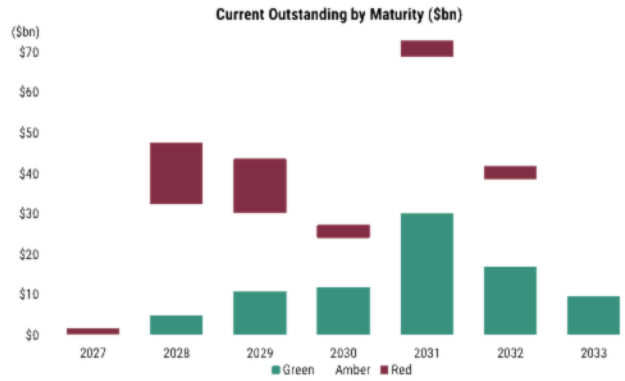
By contrast, longer-dated maturities exhibit a more resilient risk profile. 2031 is the biggest single year at $72 billion, but only 5% of it is Red and 42% is Green. Red exposure falls to zero for more recent vintages (e.g., 2033 maturities).

Exhibit 11: Roughly 3/4 of the Red cohort is rated B- or below



Source: PitchBook, Morgan Stanley Research

Exhibit 12: The 2028/29 maturities have high Red concentration (31%)



Source: PitchBook, Morgan Stanley Research

Taken together, in our view, the immediate concern for software borrowers with exposure to AI disruption risk is refinancing capacity rather than realized business-model disruption. Issuers with 2028–29 maturities face a particularly narrow window to demonstrate earnings resilience, execute credible AI strategies, or secure additional runway before returning to capital markets. **This creates a channel through which longer-term AI uncertainty can potentially accelerate near-term credit deterioration, even before its full impact becomes evident in operating fundamentals.**

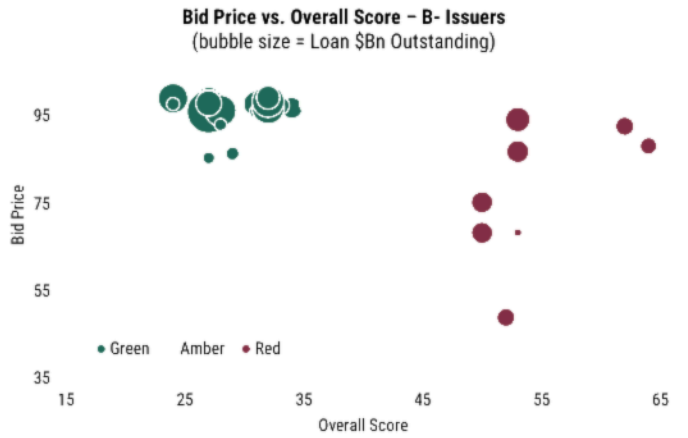
Loans with Higher AI Risk Trade with Wider Dispersion

Loan valuations show clear differentiation across AI risk bands. Currently, the weighted average bid tracks 97 (median 98) for Green, 88 (median 95) for Amber, and 73 (median 76) for Red - a 25pt gap from the lowest to highest risk band.

Widening dispersion down the AI risk spectrum is equally notable. Green loans trade in a relatively tight range, with an interquartile range (IQR) of just 3 points, vs 13 points for Amber and 45 points for Red. The middle 50% of Red loans trade between approximately 50 and 94, highlighting the wide range of valuations among issuers facing elevated AI risk.

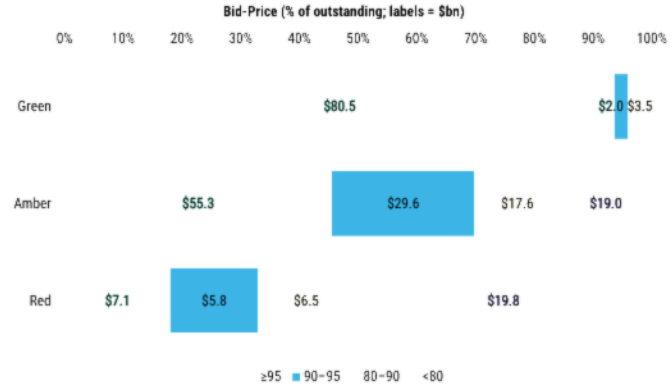
We attribute this dispersion to two factors. First, traditional credit considerations, including leverage, liquidity, refinancing capacity, and issuer-specific restructuring developments, continue to influence valuations alongside AI risk. Second, considerable uncertainty remains around how to price longer-term AI disruption. **Red-band loans still trading near par warrant particular scrutiny, in our view, as current valuations may not fully reflect the potential for longer-term business-model disruption.**

Exhibit 13: We see wide dispersion in pricing in the Amber and Red buckets, even when controlling for ratings



Source: PitchBook, Morgan Stanley Research; Only first lien loans shown

Exhibit 14: ~$20bn of Red risk loans trade at distressed levels, vs. none in the Green bucket



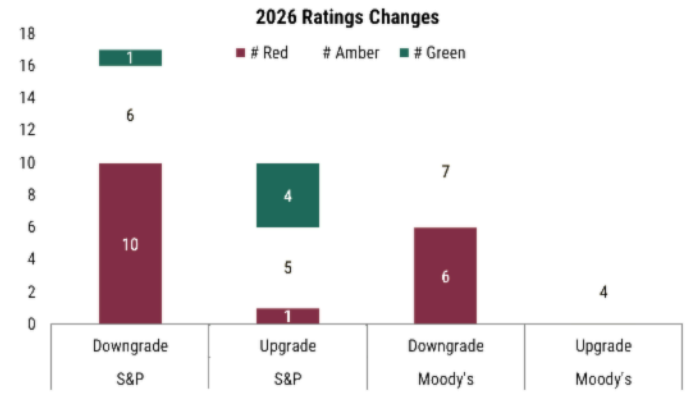
Source: PitchBook | LCD, Morgan Stanley Research

Downgrades YTD Skewed to Names with High AI Risk

Although our AI risk framework deliberately excludes in-place credit fundamentals, YTD 2026 rating actions show a notable alignment with our assessment of AI risk. **Downgrades in the sector have a clear skew to names that we find to have high AI disruption risk.** Of the 22 software issuers downgraded (by S&P or Moody's) YTD, approximately half fall into our high-risk Red band, despite representing just 22% of the 131-issuer universe. Only one downgraded issuer is classified as Green. On the flip side, upgrades show the opposite pattern. 9 of the 10 upgraded issuers fall into the Green or Amber bands, with only one classified as Red.

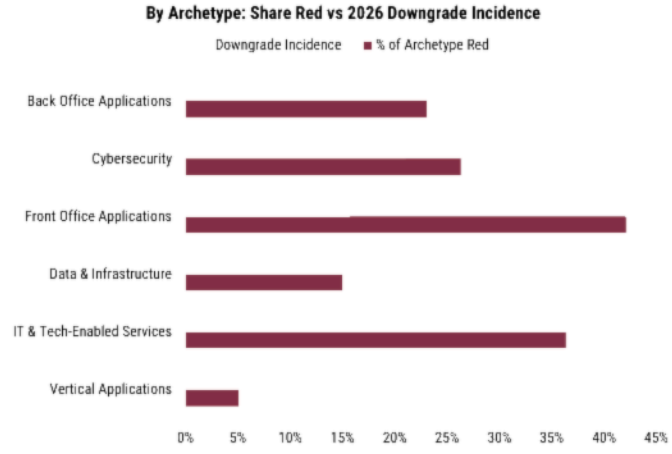
While AI disruption has yet to materially affect reported fundamentals, the alignment between rating actions and our AI risk scores suggests that structural vulnerabilities are increasingly relevant to credit outlooks. Importantly, this does not establish AI disruption as the direct cause of downgrades, but highlights how longer-term business-model uncertainty may compound existing credit weaknesses.

Exhibit 15: Downgrades by S&P and Moody's this year have largely occurred for the issuers in our Red cohort



Source: S&P, Moody's, Bloomberg, Morgan Stanley Research

Exhibit 16:S Back Office Apps have the highest downgrade incidence this year



Source: S&P, Moody's, Bloomberg, Morgan Stanley Research

What's In the Price?

AI Risk Matters in Loan Valuations

Our analysis suggests that AI disruption risk has become an important differentiator in software loan pricing. As noted earlier, AI risk appears to be reflected in loan pricing to some extent, as evidenced by the negative relationship between our AI risk scores and loan prices. To quantify this relationship, we conduct a multivariate regression of loan bid prices on AI risk scores, controlling for issuer credit ratings and maturity profiles. **Bottom line, our AI risk score is a statistically significant explanatory factor in loan valuations beyond traditional credit metrics.**

Results are summarized in Exhibit 17. Incorporating AI risk scores improves model fit (adjusted R-squared up by 4-6pp), suggesting that AI risk contains additional information on loan pricing beyond what is captured by conventional credit metrics (e.g., ratings and maturity). Moreover, AI risk exhibits a statistically significant negative relationship with loan prices. Specifically, **an incremental 10pt increase in AI risk score is associated with a ~5pt decline in loan price, holding credit rating and maturity constant.**

Exhibit 17: Regressions of loan bid prices on AI risk scores, pre-2028 maturities and rating dummies

	(1)	(2)	(3)	(4)	(5)
AI Score Overall	-0.78		-0.41		-0.49
	(0.14)		(0.12)		(0.12)
Pre-2028 Maturities				7.52	9.49
				(3.20)	(3.20)
Rating_B+		-3.84	-4.24	-3.58	-3.98
		(1.25)	(1.97)	(1.55)	(2.33)
Rating_B		-3.85	-3.62	-4.28	-4.12
		(1.16)	(1.49)	(1.32)	(1.60)
Rating_B-		-8.88	-8.90	-9.75	-10.01
		(1.81)	(1.85)	(2.00)	(2.02)
Rating_CCC or below		-32.24	-27.80	-34.72	-30.18
		(4.52)	(4.90)	(4.47)	(4.74)
Constant	119.79	98.89	115.18	98.01	116.85
	(5.11)	(0.48)	(4.63)	(0.80)	(4.71)
Observations	153	153	153	153	153
R-squared	19%	39%	43%	42%	48%
Adjusted R-squared	19%	37%	41%	39%	45%

Note: Standard errors in parentheses.

Source: Bloomberg, PitchBook LCD, Morgan Stanley Research. Note: Regression (1) - (5) corresponds to linear regressions of loan bid prices on the given list of variables, including AI risk scores, pre-2028 maturities, and rating dummies

Although AI risk is increasingly reflected in valuations, price dispersion remains wide especially for the higher risk cohorts. To identify potential relative-value dislocations, we compare observed loan prices with levels implied by our regression models, incorporating AI risk scores, credit ratings, and maturities.

Exhibit 18 summarizes the prediction errors (difference between actual and model-implied price) by archetype and by AI risk bands. In particular, **our results suggest that *IT services* has a relatively high concentration of loans trading rich (> +5pt above model implied levels), while *Cybersecurity* and *Data & Infrastructure* have meaningful share**

of loans screening cheap (< -5pt to model implied levels). Within the Red risk band, the distribution is particularly wide, with approximately 34% of loans screening rich and 45% of loans screening cheap.

We are cognizant that these findings should be viewed as potential relative-value signals rather than definitive evidence of mispricing. Pricing deviation may reflect differences between market perception of AI risk and ours, but could also arise from other factors not captured in the model, including loan-specific catalysts. Nevertheless, we think the framework provides a useful starting point for identifying credits where market valuations appear inconsistent with their assessed structural AI vulnerability, warranting further fundamental analysis.

Exhibit 18: Summary of prediction errors by business archetypes and by AI risk bands

Table: Model-Implied Mispricing by Group

Group	N	Mean Pred. Error	Median Pred. Error	% Cheap	% Rich
Panel A: By Archetype					
Back Office Applications	13	-1.70	0.32	30.8%	23.1%
Cybersecurity	22	-1.65	0.69	36.4%	22.7%
Data & Infrastructure	23	-1.72	0.39	30.4%	17.4%
Front Office Applications	25	-0.33	0.73	28.0%	24.0%
IT & Tech-Enabled Services	25	4.13	5.80	16.0%	52.0%
Vertical Applications	45	0.07	1.34	22.2%	28.9%
Panel B: By Color					
Green	38	-0.24	-0.69	18.4%	15.8%
Amber	77	1.25	2.25	20.8%	32.5%
Red	38	-2.28	1.11	44.7%	34.2%

Note: N number of observations. Prediction error regression residual: positive values indicate the observation screens rich relative to the model. negative values cheap. % Cheap / % Rich share of observations in each group classified as cheap / rich.

Source: Bloomberg, PitchBook LCD, Morgan Stanley Research

Market Is Increasingly Differentiating Credits by AI Risk

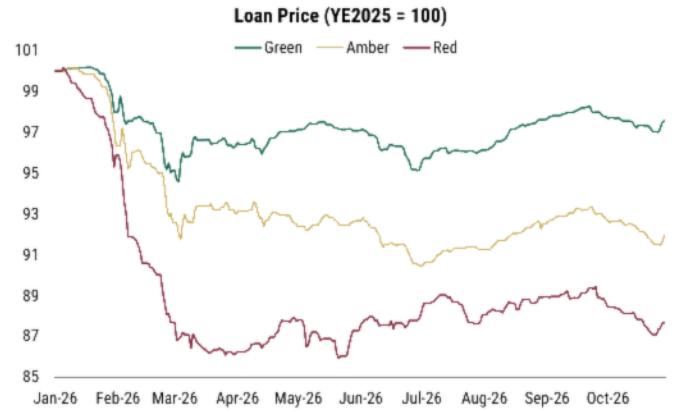
While the software sell-off earlier this year appeared largely indiscriminate, the subsequent recovery has been increasingly differentiated. This suggests that the market is no longer treating software exposure as a uniform risk; rather, **valuations increasingly reflect differences in competitive positioning, AI readiness, and the quality of borrowers' strategic responses.**

Loans with lower AI risk experienced a more robust recovery. Loans in the Green Band have led the rebound, collectively retracing around half of the price declines from the March trough. In contrast, while Loans in the Amber and Red bands participated in the initial selloff, they subsequently reached new lows in June and May respectively, and have since recovered meaningfully less than the Green cohorts.

As a result, price tiering across AI risk bands has widened over time, highlighting, we think, the growing relevance of AI risk in loan valuations. At the aggregate level, the price gap between the Green and Red Bands has expanded from 17 pt to 25 pt.

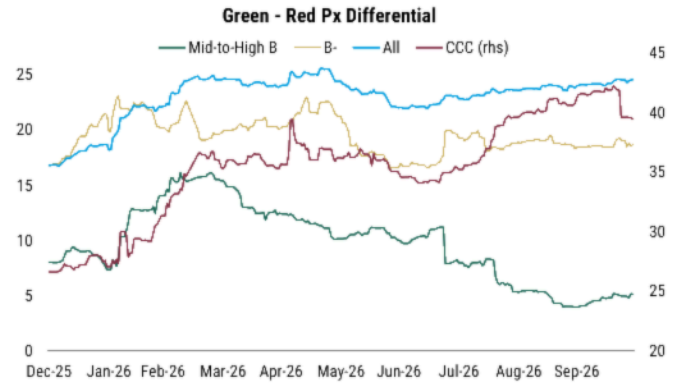
Importantly, the widening valuation gap across AI risk bands is most pronounced among lower-rated borrowers. Within the CCC-rated software cohort, the price differential now reached 40 points, compared with 27 points at the beginning of the year. By contrast, the gap has narrowed among mid-to-high single-Bs. **This suggests that market sensitivity to AI risk is particularly acute among fundamentally challenged borrowers, where AI disruption may compound existing credit vulnerabilities.**

Exhibit 19: The least disruptable (Green) Software names have retraced much of their losses YTD.



Source: Morningstar, Morgan Stanley Research

Exhibit 20: Low quality Software borrowers have seen significant widening between Green and Red loan prices.



Source: PitchBook, Morgan Stanley Research

Exhibit 21:

Below we compare current debt-weighted average bid prices with their YTD lows and year-end 2025 levels, highlighting the extent of the recovery across AI risk bands and software subsectors.

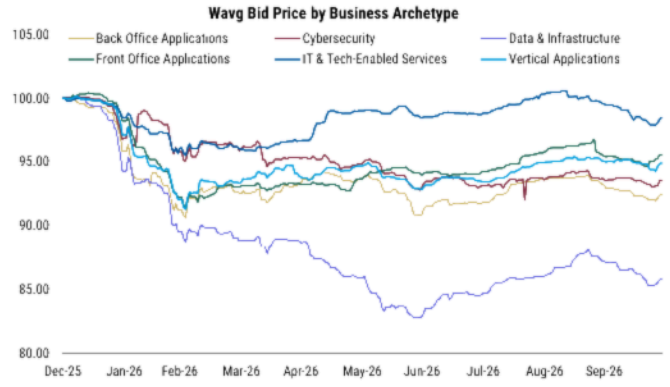
	Current Wavg. Bid Price	YTD Low Wavg. Bid Price	Low Date	YE 25 Bid Price	Band Level Drawdown Retracement (%)
Green	97	94	3/3/2026	100	**55**
Amber	88	87	6/30/2026	96	**17**
Red	73	71	5/21/2026	83	**12**
Sub-Sectors					
Back Office Applications	90	88	3/3/2026	97	**19**
Cybersecurity	87	86	8/21/2026	93	**19**
Data & Infrastructure	83	80	6/26/2026	97	**18**
Front Office Applications	89	85	3/3/2026	93	**48**
IT & Tech-Enabled Services	94	91	3/3/2026	95	**67**
Vertical Applications	91	87	3/3/2026	96	**42**

Source: PitchBook, Morgan Stanley Research; As of 10/29/2025

Performance dispersion is also evident across software business archetypes, although the narrative is more nuanced. Despite relatively elevated average AI risk scores, IT & Tech-Enabled Services has recovered much of its earlier losses, supported by strong performance in several large names. Rackspace's $1.6 billion term loan B has rallied 39pt from its March low, from 45 to 84pt today - in our view this was likely due to a combination of its opportunistic repurchasing, AI partnerships and a 15% head count reduction. Peraton's $5.7 billion term loan B (the largest security by par in the sub-sector) has also seen price appreciation from 84 in March to 91pt today. Finally, Gainwell's new term loan B gained 5pt after its refinancing transaction in August.

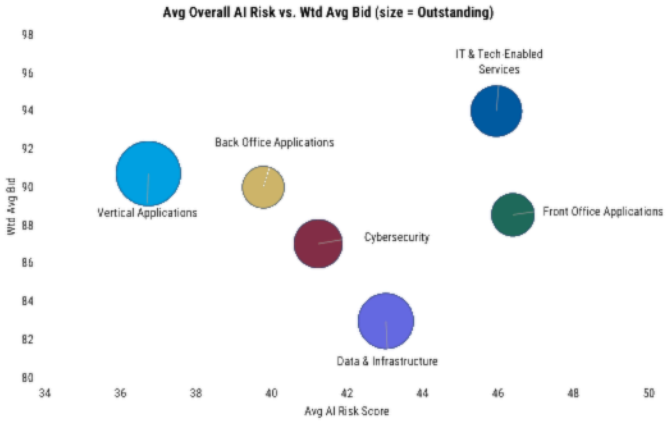
The divergence underscores the importance of issuer-specific developments in driving subsector performance, even within business archetypes facing elevated structural AI risk. In other words, **strong price recoveries do not necessarily imply that longer-term AI disruption concerns have receded.**

Exhibit 22: Performance tiering exists at the business archetype level



Source: PitchBook, Morgan Stanley Research; Only first lien loans shown

Exhibit 23: IT & Tech Enabled Services loans are currently trading at the highest level on average due to idiosyncratic events related to a few issuers

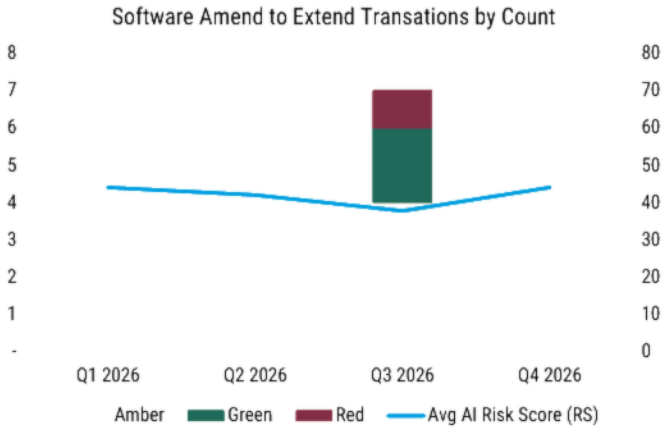


Source: PitchBook, Morgan Stanley Research

Refi Market Remains Accessible, but High-AI-Risk Names Face Increasingly Challenging Economics

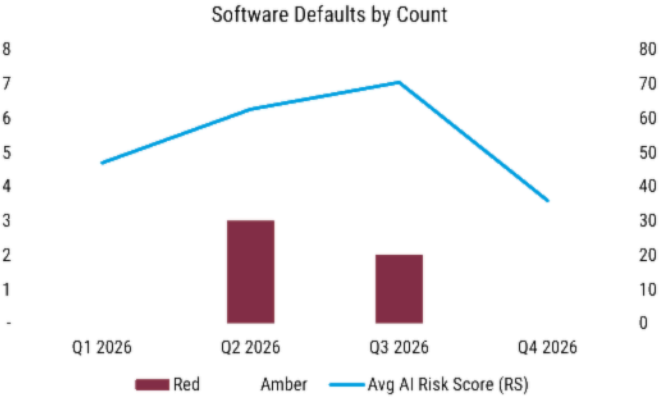
Contrary to earlier concerns over a broad-based closure of capital markets for the sector, refinancing markets remain accessible, especially to fundamentally stronger software borrowers. That said, lender appetite has become increasingly selective. **Successful refinancings and amend-and-extend transactions have been concentrated among issuers that we score relatively low in AI disruption risk (** Exhibit 26 **). Out of the 11 completed transactions in the Software and adjacent sector, 10 fall into our Green or Amber AI risk bands, with scores of 30–44.** These include two Green issuers (Proofpoint and Sophos) and eight Amber issuers (athenahealth, Gainwell, CoreLogic, Paysafe, Imprivata, Gen Digital, Nord Security, and Ensono). The sole Red issuer (Conga) sits at the threshold between medium and high risk (AI risk score 50) and secured refinancing only on its second attempt, following an unsuccessful effort earlier this year.

Exhibit 24: Most amend to extend transactions this year have been by mid to low risk names...



Source: Bloomberg, Pitchbook | LCD, Morgan Stanley Research

Exhibit 25: ... whereas defaults/DEs have been in mid to high risk issuers, per our framework.



Source: Bloomberg, Pitchbook | LCD, Morgan Stanley Research

Even for borrowers able to access the market, maturity extensions have come at a meaningful cost. Recent amend-to-extend deals have pushed maturities out by 1–3 years, but with spread step-ups of roughly 50–225bp. Ensono was at the low end (+50bp) and Paysafe at the high end (+225bp, with the loan downsized). Some transactions also featured discounted issuance prices, with OIDs of 95–97 (Paysafe, Sophos), and tighter lender protections, including Proofpoint's omni-blocker provision.

Other issuers diversified their funding instead. Gainwell refinanced into new loans and high-yield bonds in the mid-9% range, and athenahealth carved out $500 million of 7.5% secured notes. Nord Security was the only issuer to reprice its 2032 loan tighter (–50bp), and it stands out as an exception. **Overall, these transactions suggest refinancing capacity remains available, but increasingly on terms that reflect greater lender selectivity and demand for creditor protection.**

Exhibit 26: Successful refinancing and amend to extend transactions YTD.

Issuer Info			Debt Level Info				Credit Event Info			
Issuer	Sector	AI Risk	CUSIP	Description	Maturity Date	Rating	Event Date	Event Type	Short Description	Cost
Ensono LP	IT Services	Amber	29359DAB3	ENSONO TL B 1L USD	5/26/2028	B2 / B	10/22/2026	Amend to Extend	Priced $1.4bn 1L TL A&E deal to extend maturity by a year, increased coupon 50bp to S+450	50bp
Nord Security	Software	Amber		CYBEBV TL B 1L USD	10/8/2032	B1 / BB	10/8/2026	Refinanced	Refinanced its TLB from S+400 to S+350 with the same maturity (new FIGI: BBG025BDSSS3)	-50bp
Sophos Ltd.	Software	Green	86875TAE7	SOPHLN TL B 1L USD	3/5/2027	B3 / B-	9/24/2026	Amend to Extend	Amend-to-Extend by 2yr. USD and EUR loans. Coupon to step up from S+350 to S+500/525, OID 97. Sponsor indicated no additional capital to business	150bp
Apttus Corp. (Conga)	Software	Red*	03835XAD4	APTCOR TL B 1L USD	5/8/2028	B3 / B	8/21/2026	Refinanced	Existing lenders repaid at par, refinanced to 2033; part of $625m facility backing Conga's PROS acquisition plus $548m existing debt; failed to refinance earlier this year	-
Gainwell Acquisition Corp	IT Services	Amber	59909TAC8	GAINAC TL B 1L USD	10/1/2027	WR / NR	8/11/2026	Refinanced	Refinanced into new 5yr HY and Loans. Coupon up from S+400 to S+450-475, HY mid 9%s	-
Optimal Payments Plc (Paysafe)	IT Services	Amber	70451NAB2	PSFE TL B1 1L USD	6/28/2028	B2 / B	8/10/2026	Amend to Extend	A to E by 2 yrs; downsized $651m / EUR478m TLBs at S/E+500, 95.0 OID (from S+275)	225bp
athenahealth Inc	Health Care Technology	Amber	04686RAB9	ATHENA TL B 1L USD	2/15/2029	B2 / B	7/31/2026	Amend to Extend	Refinanced 2029 TLB (S+275) into $500m 5.5NC2 secured notes (7.5%) plus $1.04bn TLB due 2032 at S+325	50bp
Proofpoint Inc	Software	Green	74345HAJ0	PFPT TL B 1L USD	8/31/2028	B2 / B	7/28/2026	Amend to Extend	Refinancing, Maturity Extended by 2 yrs, Coupon up from S+300 to S+450, Stronger Protection (omni blocker) | only one major investor opted not to refi	150bp
Corelogic	Professional Services	Amber	21870FBA6	CLGX TL B 1L USD	6/2/2028	B2 / NR	7/20/2026	Amend to Extend	Maturity Extended by 3 yrs, Coupon up from S+350 to S+425, Stronger Protection	75bp
Imprivata Inc.	Health Care Technology	Amber	45323KAG5	IMPR TL B 1L USD	12/1/2027	WR / NR	6/26/2026	Amend to Extend	A to E, Maturity Extended by 2 yrs, Coupon up from S+300 to S+375	75bp
Gen Digital Inc	Software	Amber	66877AAF5	GEN TL B1 1L USD	9/12/2029	Ba2 / BB	3/27/2026	Amend to Extend	Maturity extension on 2027 TLA to 2032; $1.5bn RCF and portion of Tranche A extended to Mar-2031	-

Source: Bloomberg, PitchBook | LCD, Morgan Stanley Research. The framework proposed here is not an investment recommendation. It is meant to capture one dimension of credit risk – the AI risk of companies. It does not purport to talk about other risks that are also pertinent to loan valuation. Investors should consider many factors when evaluating a loan. *Based on our framework Conga scores on the Amber/Red threshold (50).

At the other end of the AI risk spectrum, refinancing options remain severely constrained. Of the 7 defaults recorded across software and adjacent sectors this year, 5 score in Red and 2 in Amber. This concentration suggests that borrowers facing both elevated AI disruption risk and deteriorating credit fundamentals have substantially more limited access to conventional refinancing solutions.

Exhibit 27: The seven defaults we have seen this year in Software and Software adjacent sectors have occurred in names that we categorize as having higher exposure to AI disruption risk.

Issuer Level Info			Debt Level Info				Credit Event Info		
Issuer	Sector		CUSIP	Description	Maturity Date	Rating	Event Date	Event Type	Short Description
Syniverse Technologies Inc	IT Services	Amber	87168TAB7	SVR TL 1L USD	5/13/2027	WR / D	10/6/2026	Default	S&P and Moody's view the a-to-e transaction (2027 to 2029) on Syniverse's first-lien term loan as a default event
The Knot Worldwide	Interactive Media	Red	94847DAJ0	WEDINC TL B 1L USD	1/31/2028	WR / B2	8/24/2026	Default	Exchanged into new 2030 loan
System1 Group Inc	Software	Red	68572CAC2	SYSTMO TL B 1L USD	7/27/2027	WR / NR	7/24/2026	Default	Distressed exchange to 2031, PIK, Cpn. +25bp
Optiv Inc.	IT Services	Red	68405PAB8	ACCVNT TL 1L USD	8/3/2026	WR / CCC	5/29/2026	Default	Distressed exchange, extended with PIK
West Corp	Software	Red	68162RAH4	WSTC TL B3 1L USD	4/12/2027	WR / NR	5/28/2026	Default	Payment default
Perforce Software	Software	Red	71376GAK7	PERSOF TL B 1L USD	7/2/2029	B3 / B-	4/10/2026	Default	2L exchanged into 1L notes
RSA Security	Software	Amber	75774EAG0	RSAS TL 1L USD	4/27/2028	WR / NR	1/31/2026	Default	Distressed Exchange - Completed Jan-26 exchange with all 1L and 2L holders; new $135m 1L TL and revolver for liquidity; new loan due 2030

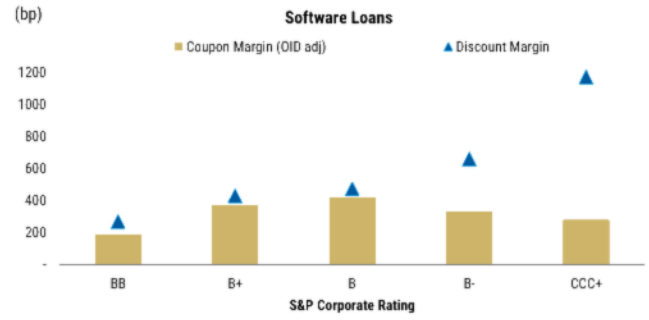
Source: Bloomberg, PitchBook | LCD, Morgan Stanley Research. The framework proposed here is not an investment recommendation. It is meant to capture one dimension of credit risk – the AI risk of companies. It does not purport to talk about other risks that are also pertinent to loan valuation. Investors should consider many factors when evaluating a loan.

The refinancing cost turns forbiddingly high for lower quality names with high AI risk. Based on prevailing market pricing, we estimate that for low-B names, refinancing cost would increase by ~100bp for the low-AI-risk cohort (Green) and ~400bp for the moderate-AI-risk cohort (Amber). By comparison, low-B and CCC names in Red would face coupon step-ups of 550-1000bp over existing coupon margins, if they were to refinance pre-2029 maturities today, effectively leaving them with very limited refinancing options.

We expect refinancing markets to remain selective, with AI risk increasingly shaping lender appetite, pricing, and structural protections. The refinancing window should remain widest for low-risk issuers that are willing to pay up for maturity runway. Conversely, high-AI-risk issuers face greater challenges in extending maturities given their limited financial flexibility, leaving them particularly exposed to refinancing pressure.

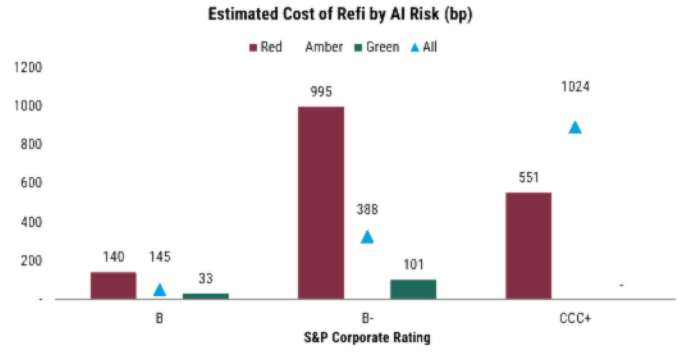
In our view, AI disruption risk can therefore accelerate credit deterioration through restricted refinancing access, even before its full impact becomes visible in operating fundamentals.

Exhibit 28: B-rated Software names face 50-330bp coupon step-up in refinancing



Source: Morningstar, Morgan Stanley Research

Exhibit 29: Incremental borrowing cost turns increasingly challenging for lower quality names with high AI risk



Source: Morningstar, Morgan Stanley Research

Where to Go From Here...

AI Risk Evolves Over Time

AI risk is dynamic, as borrowers increasingly pursue strategic repositioning to adapt to the evolving AI landscape. Some companies are integrating LLMs and generative AI into existing platforms to enhance product offerings, while others are committing capital to build AI infrastructure or fundamentally pivot their business models. Companies are at different stages of their AI adoption journeys, with some already executing strategic initiatives and others still developing viable strategies. **The pace and effectiveness of these transitions will likely vary depending on management's commitment, execution capabilities, and the evolving AI landscape.** As a result, companies' AI adoption trajectories may accelerate, stall, or change direction over time.

Sponsor behavior adds another layer of differentiation

In our view, PE sponsors with deep sector expertise and extensive experience managing software businesses are better positioned to help portfolio companies navigate AI disruption and accelerate adoption.

Some proactive sponsors are establishing firm-wide AI partnerships to provide portfolio companies with scalable access to advanced AI tools. Alternatively, instead of building AI capabilities organically, some others are increasingly leveraging bolt-on M&A to accelerate AI capabilities. Such acquisitions can help portfolio companies integrate AI-powered solutions, expand their service offerings, and strengthen their competitive positioning within specific verticals.

In other cases, sponsors are pursuing an AI consolidation strategy to combine complementary capabilities and address a broader range of customer needs.

The evolving nature of AI risk underscores the need for ongoing reassessment

Strategic pivots, sponsor interventions, and technological advances can materially alter a company's competitive positioning and AI readiness. Moreover, the emergence of more capable LLMs could undermine existing AI strategies while simultaneously creating new opportunities.

The pace of AI adoption, the evolution of technological capabilities, and companies' strategic responses remain highly fluid. **Consequently, AI risk scores should be viewed as evolving assessments rather than a static and definitive prediction of future credit trajectory.**

From Top-lines to Bottom-lines: Margin Preservation Will Be Key

AI disruption presents a clear challenge to software companies' top-line growth. The next question is the extent to which these pressures translate into bottom-line profitability.

Unlike traditional SaaS models, where higher usage generally supports operating leverage, greater engagement with AI-powered applications can create gross margin pressure if monetization does not adequately reflect the underlying cost intensity of the tasks being performed. AI functionality introduces a usage-based cost structure that varies significantly depending on usage intensity, task complexity, and model selection etc.

That said, companies have several levers to mitigate these pressures

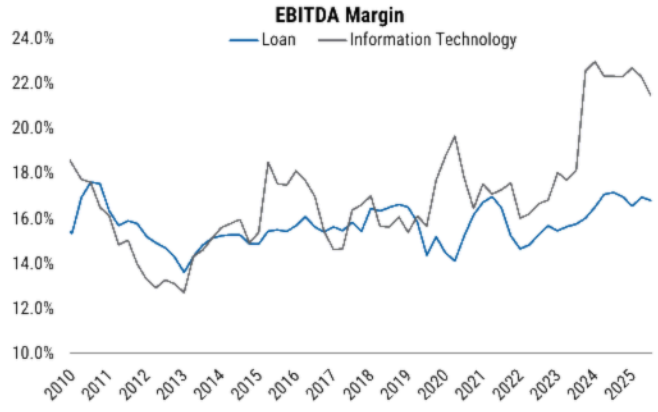
As highlighted by our software analysts, these include capturing declining inference costs, adopting multi-model architectures / open-source models, and training internal models on domain-specific context etc. **Consequently, pricing architecture, workload optimization, and inference efficiency are likely to become central determinants of long-term profitability for AI software companies.**

For PE sponsors, margin preservation and expansion are becoming increasingly important drivers of investment returns

Historically, LBO returns have benefited from a combination of revenue growth, multiple expansion, and leverage. For software LBOs, the investment thesis has been underpinned by high gross margins, recurring revenues, and strong operating leverage. However, the shift toward AI-enabled software challenges their margin profiles.

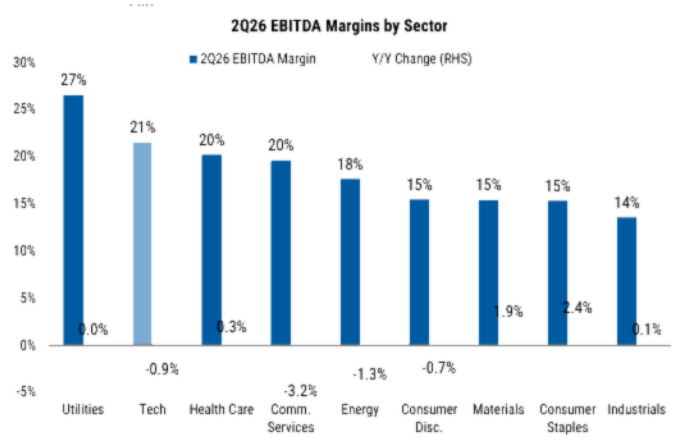
With these traditional return drivers taking a backseat amid AI disruption and a more challenging valuation environment, operational improvements are gaining greater importance. In particular, sponsors are increasingly focused on protecting portfolio company margins while funding AI investment and strategic repositioning. We believe the ability to preserve margin will be a key differentiator for PE investment returns, with implications for borrowers' credit performance.

Exhibit 30: The median EBITDA margin in the Tech sector has consistently outperformed the overall index



Source: FactSet, Morgan Stanley Research

Exhibit 31: Tech EBITDA margin is the second highest across sectors, but saw a 0.9% Y/Y decline last quarter



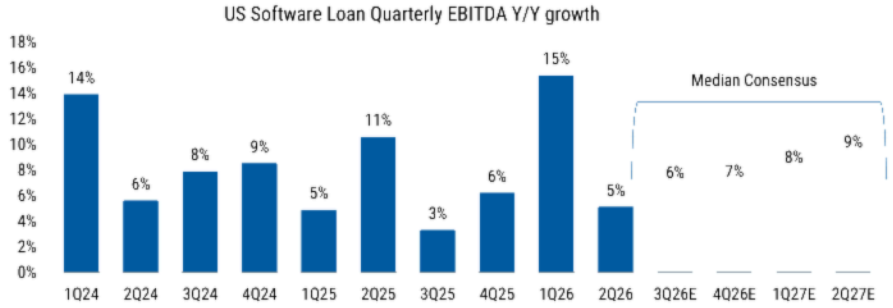
Source: FactSet, Morgan Stanley Research

AI Risk Reinforces Performance Dispersion

AI disruption has yet to materially affect credit fundamentals, despite emerging evidence of pressure at the single name level

So far, in-place fundamentals have remained relatively resilient. In our 2Q26 fundamental update, the Software sector recorded 5% y/y EBITDA growth, compared with 8% for the broader leveraged loan index. While the sample includes only 10 Software issuers, reflecting the sector's predominantly private composition, it offers a limited but useful indication of underlying operating performance. Looking ahead to 2027, median consensus estimates point to 6-9% earnings growth, suggesting that the more pronounced fundamental impact of AI disruption may lie further out.

Exhibit 32: Consensus estimates point to continued EBITDA growth for the median Software borrower in 2027



Source: FactSet; Morgan Stanley Research; Note: Only 10 Software issuers are in our fundamental database, measured by FactSet actual LB LTM by a endar quarter based on consensus basis to be comparable to forward estimates

Software defaults skew to names with low credit quality, near-term maturity and high AI risk

Recent refinancing transactions have eased concerns over market access, demonstrating that financing remains available for the right credit at the right price and terms. **With that, we see risks skew toward a better default outcome than our expectations laid out earlier this year.**

Looking ahead, we see the highest default risk among lower-quality issuers with near-term maturities and elevated AI exposure. Although not an immediate earnings headwind per se, AI disruption risk can compound existing pressures among highly leveraged borrowers facing near-term refinancing needs.

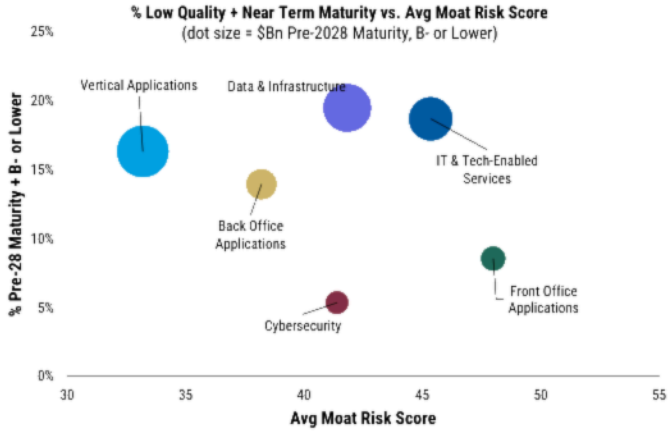
Using our AI framework, we identify 13 issuers in the cohort, or 10% of the sector's 131 issuers. We view this 10% as facing a materially higher probability of default through year-end 2027. However, risks remain fluid. As AI disruption intensifies, some names currently classified as Amber could migrate into Red and vice versa, potentially reshuffling the pool of high-risk credits over time.

Exhibit 33: 5% of Software issuers are low quality with a 2028 maturity in the Red bucket, rising to 10% in 2029.

% of All Software Issuers	Pre-28 Low Quality	Pre-29 Low Quality
Green	1%	6%
Amber	6%	11%
Red	5%	10%

Source: Morningstar, Morgan Stanley Research

Exhibit 34: Cybersecurity, followed by Front Office Applications, have the lowest exposure to lower-rated issuers with near-term maturities.



Source: Morningstar, Morgan Stanley Research

Over the medium term, AI risk introduces greater performance dispersion

While companies' existing business models and "moats" remain relevant, their AI-readiness, and the ability to adapt through product innovation, pricing adjustments, cost optimization, and strategic repositioning become increasingly important in determining the medium-term outcomes.

The path to AI monetization is unlikely to be linear, particularly for companies transitioning from traditional seat-based pricing toward usage- or consumption-based models. Temporary revenue disruption may arise. Through the journey of AI adoption, financial flexibility and execution capabilities will be key. Strong starting fundamentals provide borrowers with greater capacity to fund AI-related investment, absorb potential earnings volatility, and adapt their business models.

Implications for CLOs

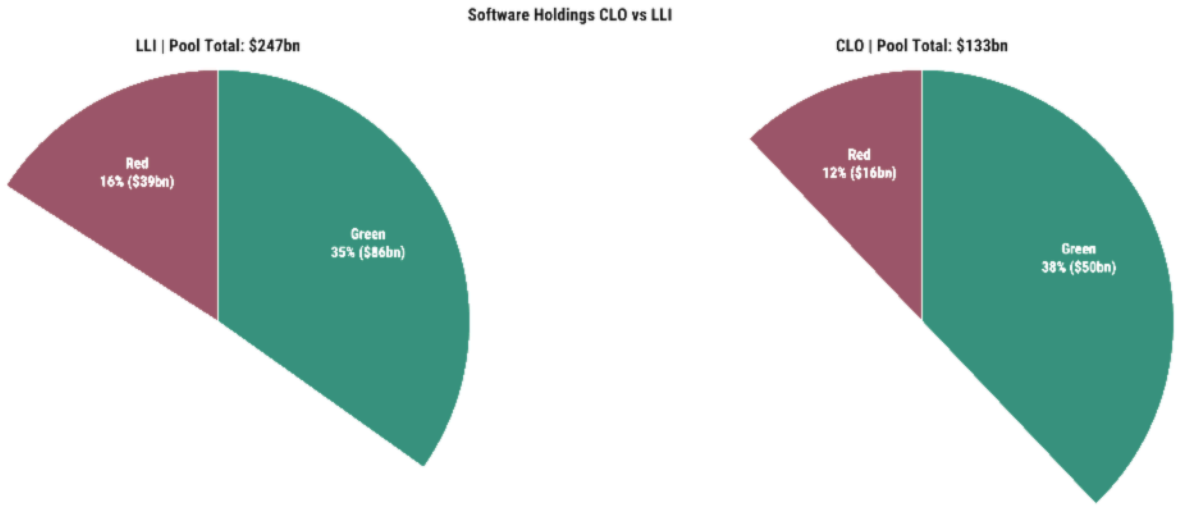
As investors become increasingly discerning about AI risk, the composition of software exposure matters more than the headline sector allocation. Two CLOs with similar software concentrations may face materially different credit outcomes depending on the underlying borrowers' business-model durability, AI readiness, and financial flexibility. Our AI risk framework therefore complements traditional collateral analysis by distinguishing between software issuers with relatively defensible franchises and those more exposed to structural disruption.

The conclusions are three-fold. First, CLO portfolios are modestly skewed toward software borrowers we identify as low-AI-risk relative to the broader loan market. Second, deals with higher exposure to the Red cohorts tend to have lower MVOC (market value ation) and wider spreads, suggesting that the market is increasingly differentiating across the quality of software holdings. Third, managers have been actively rotating toward lower-risk issuers and longer-dated maturities rather than exiting software altogether.

CLO Software Holdings Skew Toward Lower AI Risk

CLO portfolios have a more defensive software mix than the broader leveraged loan market. Out of the ~$250 billion software loans covered by our AI risk assessment, CLOs hold $133 billion, or roughly 54% of the outstanding par balance. Within CLO holdings, Green accounts for 38% ($50 billion), Amber for 50% ($67 billion), and Red for 12% ($16 billion). As mentioned above, the overall loan market has a somewhat riskier mix, with 35% Green, 49% Amber, and 16% Red.

Exhibit 35: CLOs hold a more defensive software mix than the broader loan market



Source: Intex, PitchBook | LCD, Morgan Stanley Research. Note: Unlike our Monthly Manager Factbook, exposures here are based on PitchBook | LCD loan classifications (not trustee reports via Intex). Sector-level exposures are based solely on CLO portfolio assets that have a valid LCD sector mapping. CLO loans that lack such mapping are excluded from our analysis. Our data coverage of the selected outstanding universe we are examining is greater than 90%.

Put differently, CLOs are relatively underweight software names that screen as having

high AI risk, and overweight in more resilient names compared to the overall index. The distinction is encouraging, although it does not eliminate the sector's underlying exposure to AI disruption risk.

Looking under the hood, the underweight of names in Red is prevalent across software subsectors. CLOs hold 41% of outstanding Red-band loans, compared with 59% of Green loans. The difference is particularly pronounced in Front Office Applications and Data & Infrastructure (two archetypes ranking high in average AI risk scores), where CLOs hold just 31% and 36% of Red-band loans, respectively. By contrast, CLO ownership of Red-band loans reaches approximately 52% in both Back Office and Vertical Applications, two archetypes with low AI risk scores on average.

Exhibit 36: Software Loans by AI risk bands and by business archetypes

	Outstanding ($bn)				CLO Holding ($bn)				% CLO Holding			
Archetype	**Red**	**Amber**	**Green**	**Total**	**Red**	**Amber**	**Green**	**Total**	**Red**	**Amber**	**Green**	**Total**
Vertical Applications	$7	$31	$26	$65	$4	$18	$13	$35	52%	57%	50%	53%
Data & Infrastructure	$6	$33	$9	$48	$2	$18	$5	$25	36%	54%	59%	53%
IT & Tech-Enabled Services	$6	$24	$11	$40	$3	$12	$6	$20	47%	48%	52%	49%
Cybersecurity	$7	$15	$14	$37	$3	$8	$8	$19	37%	52%	60%	52%
Front Office Applications	$9	$13	$6	$29	$3	$8	$5	$16	31%	63%	80%	56%
Back Office Applications	$3	$5	$20	$28	$2	$3	$13	$18	52%	69%	66%	65%
Total	$39	$121	$86	$247	$16	$67	$50	$133	41%	55%	59%	54%

Source: Intex, PitchBook | LCD, Morgan Stanley Research

Quality Matters More than Quantity in CLO Tranche Pricing

When it comes to AI risk, we find that the quality mix within software matters more than just the overall software exposure. While higher software concentration is generally associated with weaker collateral valuations, our analysis suggests that the AI risk composition within software provides greater differentiation than headline sector concentration alone.

Exhibit 37 illustrates this distinction. Deals with BB MVOC below 102.5% have higher median software exposure (14.2% vs. 11.1% for deals above 105.5%) and a riskier composition, with Red loans accounting for 14.7% of software holdings, compared with just 5.4% in higher-MVOC deals. In other words, **weaker-MVOC portfolios tend to have both a larger software exposure and a substantially riskier mix within the sector.**

A similar pattern emerges in secondary BB spreads (Exhibit 38). Across the tightest and widest spread quintiles, median software exposure increases by only ~2pp, from 11.9% to 13.7%. Yet the median Red share within software nearly doubles from 7.1% to 13.8%, while the Green share declines from 44.7% to 35.1%. **This suggests that the valuation tiering has been even more evident in the quality mix within software loans.**

Exhibit 37: Lower-MVOC deals hold more software and a riskier mix within it

BB MVOC	Software (%)	Green (%)	Amber (%)	Red (%)
Below 102.5	14.2%	33.2%	50.2%	14.7%
102.5–104	12.7%	36.3%	51.3%	11.5%
104–105.5	12.1%	41.5%	49.2%	8.8%
Above 105.5	11.1%	45.8%	47.3%	5.4%

Source: Intex, PitchBook | LCD, Morgan Stanley Research. Note: Sample restricted to populations 5th-95th spread percentiles.

Exhibit 38: Wider-spread BBs have a higher Red share within software holdings

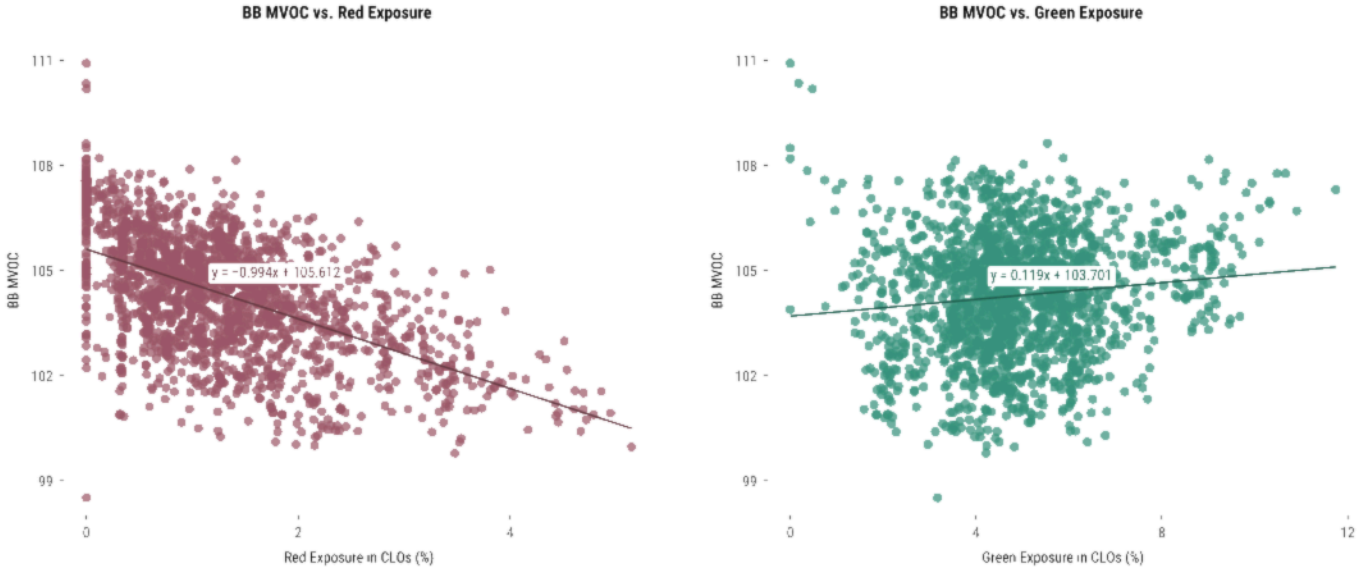
Spread Quintile	Software (%)	Green (%)	Amber (%)	Red (%)
1st Quintile (525 bp)	11.9%	44.7%	47.8%	7.1%
2nd Quintile (564 bp)	11.9%	41.1%	49.1%	8.2%
3rd Quintile (620 bp)	12.0%	41.1%	50.3%	9.4%
4th Quintile (707 bp)	12.4%	37.6%	50.8%	11.3%
5th Quintile (811 bp)	13.7%	35.1%	50.1%	13.8%

Source: Intex, PitchBook | LCD, Morgan Stanley Research. Note: Sample restricted to populations 5th-95th spread percentiles.

The relationship is also evident when examining BB MVOC against AI risk exposure measured as a share of total CLO collateral (Exhibit 39). A 1pp increase in Red exposure is associated with ~1pp lower BB MVOC, with a correlation of -0.54. By comparison, the relationship with Green exposure is much weaker: a 1pp higher Green exposure is associated with only 0.12pp higher MVOC, with a correlation of 0.12.

The asymmetry is notable: the market appears to distinguish deals by their exposure to software names with high AI risk and less so for its exposure to names with low AI risk. A collateral pool with lower exposure to names with high AI risk tends to have higher MVOC, while a larger Green allocation, on its own, tells us relatively little about overall MVOC. This is consistent with the market placing a greater penalty on identifiable exposure to AI disruption risk than a premium on perceived AI resilience. Other collateral characteristics and deal structure can also influence MVOC, so these relationships should be read as associations rather than isolated pricing effects.

Exhibit 39: Red exposure is negatively correlated with BB MVOC (r = −0.54); Green shows a much weaker relationship (r = 0.12)



Source: Intex, PitchBook | LCD, Morgan Stanley Research. Note: Sample restricted to populations 5th-95th spread percentiles.

Managers Rotating Up in Quality within Software

CLO managers have responded to rising AI concerns through selective portfolio rotation rather than broad-based reductions in software exposure. Transaction-level activity since February shows net purchases of $2.8 billion in loans that screen as Green, and $1.2 billion in Amber loans, alongside net sales of $1.1 billion in Red loans.

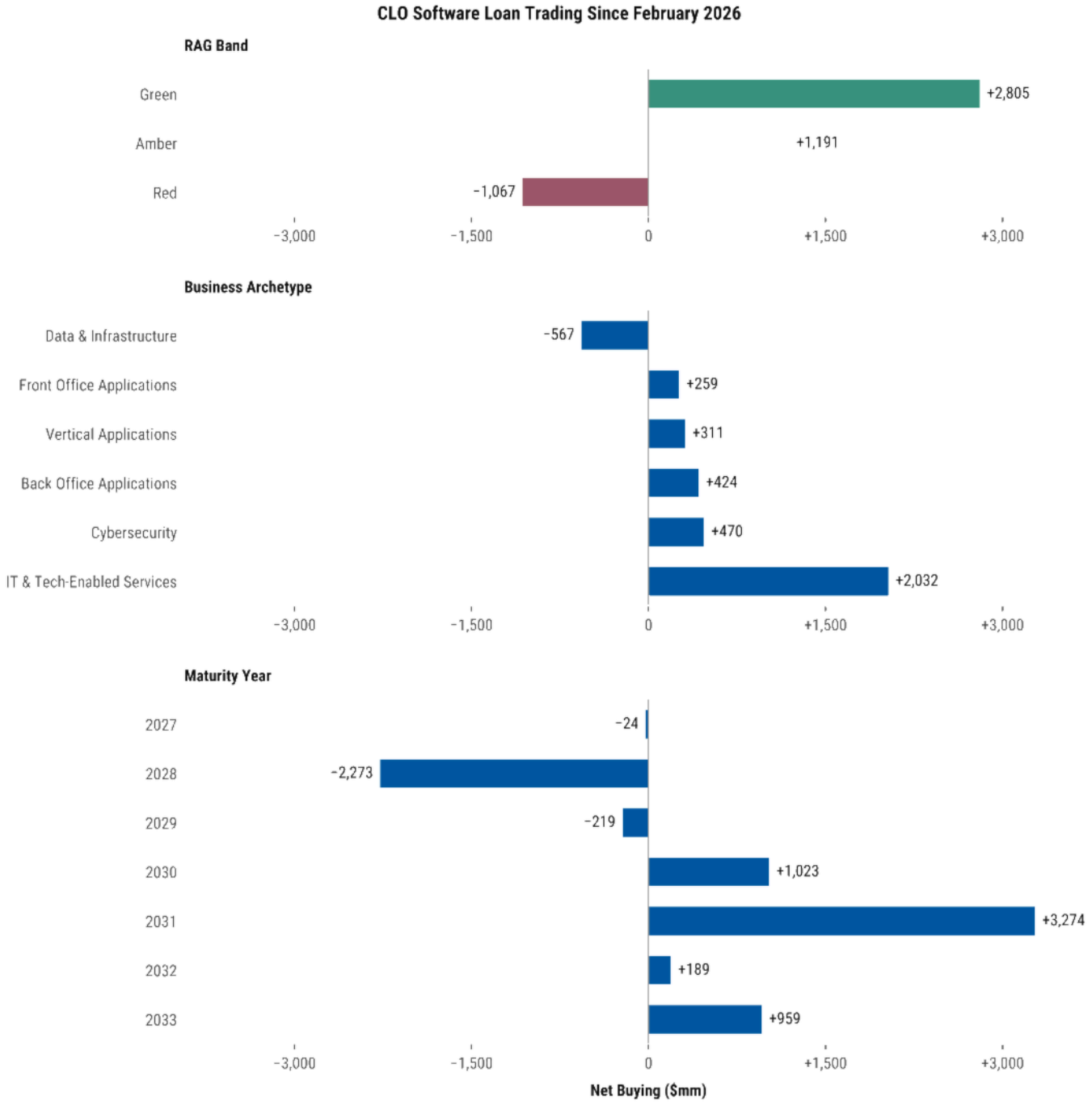
This pattern is consistent with managers seeking to reduce exposure to business models structurally exposed to AI disruption risk while retaining participation in software credits with more defensible competitive positions. However, portfolio clean-up (from Red to Green) can come at a cost. Selling discounted loans to reinvest in higher-priced, lower-risk collateral can crystallize par losses. **Managers must therefore balance the benefit of reducing future credit deterioration against the immediate cost to collateral par.**

The rotation is also evident across business archetypes and maturities. IT & Tech-Enabled Services has attracted the largest net purchases, totaling $2.03 billion, while Data & Infrastructure is the only subsector with net selling, at $567 million. This is broadly consistent with the relatively limited CLO ownership of high-AI-risk names within Data & Infrastructure.

The maturity breakdown shows that CLO managers are rotating from near-term maturities into out-year maturities. Since February, they have net sold $2.27 billion of 2028 paper and $219 million of 2029 paper, while adding $3.27 billion of 2031 maturities, $1.02 billion of 2030 maturities, and $959 million of 2033 maturities.

Taken together, these flows suggest that managers are taking a defensive stance in managing software exposure, reducing both near-term refinancing pressure and longer-term business-model disruption risk.

Exhibit 40: CLO managers have been net buyers of Green names and later maturities, and net sellers of Red names and nearer-term maturities



Source: Intex, PitchBook | LCD, Morgan Stanley Research

AI Risk Assessment in Deal Selection

We believe AI risk should become an increasingly important consideration in CLO deal selection, particularly for mezzanine investors. Active portfolio management and the ever-evolving AI adoption cycle warrant an ongoing assessment of AI risk for a given CLO portfolio, potentially even outside of the software sector.

We leave the detailed manager-level analysis to another report. But here, we highlight that portfolios with sizable exposure to Red and relatively healthy MVOC may warrant scrutiny. Some of these portfolios may hold loans with high exposure to AI disruption that trade near par. As evidence of disruption emerges, such loans could face additional repricing, eroding MVOC and weighing ly on lower-rated CLO liabilities.

On the flip side, a portfolio with muted Red exposure and low MVOC may be by the market. Its collateral discounts could reflect other credit or technical factors rather than AI vulnerability, potentially creating relative-value opportunities if underlying fundamentals prove more resilient than market pricing suggests.

Our preference is therefore for a more discriminating approach to CLO deal selection that combines AI risk assessment with in-place credit fundamentals, maturity runway, loan valuations, and deal structure.

Ultimately, we expect AI disruption to reinforce performance dispersion rather than generate uniform sector-wide stress. For managers, identifying more vulnerable business models, managing refinancing exposure, and preserving collateral value should become increasingly important sources of differentiation. For investors, the question is whether the spread compensates for both underlying credit risk and potential price volatility as the AI transition unfolds. This is particularly relevant for mezz investors, whose valuations are more sensitive to collateral performance.



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	Coverage Universe		Investment Banking Clients (IBC)			Other Material Investment Services Clients (MISC)	
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Equal-weight/Hold	1537	42%	393	42%	26%	720	43%
Not-Rated/Hold	2	0%	1	0%	50%	1	0%
Underweight/Sell	570	15%	92	10%	16%	218	13%
Total	3,684		946			1681	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

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