PIMCO

Asset-Based Finance: Quantifying Diversification Benefits and Return Potential

Asset-based finance offers a compelling opportunity to diversify portfolios and enhance risk-adjusted returns, but a robust framework for measuring associated risks and returns is essential.

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EXECUTIVE SUMMARY:

- Asset-based finance (ABF) focuses on tangible assets such as residential mortgages, consumer finance, and data infrastructure. Our research, using a public market equivalent (PME) approach finds that the risk-adjusted returns of ABF are attractive and exhibit lower correlation to equities compared with corporate direct lending, covering the market performance from 2000 to 2024.
- Estimated returns from ABF are higher than those from direct lending, as we believe this asset class offers better valuations and a larger liquidity risk premium.
- We propose a risk factor framework to effectively quantify the benefits and risks of ABF, understand its interplay with existing portfolio assets, and determine optimal allocation sizes.
- ABF may support portfolio stability during economic fluctuations due to its less-cyclical return profile, which can capture a diverse range of risk factors with lower correlations to traditional asset classes, making it a good complement to corporate debt exposures.

Asset-based finance (ABF), which refers to investments secured by tangible assets, is gaining traction among institutional and wealth management investors. As traditional bank lenders retreat amid tighter regulations and financing conditions, nonbank lenders are capitalizing on opportunities in sectors such as residential mortgages, consumer finance, aviation, and data infrastructure. With a market value estimated in excess of $20 trillion, ABF offers a compelling opportunity for private credit investors. (See our December *Alternatives Investment Outlook*, "Private Credit: Asset-Based Finance Shines as Lending Landscape Evolves.")

In our view, the advantages of ABF are that it has the potential to enhance diversification, provide resilience in fluctuating economic conditions, and deliver attractive returns. However, many investors lack the robust framework necessary to effectively measure these advantages. Without such tools, assessing ABF risks, understanding its relationship with existing portfolio assets, and determining optimal allocation sizes become significant challenges.

This paper introduces PIMCO's public market equivalent (PME) benchmark and risk factor model for ABF funds, which provide the tools to evaluate performance, measure risks, and determine optimal allocation strategies for effective portfolio construction.

Looking back: The historical risk-return profile of ABF is attractive

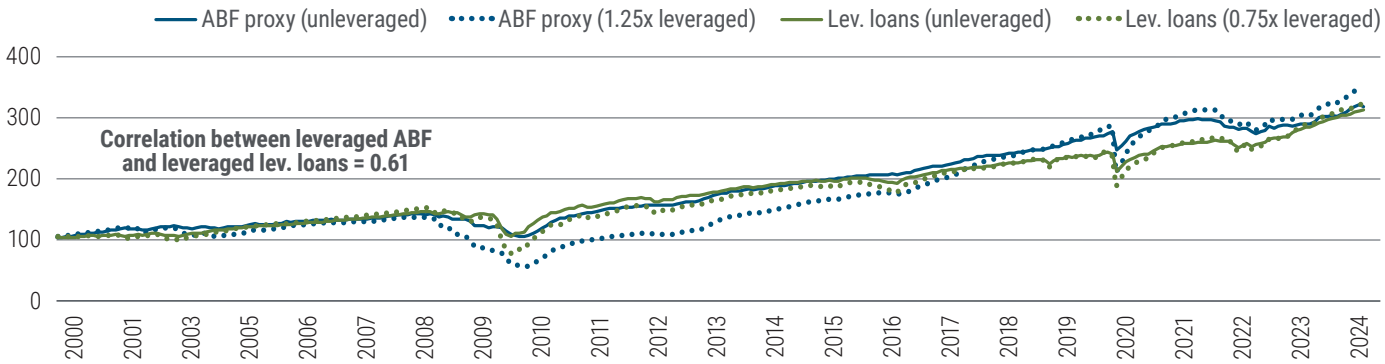
Our PME benchmark adjusts public securitized fixed income returns based on the credit quality, leverage, interest rate exposure, and spread duration typically associated with ABF funds. Given the higher average credit quality and lower unleveraged yield of ABF investments compared to direct lending funds, we assume greater leverage in private ABF funds. We use 1.25x leveraged public asset-backed securities (ABS) and residential mortgage-backed securities (RMBS), alongside 0.75x leveraged bank loans as PME proxies for ABF and direct lending, respectively.[1]

Our historical analysis of PME returns focuses on beta returns, excluding additional returns that private strategies might generate over public markets.[2] Exhibit 1 illustrates the risk-adjusted returns of the ABF beta, which were particularly attractive in the post-GFC era on a standalone basis and relative to direct lending beta.

Over the past three to five years – a period marked by rising interest rates and increasing correlations – the ABF proxy moderately underperforms public direct lending proxies.

Exhibit 1: Historical analysis of risk-adjusted returns for ABF and direct lending PMEs

Hypothetical growth of $100 (July 2000–December 2024)



	Summary stats	ABF proxy (unleveraged)	Lev. loans (unleveraged)	ABF proxy (1.25x leveraged)	Lev. loans (0.75x leveraged)
Since February 2012*	Annualized return	5.8%	5.2%	10.0%	6.4%
	Annualized volatility**	4.3%	4.8%	9.3%	8.4%
	Sharpe ratio**	1.25	0.80	0.93	0.60
Full sample	Annualized return	5.0%	4.9%	5.4%	5.1%
	Annualized volatility**	4.8%	6.0%	10.6%	10.6%
	Sharpe ratio**	0.69	0.54	0.35	0.32
	Monthly VaR (99%)***	-4.1%	-5.2%	-12.1%	-9.7%
	Skew	-2.6	-3.0	-3.5	-3.2
	Equity correlation	0.22	0.54	0.29	0.54
	HY correlation	0.36	0.78	0.39	0.78
	Core bond correlation	0.33	0.04	0.11	0.03

SOURCE: ICE, Bloomberg, and PIMCO as of 31 December 2024. *Full sample based on monthly returns from 31 July 2000. Equity = S&P 500 Index; HY = ICE BofA US HY Index, Core Bond = BBG US Aggregate Index.* **Hypothetical example for illustrative purposes only. Exhibit is not indicative of the past or future results of any PIMCO product or strategy. There is no assurance that the stated results will be achieved. Not intended as a recommendation, nor does it represent any particular PIMCO product or strategy.**

ABF proxy: We proxy monthly ABF PME returns as cash return plus excess returns over duration-matched treasuries from 75% ICE AA-BBB US ABS Index (R0A2) and 25% iBoxx US Non-Agency RMBS Index (IBXXBM38). Before February 2012, no data is available for IBXXBM38, so the spread component of the ABF Proxy is based 100% on the excess returns of ICE AA-BBB US ABS Index (R0A2). We add the return from about three years of interest rate duration exposure each month (BBG US Treasury 1-5Yr Index (LTR1TRUU) – cash). **Leveraged loans:** Represented by CS Leveraged Loan Index. When we leverage ABF, we keep rates exposure unchanged (about three years). We assume a time-varying financing cost above cash when leveraging the PME. To capture the credit quality differences, the financing spread for ABL is based on U.S. financial corporate debt rated A; direct lending is based on U.S. financial corporate debt rated BBB. Cash return is based on the FTSE 1M T-Bill Index.

* iBoxx US Non-Agency RMBS Index (IBXXBM38) incepted in February 2012. ABF Proxy returns include nonagency RMBS starting in February 2012.

** Volatility is measured as standard deviation of monthly returns. Sharpe ratio = (portfolio return - cash return) / portfolio volatility.

*** Value-at-Risk (VaR) is an estimate of the expected loss at a desired level of significance, based on the historical distribution of monthly returns.

This underperformance can be attributed to favorable conditions for corporate credit stemming from tightening credit spreads, coupled with a negative impact on ABF performance due to interest rate exposure, despite strong underlying structured credit performance. Looking ahead, ABF may benefit from its moderate duration profile as interest rates stabilize and resume their traditional role as a diversifier against credit spreads.

However, both public securitized debt and bank loans exhibit a negative skew, indicating that their return distributions are shifted to the left.[3] This serves as a good reminder to consider additional risk measures beyond volatility when constructing credit portfolios. Notably, ABF beta has a lower correlation with stocks and high yield (HY) bonds than direct lending beta, making it more positively correlated with core bonds.

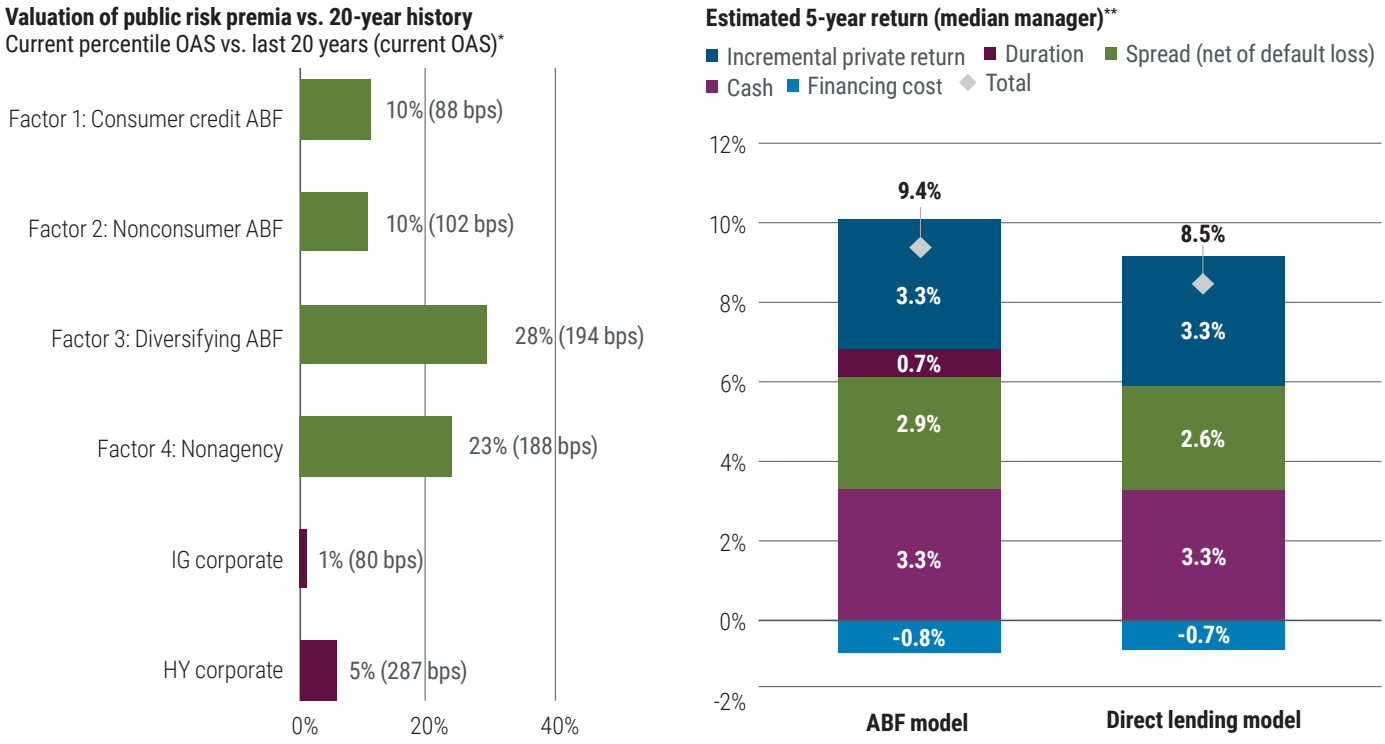
Developing a forward-looking ABF model with a framework for estimated returns

Having established an attractive risk-reward profile for ABF based on historical data, we turn our attention to current valuations and future return estimates. Our approach goes beyond broad market ABS, adopting a more nuanced perspective to construct sector-specific ABF risk factors across consumer, nonconsumer, diversifying asset-backed credit, and residential mortgage debt. We analyze over two decades of monthly credit spread changes from 10 public indices[4] covering major ABF asset types. These include student loans, credit cards, and auto loans on the consumer side, as well as aircraft, utilities, and equipment finance on the nonconsumer side.

We also include proxies for diversifying ABF exposures, such as music royalties, data centers, infrastructure, receivables, and franchise loans, along with residential mortgages (see appendix for details). Additionally, we exclude ABS securities rated AAA,[5] which constitute a large component of public structured credit markets, as their return and risk profile is generally too low for private ABF strategies.

With corporate credit spreads across investment grade (IG) and HY markets at or near historical lows, securitized markets offer marginally better valuations. To estimate returns, we adopt a risk factor-based approach similar to PIMCO's process for determining our capital market assumptions. Given that corporate spreads, such as those for the ICE BofA US High Yield Index, are close to all-time lows, we anticipate mark-to-market losses from mean reversion over the next five years, resulting in lower credit excess returns than the yield spread over Treasuries suggests (see Exhibit 2).

Exhibit 2: Valuation and estimated returns in ABF and corporate debt



Source: ICE, Bloomberg, and PIMCO as of 31 December 2024. **Hypothetical example for illustrative purposes only. Exhibit is not indicative of the past or future results of any PIMCO product or strategy. There is no assurance that the stated results will be achieved. Not intended as a recommendation.**

* Based on current OAS relative to 10-year history. We use PIMCO's models for ABF factors, ICE BofA US Corporate Index for IG Corporate, and ICE BofA US High Yield Index for HY Corporate.

** Unless otherwise specified, return estimates are an average annual return over a 5-year horizon. The estimated return is based on PIMCO's estimates for cash and duration, current spread levels of the ICE AA-BBB US ABS Index (R0A2), and the incremental return combines manager skill and liquidity / complexity premia (as observed in the median private credit fund historically – see appendix). Please refer to the appendix for additional information on estimated returns. The estimated ABS loss is based on average impairment rates of U.S. ABS rated AA, A, and BBB U.S. from 1994 to 2022. The estimated default loss in direct lending is based on long-term default and recovery statistics from Moody's and the spread component contains an assumption of HY spread changes over the coming five years. We assume 1.25x leverage for ABF and 0.75x leverage for direct lending.

In addition to carry and price impacts from mean reversion, we account for long-term average default losses per rating category in corporate and ABS markets. We also consider the cost of leverage, which we proxy with credit spreads for U.S. financials rated A or BBB for ABF and direct lending, respectively. Furthermore, the ABF model includes a term premium for three years of interest rate exposure and an incremental return based on manager skill, as well as the illiquidity and complexity premium derived from our analysis of the median private credit fund.[6]

An alternative approach, which does not require assumptions about alphas or default losses, compares the credit spreads of public and private assets of similar credit quality. As we've previously outlined (see our *Economic and Market Commentary*, "Navigating Public and Private Credit Markets: Liquidity, Risk, and Return Potential"), we believe that less-liquid private investments should provide an excess premium of about 200 basis points (bps). This premium compensates investors for potential lost alpha from active management, opportunity costs associated with the inability to rebalance, and potential cash shortfall costs for unexpected liquidity needs.

Based on recent ABF deal flow with unleveraged spread of 300–450 bps,[7] we estimate the current incremental spread of private over public ABS markets at 240 bps[8]. In direct lending, the credit spreads of recently originated deals range from 425 to 550 bps,[9] which is low versus historical levels, as spreads have materially tightened over the past two years. Using leveraged loans rated B as comparison, we estimate an average private market spread pickup of 70 bps for corporate direct lending[10].

We believe that the potential for 170 bps of additional private yield pickup in ABF can provide investors more compensation for illiquidity and complexity relative to corporate debt transactions. In our view, ABF presents a much larger and more diverse opportunity set, with higher barriers to entry due to differences in sourcing, origination, data, and analytics infrastructure required for thorough underwriting. As banks aim to enhance regulatory capital efficiency, we are observing a trend toward a bank partnership model with private ABF investors. This collaborative approach replaces the traditional model of direct competition for corporate debt deals.

Diversification benefits of ABF

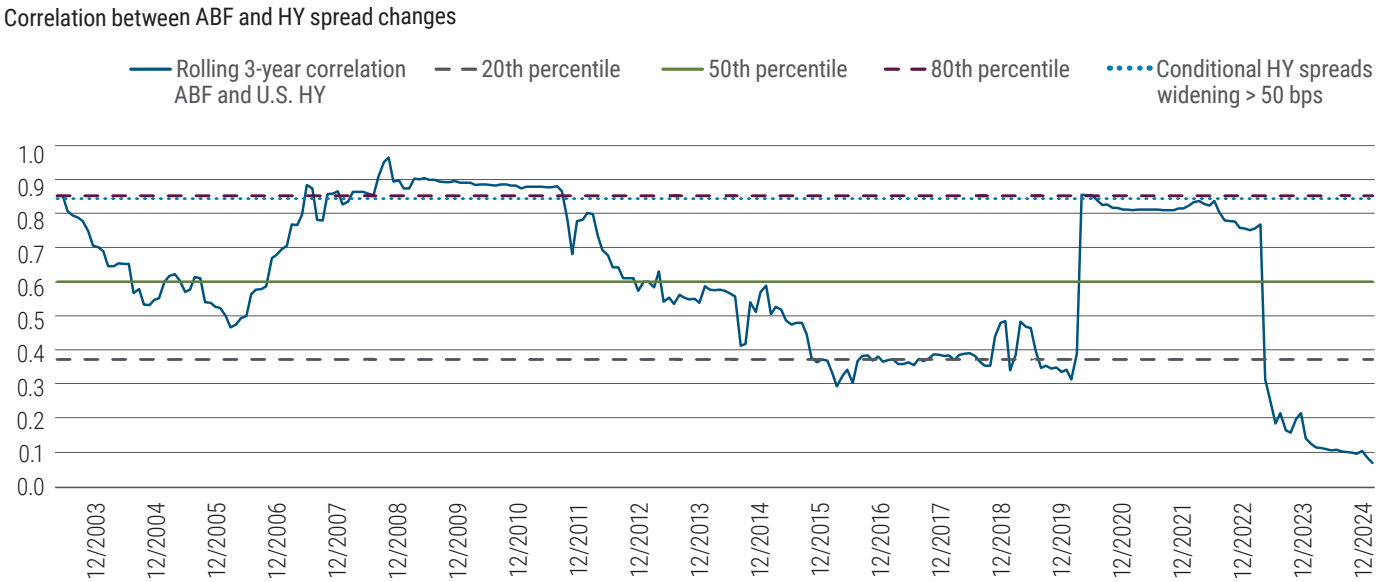
Our detailed modelling enables us to measure correlation structures within the ABF asset class and how an aggregate ABF risk factor interacts with other risk factors, such as corporate HY. The average correlation among the consumer, nonconsumer, diversifying asset-backed, and residential mortgage ABF credit factors is only 0.55, indicating diverse risk capture and limited overlap. This high degree of risk factor diversification and the resulting reduction in volatility are key reasons for the attractive Sharpe ratio of the ABF beta.

The correlation of 0.61 between the leveraged ABF and direct lending PMEs indicates the potential for meaningful diversification between the total returns of these two asset classes.

Exhibit 3 shows a risk factor perspective where we assess the co-movement of ABF and HY credit risks in isolation of other factors like interest rates. Over the full sample, we find a correlation of 0.59 between the aggregate ABF and HY risk factors, indicating ample room for diversification benefits. While the long-term diversification of ABF to HY corporate credit is impressive, it is important to note that, in line with most factors within the credit and equity universe, correlations tend to increase during periods of stress. For instance, the ABF-HY correlation jumps to 0.83 in months where HY spreads widen by more than 50 bps.

Exhibit 3: Meaningful diversification between ABF and HY over time

Full sample factor correlations (OAS changes) from 07/2000 to 12/2024	Factor 1: Consumer credit ABF	Factor 2: Nonconsumer ABF	Factor 3: Diversifying ABF	Factor 4: Nonagency	U.S. high yield
Factor 1: Consumer credit ABF	1				
Factor 2: Nonconsumer ABF	0.73	1			
Factor 3: Diversifying ABF	0.72	0.87	1		
Factor 4: Nonagency	0.38	0.32	0.29	1	
U.S. high yield	0.56	0.61	0.54	0.67	1



Source: ICE, Bloomberg and PIMCO as of 31 December 2024. **For illustrative purposes only. Figure is not indicative of the past or future results of any PIMCO product or strategy.**

Note: Conditional correlation calculated over the full sample, focusing only on months when U.S. high yield spreads widened by 50 bps or more.

ABF: We evaluate the time series of credit spread (OAS) changes of various risk factors with data starting in July 2000. ABF sector-specific OAS changes are based on the public market equivalents detailed in the appendix, and overall ABF OAS change reflects an equally weighted change of spreads across consumer, nonconsumer, diversifying asset-backed credit, and residential mortgage debt. U.S. high yield: ICE BofA US High Yield Index (H0A0).

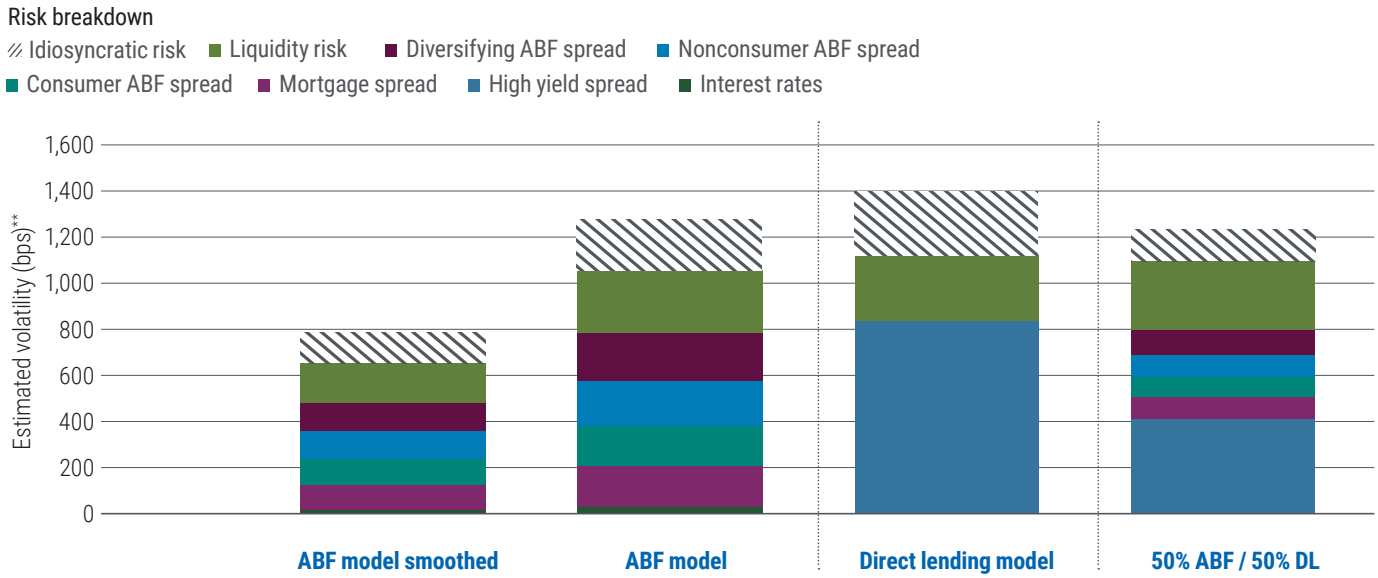
ABF is complementary to direct lending

It is widely recognized[11] that the absence of mark-to-market pricing in private markets leads to a smoothing bias and can create a misleading impression of low volatility. Since alternative investments are exposed to many of the same risk factors that influence public (and liquid) financial markets, we address the downward bias in reported volatility by developing risk factor models that aim to measure "true" economic risk.

We believe that the ABF and direct lending models[12] shown in Exhibit 4 allow for consistent comparisons to traditional asset classes and are valuable for optimizing multi-asset portfolios across public and private markets. The risk factor diversification within ABF is evident, while the volatility in direct lending is primarily driven by HY corporate and liquidity risk.

Although the leveraged credit spread duration is higher in ABF than in direct lending, its volatility and equity beta are expected to be lower. This lower volatility in ABL can be attributed to the lower volatility per unit of spread duration compared with HY corporate risk factors and the correlation benefits of combining various ABF credit risk factors. An important finding for investors with existing direct lending exposures is that these two private credit strategies may perform better together. A hypothetical equally weighted mix of ABF and direct lending yielded approximately 22% higher estimated risk-adjusted returns and a 12% lower equity beta than direct lending alone.

Exhibit 4: High degree of risk factor diversification in the ABF model



	ABF model smoothed	ABF model	Direct lending model	50% ABF / 50% DL
Estimated return*	9.4%	9.4%	8.5%	8.9%
Estimated volatility*	7.9%	12.9%	14.1%	12.4%
CVaR (1 yr, 95%)**	-9.5%	-21.3%	-26.0%	-22.2%
Sharpe ratio*	0.77	0.47	0.37	0.45
Duration	1.8	3.0	0.0	1.5
Equity beta vs. S&P 500	0.30	0.48	0.63	0.56

Source: PIMCO as of 31 December 2024. **Hypothetical example for illustrative purposes only. Exhibit is not indicative of the past or future results of any PIMCO product or strategy. There is no assurance that the stated results will be achieved. Not intended as a recommendation.**

* Unless otherwise specified, return estimates are an average annual return over a 5-year horizon. For indexes and asset class models, return estimates are based on the product of risk factor exposures and projected risk factor premia. Model risk factor exposures are based on analysis of historical index data, third party academic research and/or qualitative inputs from senior PIMCO investment professionals. Please refer to the appendix for additional information on estimated returns. Sharpe ratio calculation: (estimated return - estimated cash return) / estimated volatility. Estimated cash return = 3.32%.

** Conditional value at risk at 95% confidence over 1-year horizon. Conditional-value-at-risk (CVaR) is an estimate of the average expected loss beyond a desired level of significance. See appendix for additional information regarding volatility estimates.

Stress tests point to ABF's resilience and upside potential

Several fundamental factors suggest that ABF may be more resilient than direct lending during market downturns. Due to high borrowing costs and weakening covenants, some market participants anticipate declining recovery rates on defaulted loans. In contrast, many private ABF deals are backed by hard assets, benefit from diversification across a large pool of loans, typically have higher credit quality compared to non-IG corporate debt, and feature resilient, self-amortizing cash flows that are less correlated with the economic cycle.

Our stress tests indicate that ABF could experience approximately 45% less drawdown in a recessionary shock, thanks to its diversified spread factor footprint, moderate duration, and focus on noncorporate risk. However, in scenarios where both bonds and equities sell off simultaneously (e.g., stagflation), we do not expect ABF to meaningfully outperform direct lending.

Moreover, ABF has the potential to outperform direct lending during positive growth shocks, driven by its higher (leveraged) spread exposure and the currently tight starting level of corporate spreads in public and private markets. Our stress testing assumes that credit spreads will not tighten below all-time lows, which limits the potential for capital gains in corporate compared to structured credit spreads.

Conclusion: ABF offers the potential to enhance risk-adjusted returns at the total portfolio level

Based on historical data and current valuations, we believe that private ABF portfolios can generate higher returns than direct lending funds. We also estimate that ABF has lower economic volatility and is less procyclical than leveraged direct lending or equity markets.

The potential diversification benefits within the asset class, as compared to other assets, make ABF a valuable addition not only for private market portfolios, but also for multi-asset portfolios. Strategically incorporating ABF allows investors to thoughtfully increase their private credit allocations while potentially enhancing risk-adjusted returns at the total portfolio level.[13]

APPENDIX

Data sources for the ABF credit risk factor construction

Weights	ABF sector	Public market proxies (factors defined as OAS change)	Average public spread in bps	Factor volatility at 1.25x leverage	Beta vs. HY OAS change
25%	Consumer credit	(R0U2) ICE BofA AA-BBB US Fixed Rate Miscellaneous Asset Backed Securities Index (R0C2) ICE BofA AA-BBB US Fixed Rate Credit Card Asset Backed Securities Index (R0FS) ICE BofA US Floating Rate Student Loan Asset Backed Securities Index - leveraged	88	10.1%	0.32
25%	Nonconsumer credit	(R0E0) ICE BofA US Fixed Rate Equipment Asset Backed Securities Index - leveraged (R0AU) ICE BofA US Fixed Rate Utility Asset Backed Securities Index - leveraged *When insufficient data: (I00148US) BBG Utility ABS - leveraged* (I18845US) BBG EETC Index	102	9.9%	0.34
25%	Other diversifying assets	(R0O2) ICE BofA AA-BBB US Fixed Rate Miscellaneous Asset Backed Securities Index *When insufficient data: (R000) ICE BofA US Fixed Rate Miscellaneous Asset Backed Securities Index - leveraged*	194	10.3%	0.31
25%	Residential mortgages	(IBXXBM38) Markit iBoxx US Non-Agency RMBS Index PIMCO's resi mortgage model (non-agency risk factor)	188	16.0%	0.60

Source: PIMCO as of 31 December 2024. Based on monthly data from 7/31/2000 to 12/31/2024. **For illustrative purposes only.**

Volatility is measured as annualized standard deviation of monthly returns. We assume 6.75 years of spread duration based on 3 years of unleveraged spread duration and 1.25x leverage for ABF.

The Miscellaneous ABS category (R0O2) includes various exposures, including but not limited to music royalties, datacenters, infrastructure, wireless device payment plan agreement receivables, and whole business and franchise loans.

HY in column 6: Bloomberg US High Yield Index (H0A0).

Model risk factor exposures are based on analysis of historical index data, third-party academic research and qualitative inputs from senior PIMCO investment professionals.

Additional technical details

To ensure sufficient diversification within the subsector ABS benchmarks, we require at least 30 securities in any given month.

When no ex-AAA subsector ABS index is available, we leverage spread changes of a AAA-BBB index, based on the empirical relationship between the AA-BBB and AAA-BBB ABS indexes.

For the risk model, we assume an unleveraged spread duration of 3.0 years in ABF (equivalent to 6.75 years of spread duration when accounting for 125% leverage). We believe this is representative based on a sample of proprietary private deals. For comparison, as of 31 December 2024, the spread duration is 3.16 years for the ICE BofA AA-BBB US Asset Backed Securities Index and 3.10 years for the ICE BofA US High Yield Index.

In our ABF risk model, we adjust for liquidity and idiosyncratic risk based on our assumptions about the weighted-average life of ABF funds and the dispersion of incremental returns in the broader private debt category, as reported by Prequin over the PME benchmark. When combining the idiosyncratic risk of the four ABF sector models, instead of assuming a zero correlation, we conservatively assume a correlation structure that is identical to the correlation between the four ABF factors (average pair-wise correlation is about 0.55).

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ENDNOTES

1 Our estimate of 75% leverage is based on an analysis of large U.S. business development corporations. This estimate is consistent with the mean equity-to-total capital ratio of 60% for U.S. private debt funds, as reported in Block et al. (2023).

2 For a discussion on the liquidity risk premium, please see Baz et al. (2024).

3 Negative skew likely results from the higher downside than upside in credit investments (asymmetric payoff profile) and an increasing equity beta in down markets and high-volatility regimes (see Merton model). In addition, lower liquidity (wider bid-ask spreads) during times of stress can contribute to left skew.

4 For the full list of indices, see the appendix.

5 Excluding AAA-rated ABS has a meaningful impact on adjusting the benchmarks' credit quality as >50% of the IG U.S. ABS market is rated AAA.

6 As of 31 March 2024. The incremental return over leveraged bank loans is based on all corporate direct lending funds in the Preqin Private Debt Index, with all funds primarily focused in North America and denominated in U.S. dollars.

7 Based on recent deals reviewed by PIMCO. The spreads are adjusted for expected default losses.

8 Source: ICE and PIMCO as of 28 February 2025. We use the loss-adjusted OAS of all securities rated A or BBB in the ICE AA-BBB US ABS Index with spreads between 0% and 15%.

9 Source: Lincoln International as of March 2025. Based on deals executed in recent months for senior stretch and unitranche loans of companies with over $40 million in EBITDA.

10 Source: JP Morgan as of 28 February 2025. We use the spread to three-year takeout of the JPMorgan Leveraged Loan Index B.

11 See Baz et al. (2022) and Pedersen et al. (2014) in the References section.

12 To construct the ABF risk model, we assume an unleveraged spread duration of 3.0 years and a leveraged spread duration of 6.75 years for each of the four ABF risk factors (see appendix for details). Consistent with the PME analysis, we assume three years of exposure to U.S. rates. Lastly, we incorporate a liquidity risk factor and idiosyncratic volatility based on the weighted average life (fundamentally related to the lock-up period) and the dispersion of incremental private credit fund returns over the PME.

13 The magnitude of risk reduction and return enhancement depends on the funding source for ABF and varies across portfolios. Portfolio optimization may guide investors in determining optimal ABF allocations and funding sources.

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Unless otherwise specified, return estimates are an average annual return over a 5-year horizon. For indexes and asset class models, return estimates are based on the product of risk factor exposures and projected risk factor premia which rely on fair value models and qualitative inputs from senior PIMCO investment professionals. Model risk factor exposures are based on analysis of historical index data, third party academic research and/or qualitative inputs from senior PIMCO investment professionals. Return assumptions are for illustrative purposes only and are not a prediction or a projection of return. Actual returns may be higher or lower than those shown and may vary substantially over shorter time periods.

The analysis in this paper is based on hypothetical modeling. Hypothetical illustrations have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve results similar to those shown. In fact there are frequently sharp differences between hypothetical results and actual results subsequently achieved by any particular trading program.

One of the limitations of hypothetical results is that they are generally prepared with the benefit of hindsight. In additional, hypothetical scenarios do not involve financial risk, and no hypothetical illustration can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or to adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation if any specific trading program which cannot be fully accounted for in the preparation of a hypothetical illustration and all of which can adversely affect actual results.

There is no guarantee that these investment strategies will work under all market conditions or are appropriate for all investors and each investor should evaluate their ability to invest long-term, especially during periods of downturn in the market. No representation is being made that any account, product, or strategy will or is likely to achieve profits, losses, or results similar to those shown.

The option adjusted spread (OAS) measures the spread over a variety of possible interest rate paths. A security's OAS is the average earned over Treasury returns, taking multiple future interest rate scenarios into account.

Return assumptions are for illustrative purposes only and are not a prediction or a projection of return. Return assumption is an estimate of what investments may earn on average over a 5 year period. Return assumptions are subject to change without notice.

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It is not possible to invest directly in an unmanaged index.

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