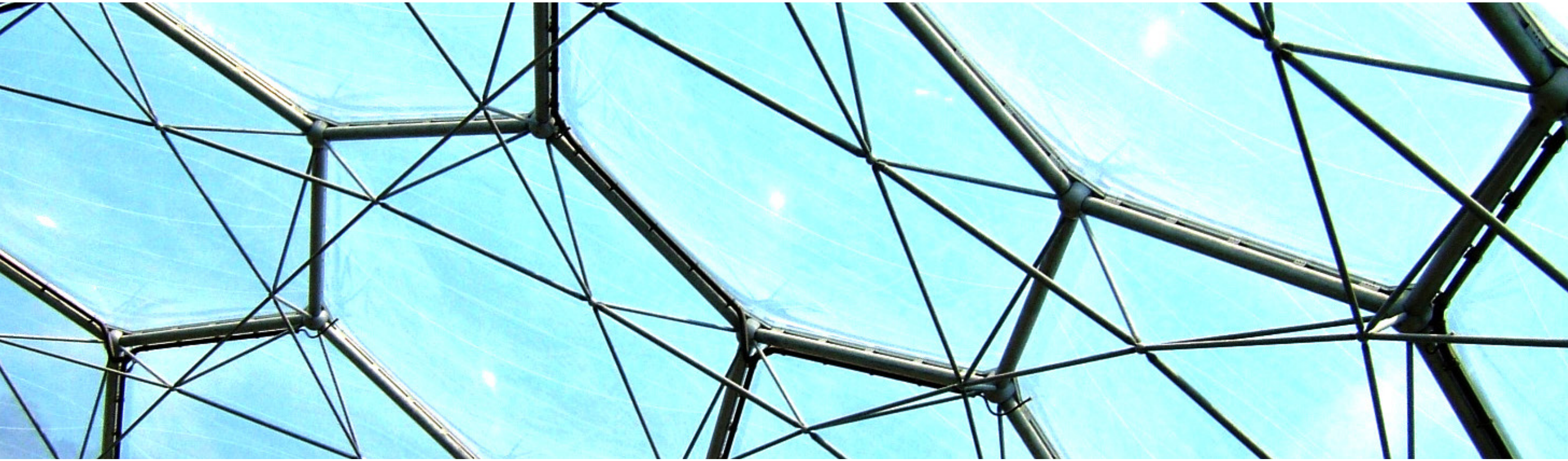
White Paper | April 2024

NEUBERGER | BERMAN



TULLY CHENG
Head of EMEA Insurance Analytics

FLORA XU
Insurance Strategist

SELENA ZHANG
Insurance Analytics Associate

DAVIS PARKS
Insurance Analytics Analyst

Capital Market Assumptions 2024: Implications for Insurance Portfolios

Each year, Neuberger Berman updates its capital market assumptions to create future return and risk estimates for major asset classes, agnostic of any tactical views or alpha-generating potential. Changes to those assumptions reflect changes in our economic and market outlooks and in asset valuations, and they can have a meaningful effect on the relative attractiveness of asset classes in portfolio optimizations.

In this paper, we present key findings from our 2024 capital market assumptions, following a year of recovering equity markets, volatile bond markets and persistent above-target inflation. We consider how those findings relate to some of the current challenges insurers are facing—such as unrealized losses complicating the portfolio rebalancing process and the low availability of reinsurance—and discuss some implications for asset allocation.

Executive Summary

- Following a dramatic sell-off in both equities and bonds during 2022, 2023 brought some relief in equities but continued uncertainty in fixed income, as inflation ran above target and policy rates were tightened further.
- We show the changes between 2023 and 2024 in our estimates for five- to 10-year return and volatility for a range of asset classes.
- For a 60/40 portfolio, an illustrative life insurer portfolio and an illustrative property & casualty (P&C) insurer portfolio, we show marginal analyses of the effect on estimated return and volatility of reallocating 1% of a portfolio *pro rata* to a range of asset classes under our 2024 capital market assumptions.
- Key findings and themes:
  - Fixed income still appears more attractive than equities although the estimated return for private equity offers substantially more compensation for its higher volatility.
  - Real estate, extended fixed income and less-liquid credit markets appear particularly attractive in terms of both estimated risk-adjusted return and our marginal analyses.
  - Extended credit may help insurers diversify credit portfolios and address the fact that refreshing portfolios to take advantage of higher market yields means realizing substantial losses on existing assets; rotating out of existing core fixed income positions into extended credit has the potential to deliver the higher estimated returns required to recover realized losses more quickly.

In 2022, a dramatic sell-off in both equity and bond markets meant that investors came into 2023 facing high fixed income yields (especially in short-dated fixed income) and lower equity market valuations. The overall effect on our capital market assumptions was a flatter capital-market line, significantly enhancing the relative attractiveness of fixed income assets over equities.

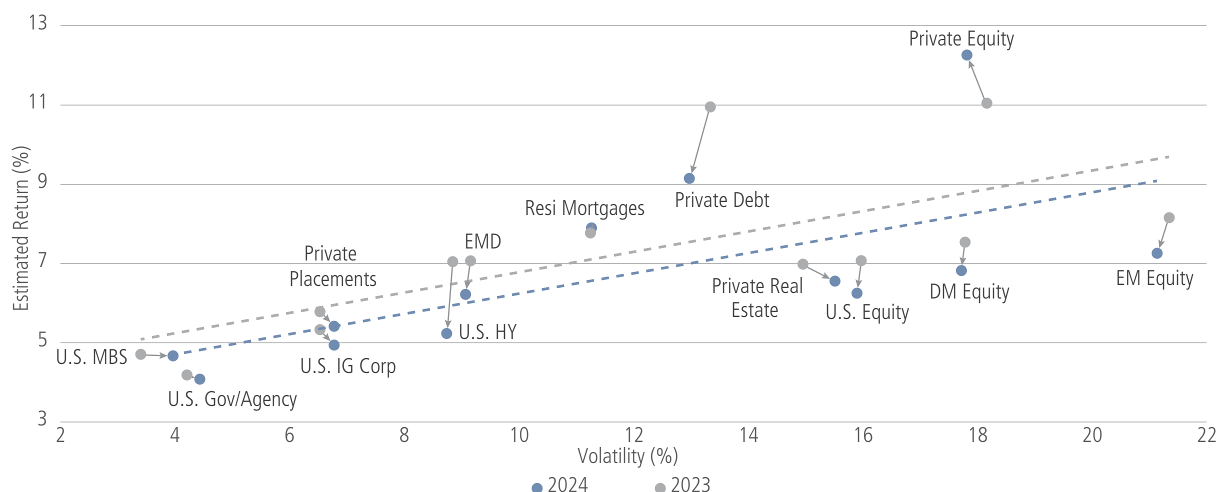
Capital Market Assumptions: 2024 Versus 2023

In 2023, inflation stayed above central bank targets and policy rates tightened further, keeping fixed income yields at elevated levels.

As we head into 2024, we observe that the capital market line depicted in figure 1 has fallen by around half a percentage point at each level of volatility. The average risk premium remains unchanged due to this parallel shift. Fixed income yields remain high compared with the decade before 2022, but expected reductions in inflation and continued spread-tightening is likely to bring them down over the coming months. The surprisingly resilient economic growth during 2023 supported a recovery in equity markets, which means investors now face full valuations despite the backdrop of high central bank rates.

FIGURE 1: NB CAPITAL MARKET ASSUMPTIONS: 2024 VERSUS 2023

Estimated annualized return and volatility, five- to 10-year term



Source: Neuberger Berman, Bloomberg-Barclays, Cambridge Associates, FactSet; Analytics are as of December 31, 2023. **IMPORTANT:** The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. The estimates do not reflect actual investment results and are not guarantees of future results. Actual returns and volatility may vary significantly. Asset classes are represented by benchmarks and do not represent any Neuberger Berman investment product or service. Please see Additional Disclosures at the end of the presentation for asset class and index definitions, terminology definitions and Neuberger Berman Capital Market Assumptions. Investing entails risks, including possible loss of principal.

Overall, these results suggest that fixed income still appears attractive relative to higher-risk assets. Shorter-duration assets such as high yield and private debt have seen meaningful downward moves in their estimated returns, given the yield-curve adjustment and spread tightening of the past 12 months, but we believe they remain attractive compared with historical yields and relative to public equity projected returns.

Private equity also remains attractive in our view. For this year's private equity estimates, we have moved from a model based on the historical relationship between private and public equity market performance to a model of the asset class's underlying fundamentals. Private equity looks more attractive than it did last year for both estimated return and volatility, and we believe this reflects the resilience of revenue, earnings growth and other key fundamental metrics of privately owned companies in the face of economic headwinds. It is worth noting that our previous historical relationship model gives a similar result because private-market investments have historically had shallower drawdowns and faster recovery rates than public market investments during downturns.[1]

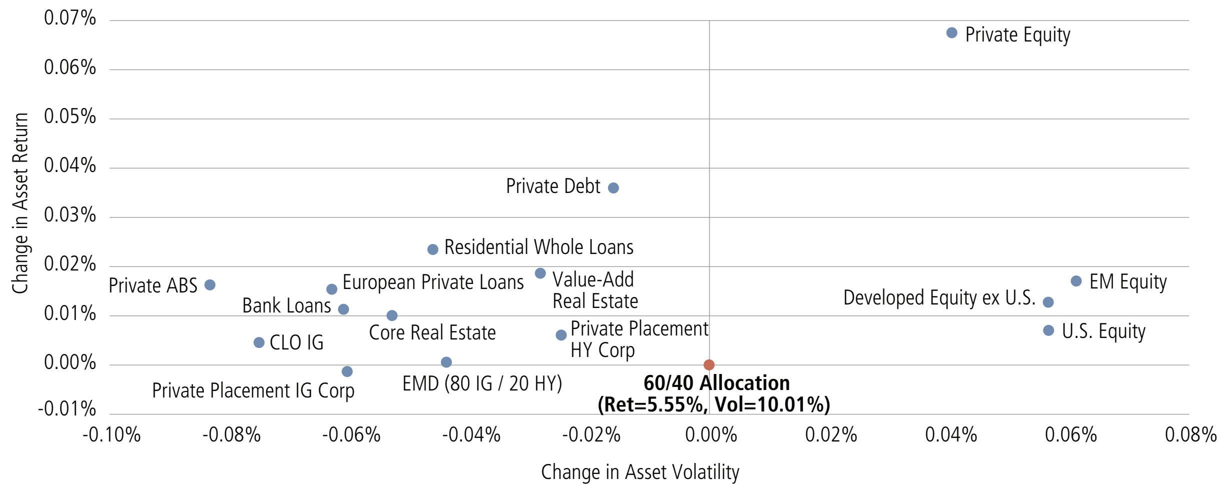
Marginal Analyses for a 60/40 Portfolio and Typical Life and P&C Portfolios

To explore these investments' potential to add value, we run a marginal analysis for a 60/40 equity/fixed income portfolio (figure 2), an illustrative life insurer (figure 3) and an illustrative P&C insurer (figure 4). The marginal analysis takes the illustrative portfolio's allocation and reallocates 1% *pro rata* to each of the asset classes shown, in turn, showing the effect that has on the portfolio's estimated return and volatility. For the purpose of this analysis, we focus on the return-risk profile of the asset classes but note that insurers are subject to capital/solvency ratio requirements and will need to consider the capital efficiency of these asset classes in asset allocation as well. Details of the illustrative insurers' portfolios are shown in the Appendix.

[1] See NB Private Equity Team and NB Institutional Solutions, "The Historical Impact of Economic Downturns on Private Equity" (May 2022) at https://www.nb.com/en/link?type=article&name=the-historical-impact-of-economic-downturns-on-private-equity.

FIGURE 2: MARGINAL ANALYSIS: 60/40 PORTFOLIO

Change in estimated annualized return and volatility of a portfolio when 1% is reallocated *pro rata* to each named asset class

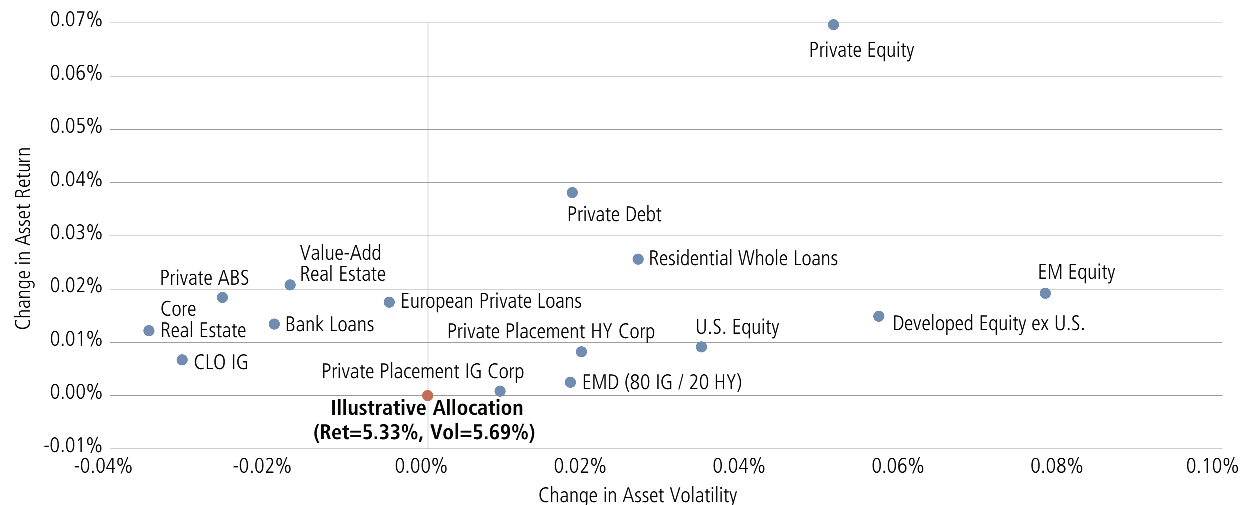


Source: Neuberger Berman, Bloomberg-Barclays, Cambridge Associates, FactSet; Analytics are as of December 31, 2023. **IMPORTANT:** The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. The estimates do not reflect actual investment results and are not guarantees of future results. Actual returns and volatility may vary significantly. Asset classes are represented by benchmarks and do not represent any Neuberger Berman investment product or service. Please see Additional Disclosures at the end of the presentation for asset class and index definitions, terminology definitions and Neuberger Berman Capital Market Assumptions. Investing entails risks, including possible loss of principal.

We show only those asset classes that improve estimated return or are not core assets commonly held in insurers' portfolios. Among these, public equities add only a little estimated return at the expense of elevated volatility, as depicted in figure 1, while real estate and extended credit asset classes appear more attractive, particularly private debt. Private equity stands out as offering the greatest potential for higher expected returns at a low expense of increased volatility.

FIGURE 3: MARGINAL ANALYSIS: ILLUSTRATIVE LIFE INSURER

Change in estimated annualized return and volatility of a portfolio when 1% is reallocated *pro rata* to each named asset class



Source: Neuberger Berman, Bloomberg-Barclays, Cambridge Associates, FactSet; Analytics are as of December 31, 2023. **IMPORTANT:** The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. The estimates do not reflect actual investment results and are not guarantees of future results. Actual returns and volatility may vary significantly. Asset classes are represented by benchmarks and do not represent any Neuberger Berman investment product or service. Please see Additional Disclosures at the end of the presentation for asset class and index definitions, terminology definitions and Neuberger Berman Capital Market Assumptions. Investing entails risks, including possible loss of principal.

Our illustrative life insurer begins with a less volatile, more liability-oriented asset allocation than a 60/40 portfolio.

U.S. equity might be more attractive to this investor than to the 60/40 investor as it would introduce a slightly higher estimated return along with some diversification against a predominately fixed income-oriented allocation. Emerging markets debt looks considerably less attractive for the opposite reason: whereas it added diversification to the 60/40 portfolio, it predominantly overlaps with existing exposures.

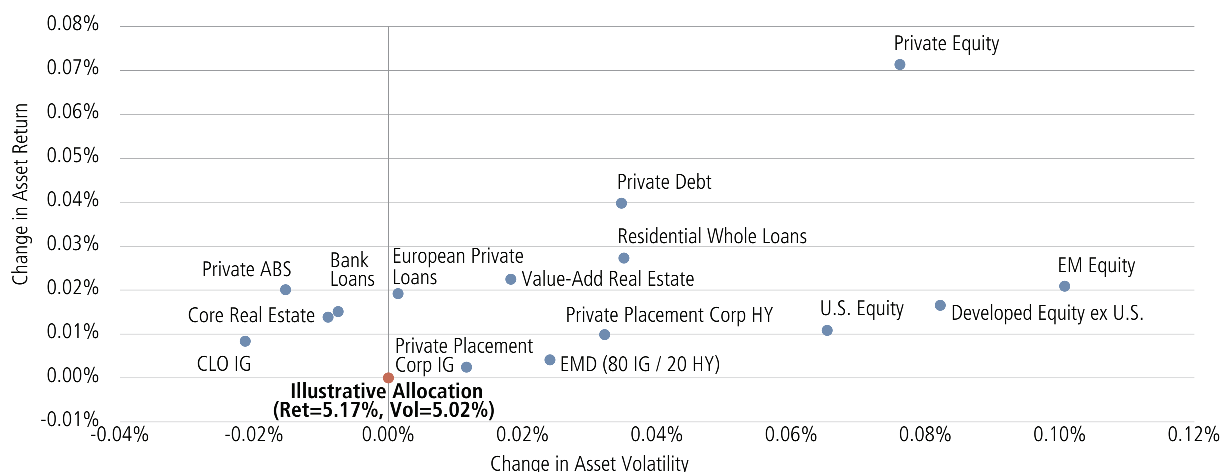
Where we see agreement in these two marginal analyses, it is with real estate, private equity and extended credit—particularly floating-rate credit asset classes such as loans, asset-backed securities and the investment grade tranches of collateralized loan obligations.

Our recent experience suggests that these asset classes are high on the agenda. Insurers are not only seeking to diversify credit portfolios via both new issuers and new sources of credit spread, they are also trying to address the fact that, while the fixed income market is once again offering attractive higher yields, refreshing portfolios can be painful after two years that have left them carrying substantial unrealized losses. Managing that by reinvesting only income and maturing principal would require a long time to refresh a large portfolio. Instead, rotating out of existing core fixed income positions into extended credit has the potential to deliver the higher yields and higher estimated returns required to recover realized losses more quickly, while also lowering portfolio volatility.

It is also worth noting that we see a number of insurers investing in alternatives such as private equity, debt and real estate via insurance company-owned life insurance (ICOLI) products with Stable Value Wraps. In these arrangements, the insurance company is the owner and beneficiary of life insurance policies, generally covering key executives, which sit in the insurer's investment portfolio and invest in underlying alternative assets. The Stable Value Wraps deliver lower accounting volatility than the underlying investments, and these ICOLI policies have meaningfully lower reserve requirements than the underlying investments, which would make these asset classes even more attractive than figure 3 indicates.

FIGURE 4: MARGINAL ANALYSIS: ILLUSTRATIVE P&C INSURER

Change in estimated annualized return and volatility of a portfolio when 1% is reallocated *pro rata* to each named asset class



Source: Neuberger Berman, Bloomberg-Barclays, Cambridge Associates, FactSet; Analytics are as of December 31, 2023. **IMPORTANT:** The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. The estimates do not reflect actual investment results and are not guarantees of future results. Actual returns and volatility may vary significantly. Asset classes are represented by benchmarks and do not represent any Neuberger Berman investment product or service. Please see Additional Disclosures at the end of the presentation for asset class and index definitions, terminology definitions and Neuberger Berman Capital Market Assumptions. Investing entails risks, including possible loss of principal.

When we turn to our illustrative P&C insurer, we see very similar results as for our life insurer. The main difference is that it is a little more difficult for this investor to lower its portfolio volatility with marginal allocations into extended/alternative fixed income and equity investments.

This is largely because it holds a low-duration asset allocation with more of a "barbell" portfolio than the illustrative life insurer. The life insurer's asset allocation is oriented to long-dated cash flow matching, with 91% in fixed income asset classes. The P&C insurer has more in investment-grade fixed income than the life insurer but only 83% in fixed income overall. This is why public equities appear much less attractive as marginal allocations and why marginal private equity adds substantially more volatility: they double-up on exposures that are already present in the portfolio.

By contrast, real estate and extended fixed income derive returns from structure and underlying property value which have low correlation to both corporate debt and equity. Consequently, these classes are able to increase returns while contracting portfolio volatility through diversification.

P&C insurers, like life insurers, face the same challenges of unrealized losses in their fixed income portfolios, but those portfolios are likely to be considerably shorter in duration and will therefore naturally refresh, via reinvestment of principal, over a shorter time. A greater current challenge is the low availability of reinsurance, which increases the need for the higher estimated risk-adjusted return that extended credit, in particular, can offer.

Conclusion: Major Change Demands Major Decisions

The market environment, and therefore capital market assumptions, have materially changed since the end of 2021. We believe that increases the importance of rethinking asset allocation for all investors but, particularly, for insurance companies that invest heavily in the fixed income markets that have moved so dramatically over the past two years.

We believe the opportunities in extended and private fixed income investment have in many cases become still more attractive, often due to capital shortages caused by banks withdrawing from certain lending and liquidity-provision roles.

We think insurers that can follow the "smart money" into these asset classes and strategies should consider doing so. These strategies have the potential to meaningfully enhance the estimated risk-adjusted returns of insurance portfolios.

Appendix

Indices Used

U.S. Government/Agency	Bloomberg Barclays Capital U.S. Government
US MBS	Bloomberg Barclays Capital U.S. MBS
U.S. Investment Grade Corporates	Bloomberg Barclays Capital U.S. Corporate
Residential Whole Loans	Bloomberg Barclays Capital U.S. MBS / Citi Legacy RMBS (Custom Index)
Bank Loans	Morningstar LSTA US Leveraged Loan Index
U.S. High Yield Corporates	Bloomberg Barclays Capital U.S. Corporate High-Yield Bond
Emerging Markets Debt IG	50% J.P. Morgan Emerging Markets Bond Global Index Diversified (EMBI GD) IG + 50% J.P. Morgan Corporate Emerging Markets Bond Index Diversified (CEMBI D) IG +
Emerging Markets Debt HY	50% J.P. Morgan Emerging Markets Bond Global Index Diversified (EMBI GD) HY + 50% J.P. Morgan Corporate Emerging Markets Bond Index Diversified (CEMBI D) HY
CLO IG	J.P. Morgan Collateralized Loan Obligation Investment Grade Index
Private ABS	42.5% Bloomberg Barclays Capital ABS A 1-3 yrs + 125 bps + 42.5% Bloomberg Barclays Capital ABS A 3+ yrs + 125 bps + 7.5% Bloomberg Barclays Capital ABS BBB 1-3 yrs + 250 bps + 7.5% Bloomberg Barclays Capital ABS BBB 3+ yrs + 250 bp
Private Placement IG Corporates	Bloomberg Barclays Capital U.S. Corporate + 45 bps (Custom Index)
Private Placement HY Corporates	Bloomberg Barclays Capital U.S. Corporate High-Yield Bond + 75 bps (Custom Index)
U.S. Equity	S&P 500
Developed Markets ex-U.S. Equity	MSCI EAFE
Emerging Market Equity	MSCI Emerging Markets
Core Real Estate	NCREIF ODCE Index
Value-Add Real Estate	NCREIF Property Index (Leveraged)
European Private Loans	iBoxx Euro Non-Financials BBB (5-7 years)
Private Equity	Burgiss Buyout Index
Private Debt	Burgiss Debt Index

Neuberger Berman Capital Market Assumptions Framework

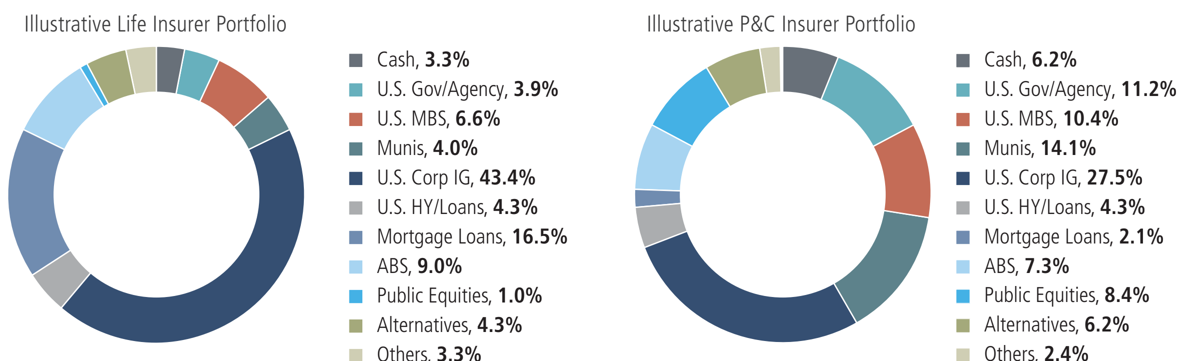
Asset Class	Return Estimate	Risk Estimate
Fixed Income	Market yields of public indices adjusted for default cost[1]	Historical volatility of monthly return series from 2007
Equity	"Building Block" approach[2]	
Liquid Alternatives	Factor regression	
Illiquid Alternatives	"Building Block" approach[2]	Historical volatility of quarterly series from 2007 with de-smoothing

[1] For certain asset classes where a standard public index may not be readily available, NB will create a proxy index using a combination of similar asset classes. Default costs are estimated at the CUSIP level then aggregated to the index level; where CUSIP-level data is unavailable, NB will estimate default costs at the index level.

[2] Separate estimates are made for different sources of return (income yield, valuation change, earnings growth), and these "blocks" are aggregated to establish an asset class-level estimated return.

Source: Neuberger Berman. For illustrative purposes only.

ILLUSTRATIVE INSURER PORTFOLIOS USED IN THE MARGINAL ANALYSES



Source: Neuberger Berman.

Estimated Return, Risk and Solvency Capital Requirement of Asset Classes Used in the Marginal Analyses

Asset Class	Asset Type	Estimated Return (%)	Ann. Volatility (%)	OAS (bps)	Rating
U.S. Gov/Agency	Fixed Income	4.08	4.4	0	AA1
U.S. MBS	Fixed Income	4.67	4.0	47	AA1
U.S. IG Corp	Fixed Income	4.94	6.8	99	A3/BAA1
Private Placement IG Corp	Fixed Income	5.42	6.8	149	A3/BAA1
U.S. HY[1]	Fixed Income	5.24	8.7	252	BA3/B1
Private Placement HY Corp	Fixed Income	6.15	9.8	398	B1
EMD[2]	Fixed Income	6.22	9.1	334	BAA3
CLO IG	Fixed Income	6.01	4.6	205	AA1/AA2
Residential Whole Loans	Fixed Income	7.90	11.3	386	A2
U.S. Equity	Equity	6.25	15.9	-	-
DM ex U.S. Equity	Equity	6.82	17.7	-	-
EM Equity	Equity	7.26	21.1	-	-
Core Real Estate	Private Markets	6.55	15.5	-	-
Value-Add Real Estate	Private Markets	7.41	22.6	-	-
European Private Loans	Private Markets	5.34	6.2	347	BAA2
Private Equity	Private Markets	12.30	17.7	-	-
Private Debt	Private Markets	9.15	13.3	734	B2
Private ABS	Private Markets	5.71	10.3	312	A2/A3

Source: Neuberger Berman, Bloomberg, Cambridge Associates, FactSet. The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. The estimates do not reflect actual investment results and are not guarantees of future results. Actual returns and volatility may vary significantly. Asset classes are represented by benchmarks and do not represent any Neuberger Berman investment product or service. Please see Additional Disclosures at the end of the presentation for asset class and index definitions and Neuberger Berman Capital Market Assumptions. Investing entails risks, including possible loss of principal.

[1] U.S. High Yield BB and B.

[2] 50% investment grade and 50% high yield.

Additional Disclosures

Index Definitions

The **Bloomberg U.S. Government Index** includes Treasuries (public obligations of the U.S. Treasury that have remaining maturities of more than one year) and U.S. agency debentures (publicly issued debt of U.S. Government agencies, quasi-federal corporations, and corporate or foreign debt guaranteed by the U.S. Government).

The **Bloomberg U.S. Mortgage Backed Securities (MBS) Index** covers agency mortgage-backed passthrough securities (both fixed-rate and hybrid ARM) issued by Ginnie Mae (GNMA), Fannie Mae (FNMA), and Freddie Mac (FHLMC). Introduced in 1986, the GNMA, FHLMC, and FNMA fixed-rate indices for 30- and 15- year securities were backdated to January 1976, May 1977, and November 1982, respectively. Balloon securities were added in 1992 and removed on January 1, 2008. 20-year securities were added in July 2000. On April 1, 2007, agency hybrid adjustable-rate mortgage (ARM) passthrough securities were added to the U.S. MBS Index. Hybrid ARMs are eligible until 1 year prior to their floating coupon date.

The **Bloomberg U.S. Corporate Index** measures the investment grade, fixed-rate, taxable corporate bond market. It includes USD-denominated securities publicly issued by U.S. and non-U.S. industrial, utility and financial issuers that meet specified maturity, liquidity and quality requirements. The Index was launched on January 1, 1973.

The **Citi Legacy RMBS Index** is a calculation of monthly total returns among pre-crisis P&I paying, non-exhangeable non-agency RMBS, utilizing cashflows reported by Intex and month-end prices from IDC. Returns are computed for the overall market and for each credit subsector. To eliminate the impact of data errors and settlements, the top and bottom 5% performers are not included in the calculation.

The **Morningstar LSTA U.S. Leveraged Loan Index** is a market-value weighted index designed to measure the performance of the market in U.S. syndicated, term leveraged loans that are held within top-tier institutional investor loan portfolios tracked by PitchBook and LCD.

The **Bloomberg U.S. Corporate High Yield Bond Index** covers the USD-denominated, non-investment grade, fixed-rate, taxable corporate bond market. Securities are classified as high-yield if the middle rating of Moody's Fitch, and S&P is Ba1/BB+/BB+ or below. The index excludes Emerging Markets debt. The Index was created in 1986, with index history backfilled to January 1, 1983.

The **JPMorgan Emerging Markets Bond Global Diversified Index (EMBI GD)** includes U.S. dollar-denominated Brady bonds, Eurobonds, and traded loans issued by sovereign and quasi-sovereign entities. The EMBI GD IG is a subset of EMBI GD containing only securities where the middle rating of Moody's Fitch, and S&P is Baa3/BBB-/BBB- or above. The EMBI GD HY is a subset of EMBI GD containing only securities where the middle rating of Moody's Fitch, and S&P is Ba1/BB+/BB+ or below.

The **JPMorgan Corporate Emerging Markets Bond Diversified Index (CEMBI)** is a market-capitalization weighted index of corporate bonds issued by entities in emerging countries. The CEMBI D IG is a subset of CEMBI D containing only securities where the middle rating of Moody's Fitch, and S&P is Baa3/BBB-/BBB- or above. The CEMBI D HY is a subset of CEMBI D containing only securities where the middle rating of Moody's Fitch, and S&P is Ba1/BB+/BB+ or below.

The **JPMorgan Collateralized Loan Obligation Index (CLOIE)** is the frst total return benchmark for broadly-syndicated arbitrage US CLO debt. CLOIE tracks US $644 billion in debt from broadly-syndicated, arbitrage floating-rate CLOs, approximately 93% of the total US CLO debt stock, across 1,400+ transactions and 8,200+ tranches managed by 130+ CLO managers.

The **Bloomberg ABS Index** tracks the investment grade ABS components of the Bloomberg U.S. Aggregate index. Securities must be rated investment-grade by at least two of the following ratings agencies: Moody's, S&P, Fitch. If only two of the three agencies rate the security, the lower rating is used to determine index eligibility. If only one of the three agencies rates a security, the rating must be investment-grade. Securities must be ERISA eligible under the underwriter's exemption. 144A securities are not included. The ABS index includes pass-through, bullet, and controlled amortization structures. The ABS index includes only the senior class of each ABS issue and the ERISA-eligible B and C tranche. The Bloomberg ABS A 1-3 yrs is a subset of Bloomberg Barclays Capital ABS limited to securities with median rating A and weighted average life between 1 and 3 years, and the 125 bps spread comes from internal analytics at Neuberger Berman. The Bloomberg Barclays Capital ABS A 3+ yrs is a subset of Bloomberg Barclays Capital ABS limited to securities with median rating A and weighted average life greater than 3 years, and the 125 bps spread comes from internal analytics at Neuberger Berman. Bloomberg Barclays Capital ABS BBB 1-3 yrs is a subset of Bloomberg Barclays Capital ABS limited to securities with median rating BBB and weighted average life between 1 and 3 years, and the 250 bps spread comes from internal analytics at Neuberger Berman. The Bloomberg Barclays Capital ABS BBB 3+ yrs is a subset of Bloomberg Barclays Capital ABS limited to securities with median rating BBB and weighted average life greater than 3 years. The 250 bps spread comes from internal analytics at Neuberger Berman.

The **S&P 500 Index** consists of 500 U.S. stocks chosen for market size, liquidity and industry group representation. It is a market value-weighted index (stock price times number of shares outstanding), with each stock's weight in the Index proportionate to its market value.

The **MSCI EAFE Index** aims to capture the performance of large and mid cap quality growth stocks across 21 developed market countries excluding the U.S. and Canada.

The **MSCI Emerging Markets Index** is a market-value weighted index designed to represent the performance of large- and mid-cap securities in 26 emerging markets.

The **NCREIF Fund Index**—Open-End Diversified Core Equity Fund Index (NCREIF ODCE) is a capitalization-weighted, gross of fee, time-weighted return index of the performance of the net invested capital of open-end funds whose investing style typically reflects lower risk investment strategies utilizing low leverage and generally represented by equity ownership positions in stable U.S. operating properties diversified across regions and property types.

The **NCREIF Property Index** is a measurement of U.S. property-level returns dating back to 1977, comprised exclusively of operating properties acquired, at least in part, on behalf of tax-exempt institutions and held in a fiduciary environment, weighted by market capitalization.

The **Markit iBoxx EUR Liquid Non-Financials Index** is a subset of the Markit iBoxx EUR Non-Financials bonds universe and contains up to 20 investment grade rated non-financial securities with maturity 5-7yrs and a BBB rating. All bonds need to have an average rating of investment grade from Fitch Ratings, Moody's Investor Service and Standard & Poor's Rating Services.

The **Burgiss Global Buyout Funds Index** tracks the performance of closed-ended private equity buyout funds in the Burgiss Manager Universe, converted to U.S. dollars.

The **Burgiss U.S. Private Debt Funds Index** tracks the performance of U.S. closed-ended private debt funds in the Burgiss Manager Universe.

This material is provided for informational purposes only and nothing herein constitutes investment, legal, accounting or tax advice. This material is general in nature and is not directed to any category of investors and should not be regarded as individualized, a recommendation, investment advice or a suggestion to engage in or refrain from any investment-related course of action. Investment decisions and the appropriateness of this material should be made based on an investor's individual objectives and circumstances and in consultation with his or her advisors. Information is obtained from sources deemed reliable, but there is no representation or warranty as to its accuracy, completeness or reliability. All information is current as of the date of this material and is subject to change without notice. The firm, its employees and advisory accounts may hold positions of any companies discussed. Any views or opinions expressed may not reflect those of the firm as a whole. Neuberger Berman products and services may not be available in all jurisdictions or to all client types. References to third-party sites are for informational purposes only and do not imply any endorsement, approval, investigation, verification or monitoring by Neuberger Berman of any content or information contained within or accessible from such sites.

Investing entails risks, including possible loss of principal. Investments in hedge funds and private equity are speculative and involve a higher degree of risk than more traditional investments. Investments in hedge funds and private equity are intended for sophisticated investors only. Indexes are unmanaged and are not available for direct investment. **Past performance is no guarantee of future results.**

This material may include estimates, outlooks, projections and other "forward-looking statements." Due to a variety of factors, actual events or market behavior may differ significantly from any views expressed. Investing entails risks, including possible loss of principal. Investments in hedge funds and private equity are speculative and involve a higher degree of risk than more traditional investments. Investments in hedge funds and private equity are intended for sophisticated investors only. Indexes are unmanaged and are not available for direct investment. Past performance is no guarantee of future results.

The views of the research analyst and the firm and its employees on medical topics should not be relied upon as medical advice and are not intended to serve as a substitute for consulting with a qualified medical professional. There is no representation or warranty as to its accuracy, completeness or reliability. All information is current as of the date of the material and is subject to change without notice. The firm, its employees and advisory accounts may hold positions of the manufacturers of the products discussed.

Asset Class Assumptions & Estimates

Capital market assumptions used herein reflect Neuberger Berman's forward-looking estimates of the benchmark return or volatility associated with an asset class. Estimated returns and volatilities are hypothetical return and risk estimates generated by Neuberger Berman's Institutional Solutions Group. Estimated returns and volatilities do not reflect the alpha of any investment manager or investment strategy/vehicle within an asset class. Information is not intended to be representative of any investment product or strategy and does not reflect the fees and expenses associated with managing a portfolio or any other related charges, such as commissions and surrender charges. Estimated returns and volatilities are hypothetical and generated by Neuberger Berman based on various assumptions and inputs, including current market conditions, historical market conditions and subjective views and estimates. Capital market assumptions shown reflect Neuberger Berman's long-term (20+ years into the future) estimates or intermediate-term (5-7 years into the future) estimates which are reviewed at least annually. Results will differ depending on whether they are based on Neuberger Berman's long-term (20+ years into the future) or intermediate-term (5-7 years into the future) capital market assumptions. Neuberger Berman's capital market assumptions are derived using a building block approach that reflects historical, current, and projected market environments, forward-looking trends of return drivers, and the historical relationships asset classes have to one another. These hypothetical returns are used for discussion purposes only and are not intended to represent, and should not be construed to represent, predictions of future rates of return. Actual returns may vary significantly. Neuberger Berman makes no representations regarding the reasonableness or completeness of any such assumptions and inputs. Assumptions, inputs, and estimates are periodically revised and subject to change without notice. Estimated returns and volatilities should not be used, or relied upon, to make investment decisions.

Rate of Return Estimate: Rate of return or geometric return is a measure of average returns of an investment over a period of time. Geometric rate of returns are typically referred to as annualized compound rate of returns and are always less than or equal to the arithmetic mean return of the same time series. Geometric rate of returns are used for straight-line calculations within the analysis, for example, the cash flow calculations. In straight-line calculations, each year is represented as a gain, so the compound (geometric mean) rate of return is used to adjust for the amount needed to make up for a loss in a given year. For example, if you lose 5% in one year, and gain 5% the year after, you still have less than you started with at the beginning of year one.

Arithmetic Mean Estimate: Arithmetic mean or average return is calculated by dividing the sum of a series of numbers by the number of overall items. This is more typically thought of as an "average" of the data set. Arithmetic mean or average return ignores the impact of compounding in the context of analyzing investment returns and is the simple average of returns observed over a period of time. Arithmetic mean returns are used in this material and, if applicable, the Efficient Frontier, because, through randomization, losses and gains are being accounted for each year.

Standard Deviation: A statistical measure of the volatility based on the distribution of a set of data from its mean (average value). For example, a portfolio with an average return of 10% and a standard deviation of 15% would return a result between -5% and +25% the majority of the time (68% probability or 1 standard deviation), almost all of the time the return would be between -20% and +40% (95% probability or 2 standard deviations). If there were 0 standard deviation then the result would always be 10%. Generally, more aggressive portfolios have a higher standard deviation and more conservative portfolios have a lower standard deviation.

No part of this document may be reproduced in any manner without prior written permission of Neuberger Berman Europe Limited.

This material is being issued on a limited basis through various global subsidiaries and affiliates of Neuberger Berman Group LLC. Please visit www.nb.com/disclosure-globalcommunications for the specific entities and jurisdictional limitations and restrictions.

The "Neuberger Berman" name and logo are registered service marks of Neuberger Berman Group LLC.

NEUBERGER | BERMAN

Neuberger Berman
1290 Avenue of the Americas
New York, NY 10104-0001

Z0457 04/24 1826396 ©2024 Neuberger Berman Group LLC. All rights reserved.

www.nb.com