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JONATHAN BAILEY
Global Head of ESG and Impact Investing

EDWARD JONES
European Institutional Relationship Manager

ARGI SAMPEDRO
ESG Policy and Regulatory Strategist

TULLY CHENG
Head of EMEA Institutional Solutions

FLORA XU
Client Strategist

UK Pension Reform: The Case for Further Consolidation

The UK government's Pension Schemes Bill, announced in July, aims to deliver strong returns for pension holders, enable bigger allocations to alternative investments, and unlock billions of pounds to support economic growth and the climate transition.

We welcome the subsequent proposals made by Chancellor Reeves in her Mansion House speech and their focus on consolidating the UK's fragmented pension schemes, which we see as a crucial step in delivering these objectives. It is the first step toward creating the scale and the governance sophistication required to improve access to the asset managers and alternative investments that can enhance diversification.

In this paper, by presenting optimised model portfolios, we aim to demonstrate how well-calibrated, diversified investments and exposure to alternative asset classes can improve retirement outcomes for pension scheme members. We believe the ongoing UK government review will make it easier for pension scheme managers to implement such portfolios.

Executive Summary

- Consolidating the UK's highly fragmented Corporate Defined Benefit (DB) and Defined Contribution (DC) pension schemes can reduce costs, increase efficiency and improve access to high-return alternative investments, ultimately benefiting savers and the UK economy.
- The pension models of Canada and Australia highlight the advantages of strategic consolidation and diversification: by investing in private assets, in particular, these countries' large pension funds have achieved significant returns that have enhanced pensioner welfare and spending capacity.
- Consolidation aligns with the UK government's objectives by potentially making it easier to channel long-term investments into low-carbon infrastructure and other solutions that support the climate transition.
- As regulatory requirements increase, particularly around environmental, social and governance (ESG) factors, larger consolidated funds will be better equipped to meet these demands. Scale enables access to quality talent and external expertise that can support the climate transition and other sustainability-related goals.

We believe the current fragmentation of the UK's pension schemes, along with a focus on costs versus outcomes, leads to inefficiencies and missed opportunities for pension funds to invest in assets with high risk-adjusted returns. We therefore welcome the Pension Schemes Bill announced in July and further details on the Government's plans announced in the Mansion House speech.

The oversight, cost, maintenance and management challenges facing smaller DC and Corporate Defined Benefit (DB) schemes hinder asset performance. Consolidation can reduce costs, increase efficiency, and improve access to the asset managers and alternative investments that can enhance diversification and returns for savers. More efficient investment can raise economic growth in itself, while the resulting better pensions should add to that growth by supporting higher spending by retirees.

In this paper, by presenting optimised model portfolios, we aim to demonstrate how well-calibrated, diversified investments and exposure to alternative asset classes can improve retirement outcomes for pension scheme members. We believe the ongoing UK government review will make it easier for pension scheme managers to implement such portfolios.

Why Consolidation Matters: Harnessing Collective Strength in Pension Funds

The Fragmentation of the Corporate DB Market

The Corporate DB pensions market is highly fragmented: while some 5,000 schemes manage more than £1.4tn of assets, 75% of existing schemes manage under £100mn, some of which could benefit from consolidation.[1] The Department for Work and Pensions (DWP) has proposed a permanent "Superfund" regulatory regime to help sponsoring employers and trustees manage DB liabilities.[2]

According to the Pensions and Lifetime Savings Association (PLSA), the typical corporate DB schemes has around 70% in bonds, 20% in equities and less than 10% in alternatives.[3] Fragmentation limits the ability to invest in high-return asset classes like infrastructure and private equity, in particular, where investment vehicles traditionally require very large commitments.

Although formally outside the scope of the reforms announced by the Government to date, we believe consideration should be given to the consolidation of corporate DB pensions and their potential to provide risk capital to UK companies.

Consolidation among public-sector DB schemes shows the way forward. A total of 86 English and Welsh Local Government Pension Scheme (LGPS) funds, managing £354bn, have now been merged into eight large asset pools managing c.£25 – 80bn each.[4] The LGPS is expected to grow to over £500bn of assets by 2030.[5] The UK government wants to speed up the delegation of investment management from administering authorities to these eight pools but currently has no plan to consolidate them further—and we agree that the current arrangement strikes the right balance between scale and the ability to focus on investment in local communities.

[1] The Pension Protection Fund, *The Purple Book 2023*, at https://www.ppf.co.uk/Purple-Book.
[2] DWP, at https://www.gov.uk/government/consultations/defined-benefit-pension-scheme-consolidation/outcome/government-response-consolidation-of-defined-benefit-pension-schemes.
[3] PLSA, *Pensions and Growth: A Paper by the PLSA on Supporting Pension Investment in UK Growth* (June 2023), at https://www.plsa.co.uk/Portals/0/Documents/Policy-Documents/2023/Pensions-and-Growth-Jun-2023.pdf.
[4] Local Government Pension Scheme Advisory Board—England and Wales, *Scheme Annual Report 2023* (September 2024) at https://lgpsboard.org/index.php/scheme-annual-report-2023.
[5] PLSA, *Op. Cit.*

The Promising Evolution of DC Schemes

DC schemes vary widely, from small personal pension plans to very large multiemployer Master Trusts.

Consolidation is underway among occupational trust-based schemes, driven by market forces as well as the DWP and The Pensions Regulator (TPR), which urge the smallest schemes to merge if they cannot prove they offer value for money. But it is Master Trusts, established with the 2012 introduction of automatic enrolment, that point to the scalability that comes with consolidation. Just 34 are authorised today, but they serve more than 20mn savers and manage over £200bn in assets, and they are expanding quickly, with some estimates projecting that they will oversee £1tn in assets by 2030.[6]

DC schemes still primarily invest in listed equities and global indices—only 5% of DC assets were invested in property and alternatives in 2023[7]—but as their scale grows, some have begun to invest small amounts in illiquid assets. According to a survey of 21 larger single-employer trust and Master Trust schemes published by the Defined Contribution Investment Forum (DCIF) in March 2024, 42% had already made an allocation to private markets, and a further 28% were actively planning to do so.[8] We hope that as the scale of the DC market continues to grow and Master Trust consolidation continues, the challenges around scale and large upfront investments become less relevant.

Enhancing Risk-Adjusted Returns Through Diversification

To illustrate the benefits of the enhanced diversification that becomes possible when consolidation and scale broadens the investment opportunity set, we show the effect of moving from a typical asset allocation to a modelled allocation optimised for risk-adjusted return. We base our starting illustrative allocations on average asset allocations provided by the Pensions and Lifetime Savings Association (PLSA) as of 2023.[9]

Optimising a Corporate DB Portfolio

Our analysis demonstrates that further diversifying an illustrative DB portfolio by taking some of the allocation to public bonds and equities and sharing it among alternative investments can increase estimated return by 69 basis points (even after taking account of higher fees), while reducing volatility by as much as 1.5 percentage points.

As well as allocating away from public markets to alternatives in general, the optimised portfolio also pivots its real-asset exposure away from real estate and into infrastructure, and shifts fixed income weightings from credit and domestic government bonds to global government bonds. While this might not be suitable for very mature schemes or those heading for an insurance buyout, we believe it can be appropriate for schemes with longer investment horizons.

[6] The Pensions Regulator, at https://www.thepensionsregulator.gov.uk/en/master-trust-pension-schemes/list-of-authorised-master-trusts; PLSA, *Op. Cit*.
[7] PLSA, *Op. Cit.*
[8] DCIF, *Investing in Private Markets: The barriers are coming down* (March 2024), at https://dcif.co.uk/wp-content/uploads/2024/03/Investing-in-private-markets-part-one-FINAL.pdf.
[9] PLSA, *Op. Cit.*

FIGURE 1. DB PORTFOLIOS: SWITCHING FROM PUBLIC MARKETS TO ALTERNATIVES CAN ENHANCE RISK-ADJUSTED RETURN, EVEN AFTER FEES

	Illustrative Portfolio	Optimised Portfolio	Change	Asset Class Fee
Cash & Equivalent	1%	1%	-	0.08%
GBP Gov/Agency	29%	25%	-4%	0.08%
Global Gov/Agency	21%	25%	+4%	0.08%
GBP Corp IG	8%	5%	-3%	0.08%
Global Credit	12%	10%	-2%	0.08%
Core Fixed Income	**71%**	**66%**	**-5%**	
UK Equity	3%	3%	-	0.10%
Global Equity	14%	7%	-7%	0.10%
Public Equity	**17%**	**10%**	**-7%**	
Hedge Funds	3%	1%	-2%	2.00%
Insurance-Linked Strategies	0%	3%	+3%	2.00%
Direct Lending	0%	1%	+1%	1.00%
Specialty Finance	0%	3%	+3%	1.00%
Residential Mortgages	0%	1%	+1%	0.40%
Private Equity Buyout	4%	8%	+4%	2.00%
Venture Capital	1%	2%	+1%	2.00%
Infrastructure	1%	3%	+2%	0.50%
Real Estate	4%	2%	-2%	0.50%
Alternatives	**12%**	**24%**	**+12%**	

	Illustrative Portfolio	Optimised Portfolio	Change
Expected Return	**5.13%**	**6.00%**	**+0.87%**
Volatility	**5.80%**	**4.30%**	**-1.50%**
Fee	**0.24%**	**0.41%**	**+0.17%**
Net-of-Fee Return	**4.90%**	**5.59%**	**+0.69%**

Source: Neuberger Berman, Bloomberg, Cambridge Associates, Burgiss, FactSet. Analytics as at 31 August 2024. The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. Non-GBP assets are hedged to GBP using three-month forwards (-0.20% USD to GBP).
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Optimising a DC Portfolio

The illustrative DC scheme portfolio starts with a meaningfully higher allocation to listed equities, and therefore higher estimated return and volatility than the typical DB allocation. For that reason, in the optimisation we allow portfolio volatility to remain higher in order to sustain a similar level of estimated return. The starting allocation to private markets is lower than for a DB portfolio, however, and for that reason we capped the weightings to private assets to avoid an unrealistically large change in allocation. Overall, the optimisation shifts allocations away from public equities into diverse private markets and, to a lesser extent, away from domestic government bonds and global credit into global government bonds and domestic credit.

The resulting optimised portfolio raises the estimated net-of-fees return by 62 basis points while reducing volatility by 90 basis points.

FIGURE 2. DC PORTFOLIOS: SWITCHING FROM PUBLIC EQUITIES TO ALTERNATIVES CAN ENHANCE RISK-ADJUSTED RETURN, EVEN AFTER FEES

	Illustrative Portfolio	Optimised Portfolio	Change	Asset Class Fee
Cash & Equivalent	5%	5%	-	0.08%
GBP Gov/Agency	4%	2%	-2%	0.08%
Global Gov/Agency	3%	4%	+1%	0.08%
GBP Corp IG	4%	8%	+4%	0.08%
Global Credit	5%	3%	-2%	0.08%
Core Fixed Income	**21%**	**22%**	**+1%**	
UK Equity	23%	14%	-9%	0.10%
Global Equity	50%	41%	-9%	0.10%
Public Equity	**73%**	**55%**	**-18%**	
Hedge Funds	3%	2%	-1%	2.00%
Insurance-Linked Strategies	0%	0%	-	2.00%
Direct Lending	0%	5%	+5%	1.00%
Specialty Finance	0%	0%	-	1.00%
Residential Mortgages	0%	0%	-	0.40%
Private Equity Buyout	1%	8%	+7%	2.00%
Venture Capital	0%	2%	+2%	2.00%
Infrastructure	0%	5%	+5%	0.50%
Real Estate	2%	1%	-1%	0.50%
Alternatives	**6%**	**23%**	**+17%**	

Expected Return	**5.77%**	**6.60%**	**+0.83%**
Volatility	**11.60%**	**10.70%**	**-0.90%**
Fee	**0.18%**	**0.39%**	**+0.21%**
Net-of-Fee Return	**5.59%**	**6.21%**	**+0.62%**

Source: Neuberger Berman, Bloomberg, Cambridge Associates, Burgiss, FactSet. Analytics as at 31 August 2024. The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. Non-GBP assets are hedged to GBP using three-month forwards (-0.20% USD to GBP).
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. This material is for educational purposes only and nothing herein constitutes investment advice or an investment recommendation. Asset classes are represented by benchmarks and do not represent any Neuberger Berman investment product or service. Estimates are shown gross of fees which do not reflect the fees and expenses associated with managing a portfolio. If such fees and expenses were reflected, estimates shown would be lower. Please see disclosures at the end of this material for additional information regarding Neuberger Berman's Capital Market Assumptions.

Our models suggest that consolidated, larger-scale DC pension schemes able to invest in high-return assets such as infrastructure, private equity and other alternatives may achieve better risk-adjusted returns for savers.

Diversification Unlocks New Capital to Support the UK's Climate Transition

A survey by Opinium Research in 2023 suggests that more than 12mn UK pension holders want their pension fund to invest more in climate solutions.[10] A report by the insurer Phoenix Group and the campaigning organisation Make My Money Matter claims that UK pension funds are currently on track to raise their £100bn allocation to climate solutions to just £300bn by 2035, when they could raise it to £1.2tn.[11]

By enhancing their ability to allocate to low-carbon infrastructure, Insurance-Linked Securities (ILS), and private equity and venture capital vehicles investing in businesses developing climate solutions, we believe a consolidation of the UK's pension schemes will not only help them play a role in achieving the government's climate-financing and net-zero objectives, but also align them with members' preferences.

In addition, regulatory requirements are increasingly demanding more climate expertise from trustees.

Climate reporting obligations introduced in the Pensions Scheme Act of 2021 require pension schemes with over £1bn in assets to report on the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD), and the UK government is now expected to extend this requirement to smaller schemes under £1bn. That would remove any incentive to remain small, and increase the need for the governance, stewardship, investment, monitoring and reporting capacity that, in our view, is available only to those with scale.

In 2022, the DWP introduced new requirements for pension schemes to measure and publish how their investments support the Paris Agreement, which may also be extended to smaller schemes over time. This is a complex and resource-intensive assessment exercise: the Net-Zero Investment Framework (NZIF) developed by the Institutional Investor Group on Climate Change (IIGCC) provides a useful model but, in our view, most pension schemes will need to work on it with an external partner. To that end, Neuberger Berman has developed its own Net-Zero Alignment Indicator to help asset owners capture their portfolios' current and prospective alignment with the Paris Agreement objectives.[12]

How do we get there? Lessons from Canada and Australia

Canada and Australia offer useful models for how diversification and better returns for savers can be achieved through strategic consolidation and scale.

For example, as at March 2024, the Canada Pension Plan Investment Board (CPPIB) reported that almost half of Canada Pension Plan fund assets were in private equity and real assets. This diversified approach has yielded an average annual return of 9.2% over the past decade, demonstrating the potential benefits of investing in alternative assets.[13] The Australian Superannuation funds allocate 21% of their investments to real estate, infrastructure, private debt, private equity and other alternative asset classes.[14]

Moreover, Australia's largest superannuation fund, AustralianSuper, has allocated substantial resources to domestic projects, including renewable energy initiatives, suggesting that pension scheme consolidation and other reforms could also support the UK government's 2023 Mansion House Compact without mandating formal domestic investment requirements. According to KPMG, AustralianSuper's investment activities contributed approximately $7.2bn to Australia's GDP and created 11,800 additional ongoing full-time equivalent (FTE) jobs across the Australian economy in 2022.[15] That domestic pension fund investment attracts additional foreign investment, and that appetite and competition for infrastructure assets has enabled the government to realise substantial liquidity to reinvest in new infrastructure projects.

[10] Cited by Phoenix Group at https://www.thephoenixgroup.com/news-views/phoenix-group-research-unveils-that-uk-pension-funds-could-finance-up-to-12-trillion-of-investments-to-tackle-climate-change/.

[11] Phoenix Group and Make My Money Matter, *Unlocking Investment in Climate Solutions* (November 2023) at https://makemymoneymatter.co.uk/wp-content/uploads/2023/11/Phoenix-Unlocking-Investment-in-Climate-Solutions.pdf.

[12] See Jonathan Bailey and Sarah Peasey, *Net-Zero Alignment: Beyond the Numbers* (July 2023) at https://www.nb.com/en/link?type=article&name=whitepaper-net-zero-alignment-beyond-the-numbers.

[13] CPPIB, *Annual Report 2024* (May 2024) at https://www.cppinvestments.com/wp-content/uploads/2024/07/CPP-Investments-F2024-Annual-Report.pdf.

[14] The Association of Superannuation Funds of Australia, *Superannuation Statistics* (October 2024) at https://www.superannuation.asn.au/wp-content/uploads/2024/10/2410-Super-stats.pdf.

[15] KPMG, *AustralianSuper's Economic Contribution to Australia* (March 2023) at file:///C:/Downloads/KPMG%20Report%20AustralianSuper%20Economic%20Contribution%20to%20Australia%20March%202023.pdf.

Next Steps in the UK Pension Schemes Review

Considerations for the UK Government

1. Consider which aspects of successful pension models, such as Canada and Australia, can be adopted in the UK, ensuring that policy changes give pension schemes the appropriate governance to manage diverse programs of public and private assets.
2. Promote the consolidation of private DB and DC Master Trusts, where efficiency gains make it beneficial for savers.
3. Ensure policy certainty on the climate transition and prioritise the creation of domestic private market opportunities that can deliver stable long-term returns. In particular, promote the UK's new National Wealth Fund's ability to boost private investment and support emerging sectors and technologies by assuming execution risks, providing equity capital and offering innovative financing, such as concessional loans.

Our Recommendations for Trustees

1. Stay engaged with the government's reform program: Trustees can make known their views on the reforms announced by Chancellor Reeves at Mansion House through the two public consultations launched on the DC pension market and the LGPS.[16] While legislative change will take years to implement, it is key for the pensions industry to continue to bring their views to the table and prepare for the challenges and opportunities change may bring.
2. Continue conversations with existing external partners and develop relationships with new partners, focusing on their ability to support schemes throughout a potential consolidation process. This might include asking advice on how to build a private assets portfolio from scratch once consolidation makes it a realistic prospect; or modeling how being larger might affect the fee profile of an alternatives portfolio.
3. Improve understanding of the wide range of investment strategies available in private markets and the capacity to diversify a private markets allocation into niche sectors.
4. Assess appetite for investing in climate transition in response to pension holders' preferences.

Appendix

Indices Used

Asset Category	Asset Class	Index	Index Definition
Cash & Short Term	Cash & Short Term - GBP	Bloomberg Barclays 3-month Gilts Index	These indices measure the performance of GBP-denominated, fixed-rate, investment-grade public obligations of the UK.
Sterling Gov/Agency	Sterling Gilt 1-5 yrs	Bloomberg Barclays Sterling Gilt 1 – 5 yrs Index	
	Sterling Gilt 5-10 yrs	Bloomberg Barclays Sterling Gilt 5 – 10 yrs Index	
	Sterling Gilt 10+ yrs	Bloomberg Barclays Sterling Gilt 10+ yrs Index	
Global Gov/Agency	Global Agg Treasuries	Bloomberg Barclays Global Aggregate Treasury Index	Measures the performance of global government debt from a number of local currency markets.
Sterling Corp IG	Sterling Credit Corp 1-5 yrs	Bloomberg Barclays Sterling Credit Corp 1 – 5 yrs Index	These indices measure the performance of GBP-denominated, fixed-rate, investment-grade corporate bonds.
	Sterling Credit Corp 5-10 yrs	Bloomberg Barclays Sterling Credit Corp 5 – 10 yrs Index	
	Sterling Credit Corp 10+ yrs	Bloomberg Barclays Sterling Credit Corp 10+ yrs Index	
Global Credit	Global Agg Credit	Bloomberg Barclays Global Aggregate Credit Index	Measures the performance of global corporate debt from a number of local currency markets.
UK Equity	UK Equity	MSCI UK Index	Measures the performance of the large- and mid-cap segments of the UK equity market. Its 77 constituents cover approximately 85% of the free float-adjusted market capitalisation in the UK.
Global Equity	Global Equities	MSCI ACWI Index	Measures the performance of large- and mid-cap equities across 23 Developed Markets (DM) and 24 Emerging Markets (EM) countries.

[16] *Pensions Investment Review: Unlocking the UK pensions market for growth*, at https://www.gov.uk/government/consultations/pensions-investment-review-unlocking-the-uk-pensions-market-for-growth; *Local Government Pension Scheme (England and Wales): Fit for the Future*, at https://www.gov.uk/government/consultations/local-government-pension-scheme-england-and-wales-fit-for-the-future/local-government-pension-scheme-england-and-wales-fit-for-the-future

Asset Category	Asset Class	Index	Index Definition
Hedge Funds	Hedge Funds	HFRI Fund of Funds Index	Measures the performance of diversified funds of hedge funds that invest in a variety of strategies among multiple managers.
Direct Lending	Direct Lending	Burgiss Debt Index	Measure the performance of loans, bonds, credit derivatives, and other related securities of companies, government entities or tangible assets.
Specialty Finance	Specialty Finance	Neuberger Berman Proxy	Yields are provided by Neuberger Berman's Specialty Finance investment team; risk is proxied by the combination of ABS and leveraged loans.
Residential Mortgages	Residential Mortgages	Neuberger Berman Proxy	Yields are provided by Neuberger Berman's Residential Mortgages investment team; risk is proxied by the combination of US MBS and North American RMBS to reflect the duration and credit risk of the market.
PE Buyout	PE Buyout	Burgiss Buyout Index	Measures the performance of equity investments in mature, typically larger private companies acquired using leverage.
PE Venture Capital	PE Venture Capital	Burgiss Venture Capital Index	Measures the performance of venture capital investments in the Burgiss database.
Infrastructure	Private Infrastructure Equity	EDHEC Private Infrastructure Index	Measures the performance of a representative set of 700+ infrastructure companies and 2000+ private debt instruments.
Real Estate	UK Real Estate	Neuberger Berman Proxy	Constructed as a weighted average of the FTSE100 Index and UK GBP Government Index, according to the relative standing of the UK Manufacturing Purchasing Managers' Index.
ILS	Insurance-Linked Securities	Eurekahedge ILS Advisers Index	Measure the performance of 22 constituent hedge funds, equally weighted, that explicitly allocate to insurance-linked investments and have at least 70% of their portfolio invested in non-life risk.

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

Source: Neuberger Berman. For illustrative purposes only.

[1] For certain asset classes where a standard public index may not be readily available, Neuberger Berman 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, Neuberger Berman 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.

ESTIMATED RETURN, RISK AND SOLVENCY CAPITAL REQUIREMENT OF ASSET CLASSES USED IN THE OPTIMISATIONS

Asset Class	Return (%, GBP)	Ann. Vol (%, GBP)
Cash & Short Term - GBP	4.05%	0.6%
Sterling Gilt 1-5 yrs	4.15%	2.5%
Sterling Gilt 5-10 yrs	3.80%	5.9%
Sterling Gilt 10+ yrs	4.29%	12.4%
Global Agg Treasuries	4.47%	3.5%
Sterling Credit Corp 1-5 yrs	5.04%	3.7%
Sterling Credit Corp 5-10 yrs	5.06%	7.8%
Sterling Credit Corp 10+ yrs	5.32%	11.3%
Global Agg Credit	4.65%	5.0%
UK Equity	5.48%	13.4%
Global Equities	6.37%	16.4%
Hedge Funds	5.35%	6.4%
Direct Lending	7.53%	7.5%
Specialty Finance	12.14%	8.1%
Residential Mortgages	7.23%	8.2%
PE Buyout	12.10%	16.3%
PE Venture Capital	14.71%	23.0%
Private Infrastructure Equity	8.32%	10.1%
UK Real Estate	5.20%	10.0%
Insurance-Linked Strategies	9.80%	3.6%

Source: Neuberger Berman, Bloomberg, Cambridge Associates, Burgiss, FactSet. Analytics as at 31 August 2024. The performance and risk projections/estimates are hypothetical in nature and reflect the Neuberger Berman's Capital Market Assumptions. Non-GBP assets are hedged to GBP using three-month forwards (-0.20% USD to GBP).

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 annualised 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 analysing 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 randomisation, 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.

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Neuberger Berman
The Zig Zag Building
70 Victoria Street
London, SW1E 6SQ
United Kingdom
www.nb.com