

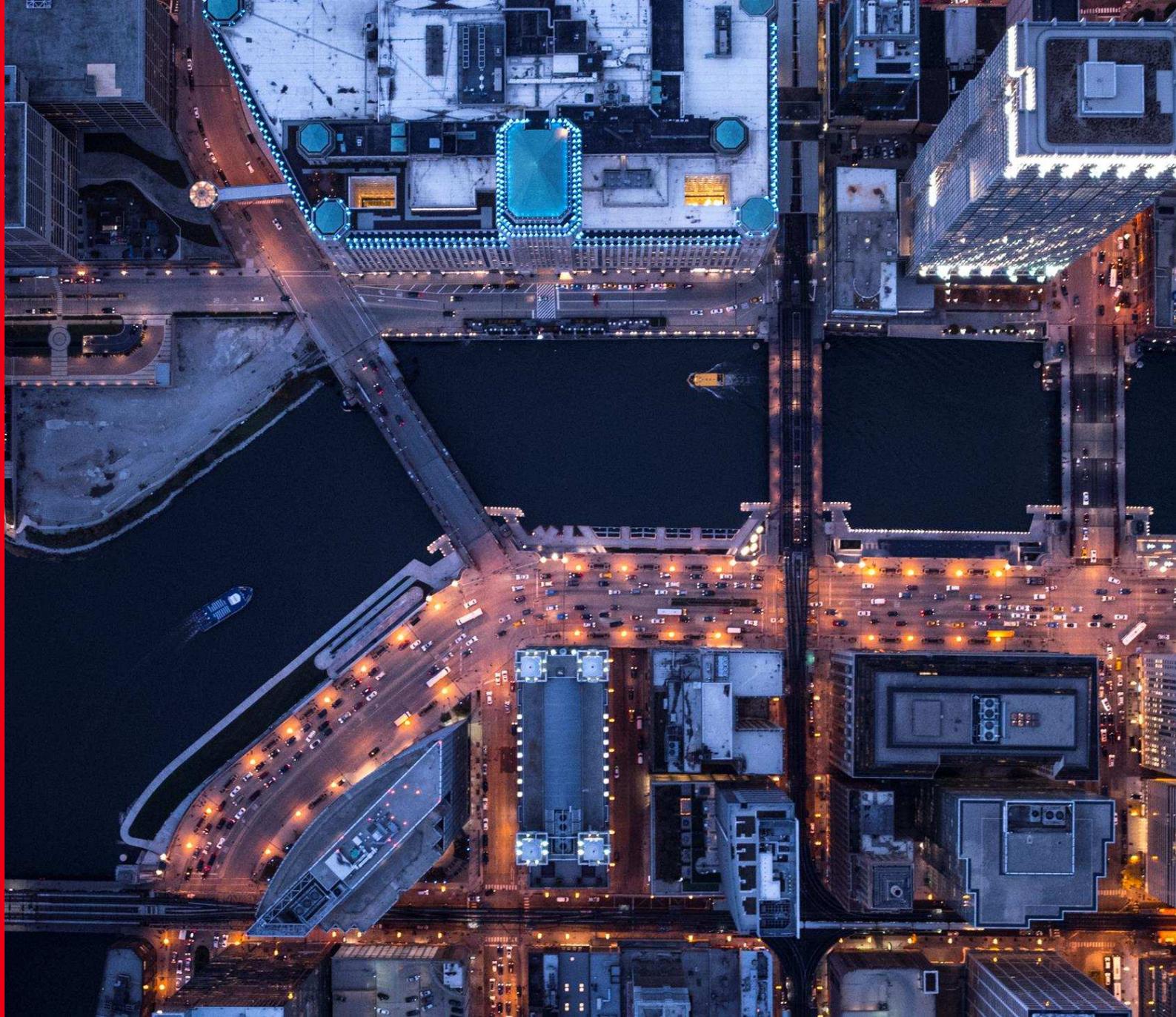
AON

Asset Liability Management Study

Pensions and Grants Fund of
the Personnel of Cyprus
Telecommunications Authority
("CYTA PF")

As at 31st October 2022

Prepared January 2023



About Aon

Aon is in the business of better decisions

Aon exists to shape decisions for the better — to protect and enrich the lives of people around the world. Our colleagues provide our clients in over 120 countries with advice and solutions that give them the clarity and confidence to make better decisions to protect and grow their business.

50,000

colleagues around the world

120+

countries with Aon clients

Through our experience, global reach and state-of-the-art analytics, we are better able to help clients meet rapidly changing, increasingly complex and interconnected challenges across four areas of need:

Navigating new forms of volatility

Building a resilient workforce

Rethinking access to capital

Addressing the underserved

Commercial Risk Solutions

Shifts in technology, economics and geopolitics are creating unprecedented volatility. We help clients identify, measure and manage their risk exposure.

\$75B+

of bound premium placed annually¹

Health Solutions

Health is declining, costs are rising and workers have vastly different needs. We help companies improve employee health and wellbeing while managing costs.

\$180B

of healthcare premium directed annually²

Reinsurance Solutions

Businesses, governments and communities need to become more resilient. Our expertise and insight help (re)insurers navigate uncharted territories and create more relevant solutions.

\$45B+

of bound premium placed annually

Wealth Solutions

Global business is becoming increasingly difficult to navigate. We help employers, fiduciaries and investment officers optimize results and provide a more secure future for their stakeholders.

\$4.1T³

of assets under advisement

¹ Includes approximately \$30 billion of captive premium

² Includes \$30B of fully-insured premium and \$150B of self-insured premium equivalents

³ As of 6/30/2021, includes non-discretionary assets advised by Aon and its global affiliates which includes retainer clients and clients in which Aon and its global affiliates have performed project services for over the past 12 months. Project clients may not currently engage Aon at the time of the calculation of assets under advisement as the project may have concluded earlier during preceding 12-month period.

Contents

1
Introduction

2
Setting the scene &
ALM Framework

3
Peer Group
Benchmarking

4
Investment Beliefs,
Metrics, Objectives
and Constraints

5
Capital Market
Assumptions and
Asset Liability
Management Study

6
Developing an
Optimal Investment
Strategy

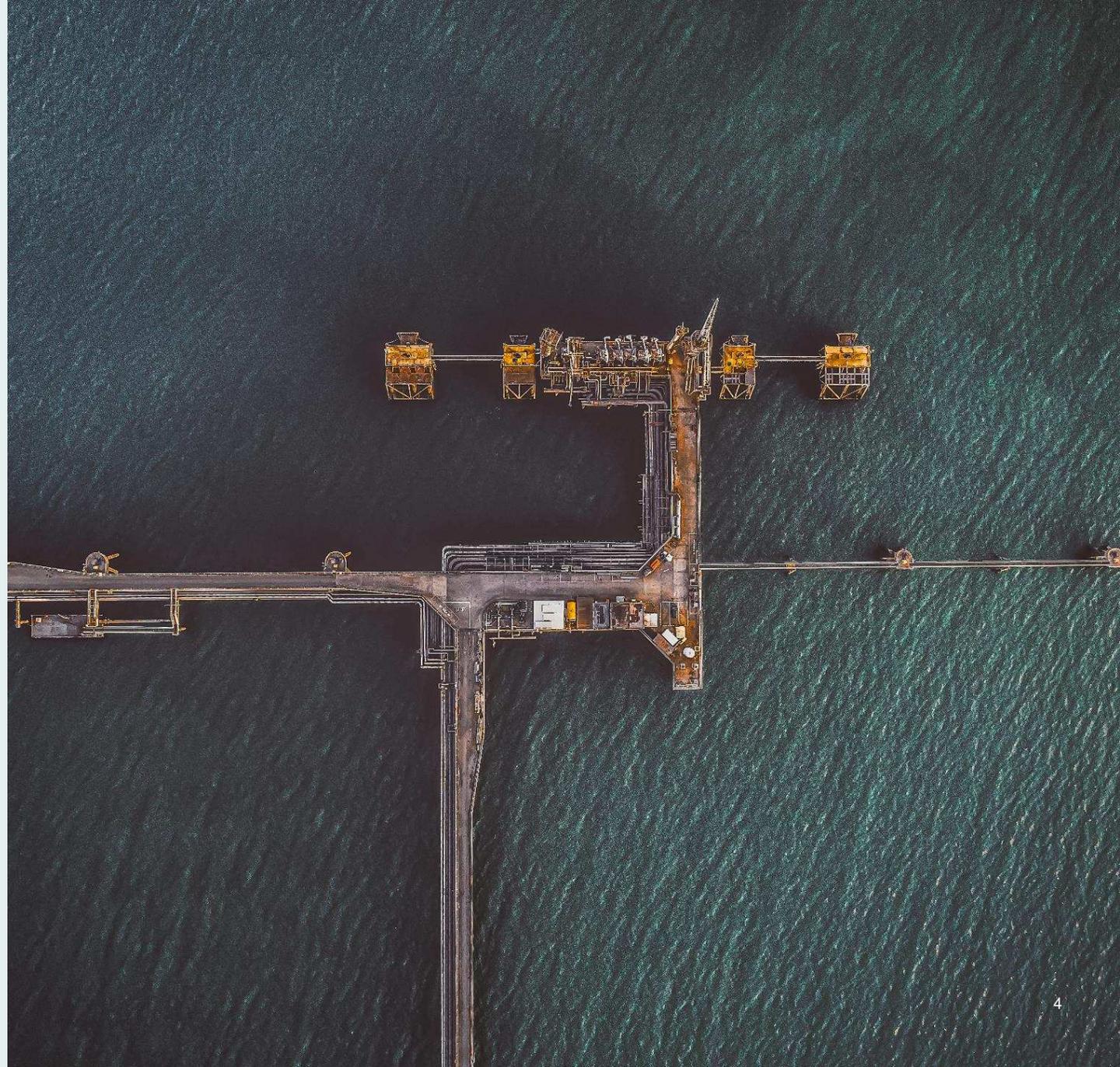
7
Additional Risk
Analysis: Economic
& Climate Change
Scenarios

8
Appendix 1:
Definitions

9
Appendix 2: Asset
Class Training

1

Introduction



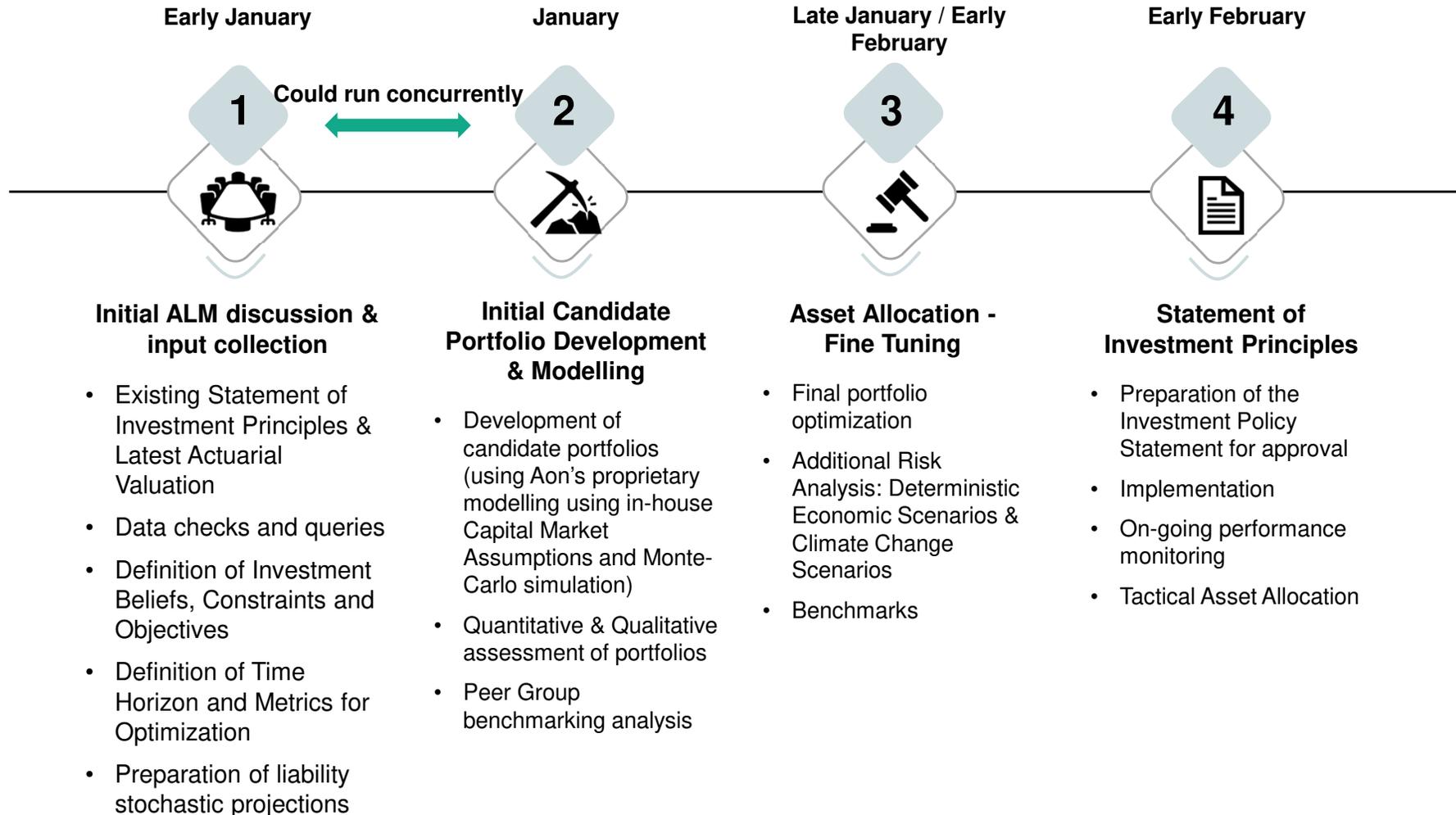
Introduction

Pensions and Grants Fund of the Personnel of Cyprus Telecommunications Authority

- Pension funds have a long term liability therefore they have a long term investment horizon. Accordingly, they need to make long-term investment decisions to meet their liabilities over many years into the future. To help them do this, defined benefit pension funds model their assets and liabilities by undertaking an ALM Study.
- The Board of Trustees (*the “Trustees”*) of the Pensions and Grants Fund of the Personnel of Cyprus Telecommunications Authority (*the “Fund”*), have completed the latest Asset Liability Modelling study (“ALM”) in February 2020, which formed the basis for the current Strategic Asset Allocation and the Statement of Investment Principles (*the “SIP”*).
- As per the Law 208 (I), 2012 and the Fund’s approved Statement of Investment Principles, the Fund must conduct a new ALM study at least every 3 years or earlier, if there is a significant event that affects the assets and liabilities of the Fund.
- Dynamic ALM study will assist the Trustees in their decision-making relative to the Strategic Asset Allocation of the Pension Fund by:
 - Setting Investment Beliefs & Constraints and updating the risk / return Objectives
 - Observing current and future risks of the implemented strategy as measured by the level of the Funding Level (FL) at the end of the time horizon.
 - Setting a new Strategic Asset Allocation for the Fund. Once the Strategy is agreed, Aon will prepare the Statement of Investment Principles.
- This study has been prepared with reference date as at 31st October 2022.



Key ALM project steps



2

Setting the scene & ALM Framework



What is an ALM (Asset Liability Management)?

- ALM provides the Trustees with an understanding of the dynamic relationship between plan assets and liabilities over time
- Illustrates the impact of various asset allocations on key financial metrics under a large range of different macro-economic scenarios (5000 scenarios)
- Identifies future trends in the financial health of the Fund based on economic uncertainties that may not be evident from an actuarial valuation, which provides only a snapshot at a point in time
- Helps determine the level of risk that is appropriate in the context of the Fund's liabilities

*An asset-liability study is a **comprehensive toolkit** for making **decisions** on a Fund's **asset allocation** and investment risk that **align with the liabilities** those funds support.*



Why Conduct an Asset-Liability Study?



- Long term asset mix is the single most important factor in determining investment performance
- An Asset-Liability Study is an integral step in setting and monitoring the Investment Policy (SIP)
 - Purpose is to develop the strategic asset mix, using the Fund’s objectives and risk tolerance as guiding principles
 - Holistic approach focused on the interaction between assets and liabilities and how that translates into achieving objectives
- Once the strategic asset mix is determined, implementation follows
 - Determine manager structure, select investment funds and monitor
- The strategic asset mix should be reviewed at least every three years (by law), or earlier if there are significant changes to the Fund or prevailing market conditions

Pension Fund: Current Asset-Liability Profile

Asset Liability Snapshot as of 31st October 2022

Metric	Value	Fund %
Market Value of Assets	€ 631,209,635	
Liability Metrics		
Projected Benefit Obligation	€ 714,656,726	
Funding Level (Deficit)	€ -83,447,092	88.3%
Contributions (YE 31/10/2023)		
SCR < benefit obligation accrual rate	€ 6,956,676	1.1%
SCR* = benefit obligation accrual rate	€ 11,052,518	1.8%
Benefits (YE 31/10/2023)	€ 32,848,458	5.2%

Financial Assumptions as of 31st October 2022 (Input from the Fund's Actuary)

Metric	Assumption
Discount Rate	3.25%
General Salary Increase	1.50%
Pension Increase	1.25%
Average Inflation Rate	2.00%
Insurable Earnings Increase	2.50%
Mortality Table	60% of PA90

Interest Rate Risk Snapshot as of 31st October 2022

Metric	Years	Change in Value (100bps shock)
Liability Duration	14.2	€ 101.5m
Asset Duration	2.1	€ 13.2m
Surplus at Risk (100 bps shock) ¹		€ 88.3m
Asset – Liability Hedge Ratio²		14.7%



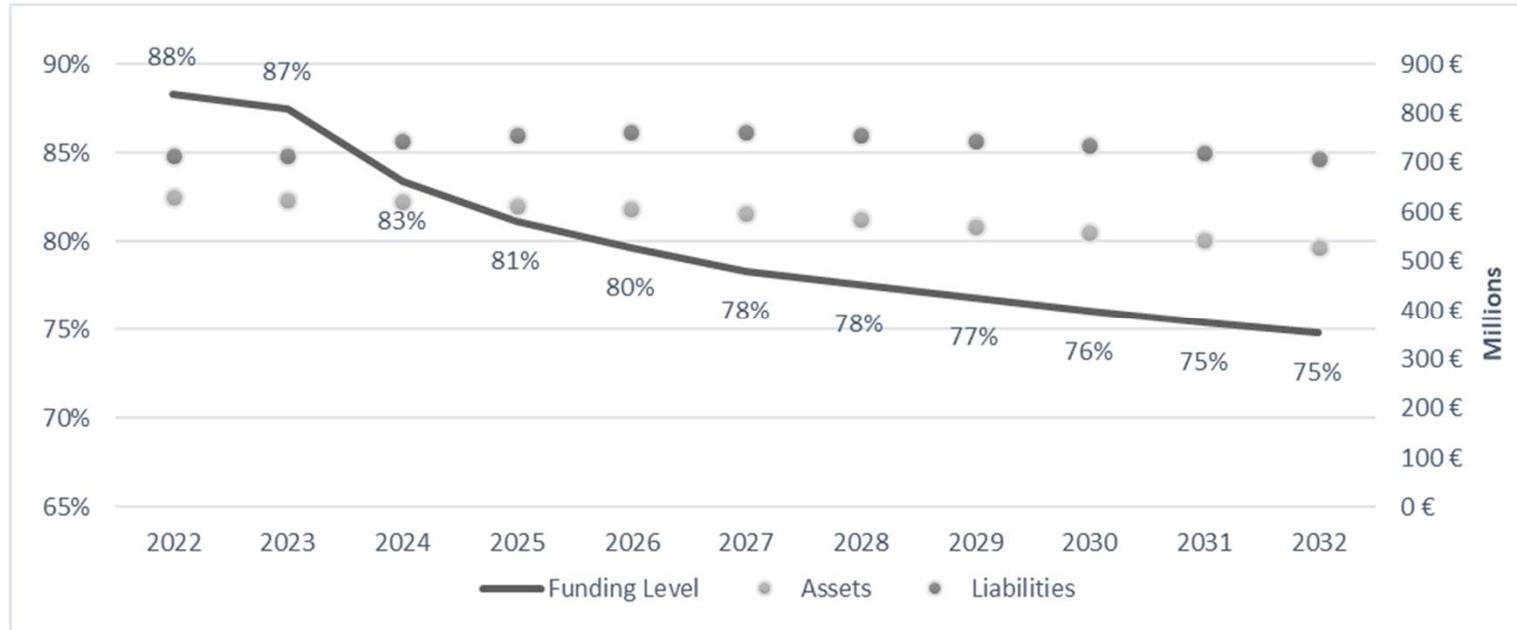
A 100 basis points change in interest rates creates an **€88.3m change** in the deficit/surplus position of the plan

¹ Excludes the impact of convexity.

² AL Hedge Ratio estimated based on Assets' and Liabilities' duration as at 31st October 2022. Asset duration estimated based on benchmarks' duration, Liability duration based on Actuary's data

Deterministic Projection of Funding Level

Inputs from the Actuarial Valuation – with SCR < benefit obligation accrual rate

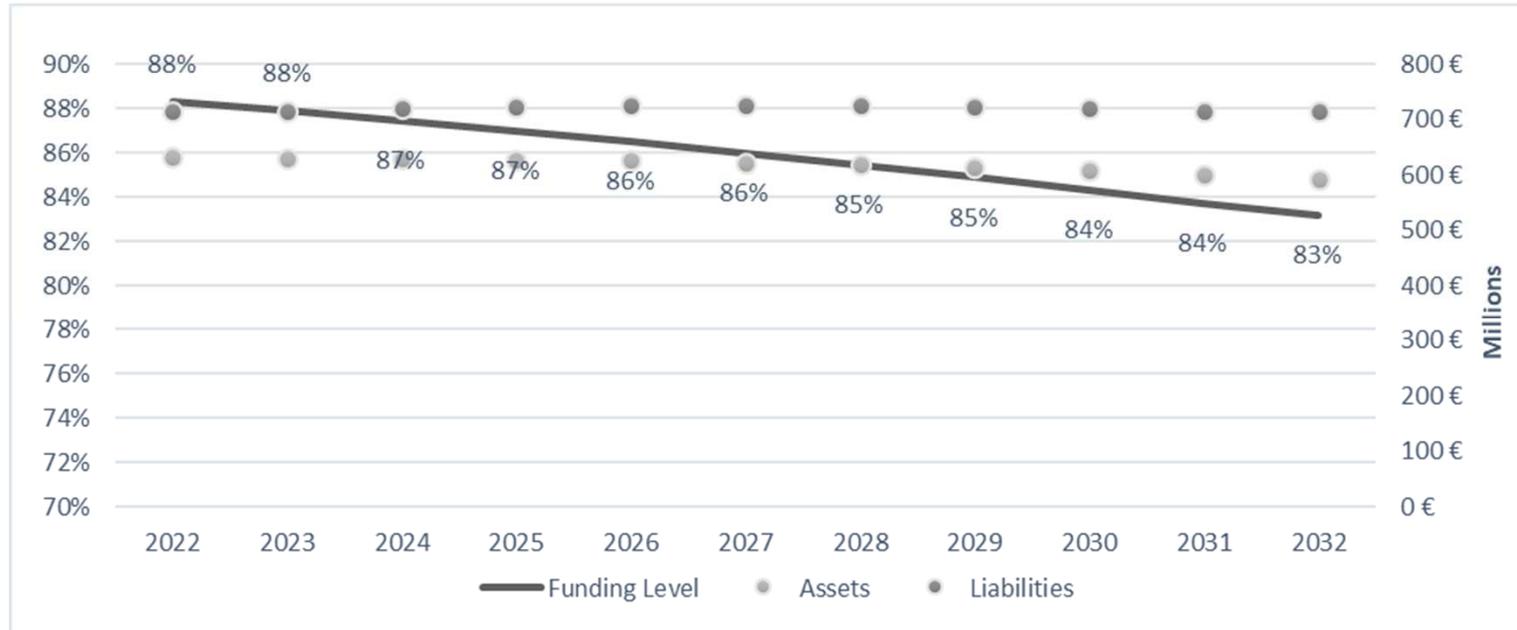


- The data reference for this ALM study is the 31st October 2022.
- Projected Benefit Obligation (Actuarial Liability), Contributions and Benefits were provided by the Fund’s Actuary as an input to the Study. For this chart, investment return on assets was assumed equal to the discount rate (i.e. 3.25%)
- The Fund is a closed DB scheme with a benefit accruals ceiling at 400 months of employment. The standard contribution rate (“SCR”) has been calculated using the attained age method taking into consideration the present value of future payrolls until the normal retirement age and not just until the point at which the 400 months of service are completed.
- This implies that the benefit obligation (Actuarial Liability) accrues at a faster rate than the pace of funding via standard contributions, resulting to a deterioration of the Fund’s deficit over the horizon examined (10-years) if the discount rate is achieved as an investment return.



Deterministic Projection of Funding Level

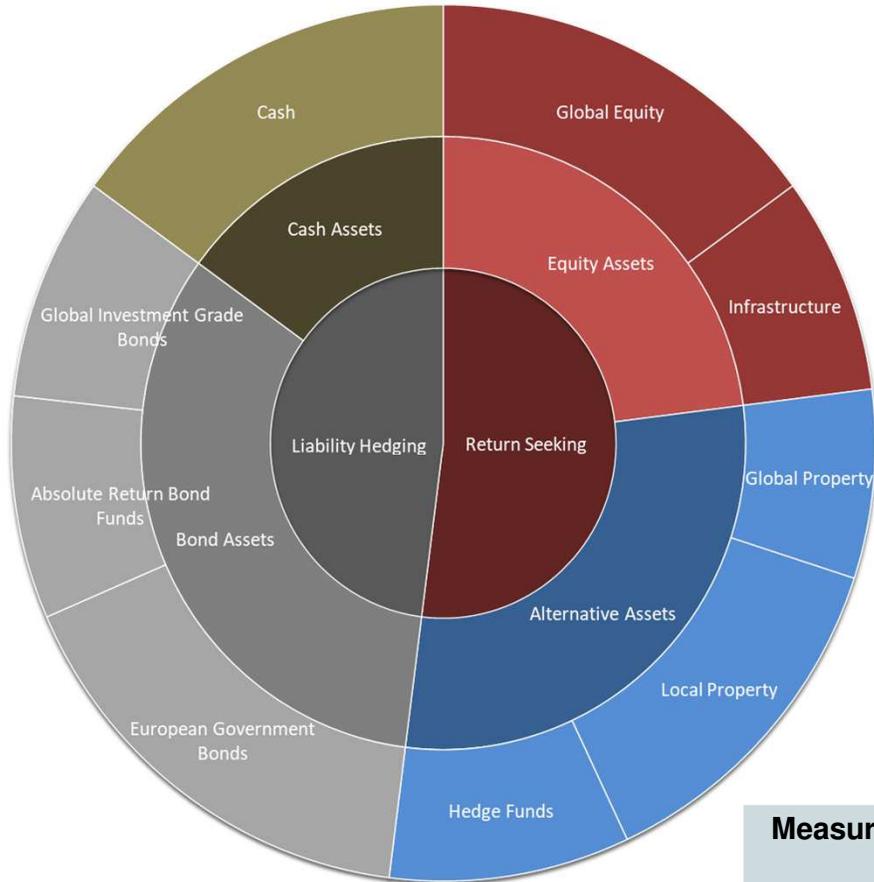
Inputs from the Actuarial Valuation – with SCR* = benefit obligation accrual rate



- The data reference for this ALM study is the 31st October 2022.
- In this scenario, the standard contribution rate (“SCR”) has been re-calculated to match the accrual rate of benefit obligations (actuarial liability), in order not to deteriorate the Fund’s deficit over the horizon examined (10-years) due to underfunding accruals over the period. For this chart, investment return on assets was assumed equal to the discount rate (i.e. 3.25%)
- **Data shown in this slide was the starting point for this ALM study.**



Existing Strategic and Current Asset Allocation



Strategic and Current Asset Allocation as of 31 st October 2022				
Asset Class	Value	Fund %	Range %	Target %
Global Equity	€ 88,141,140	14.0%	7 – 23	15.0%
Infrastructure	€ 38,832,075	6.2%	0 – 16	8.0%
Total Equity Assets	€ 126,973,215	20.1%	15 – 31	23.0%
European Government Bonds	€ 86,876,536	13.8%	8.5 – 24.5	16.5%
Global Investment Grade Bonds	€ 57,475,518	9.1%	0 – 16	8.25%
Absolute Return Bond Funds	€ 53,573,636	8.5%	0 – 16	8.25%
Total Bond Assets	€ 197,925,690	31.4%	25 – 41	33.0%
Global Property	€ 60,603,598	9.6%	2 – 12	7.0%
Local Property	€ 75,237,719	11.9%	8 – 18	13.0%
Hedge Funds	€ 36,182,497	5.7%	4 – 10	9.0%
Total Alternative Assets	€ 172,023,814	27.3%	24 – 34	29.0%
Cash (incl. Local)	€ 134,286,370	21.3%	3 – 36	15.0%
Total Cash Assets	€ 134,286,370	21.3%	3 – 36	15.0%
Total Fund	€ 631,209,089	100.0%		

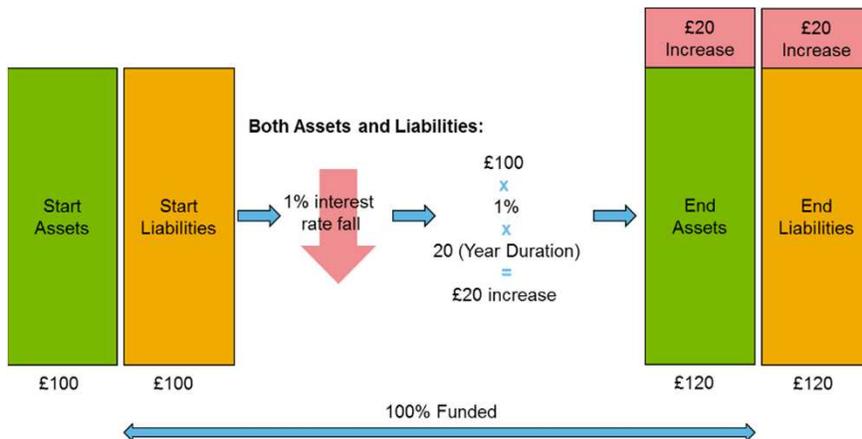
Measurements – Capital Market Assumptions (10-yrs) as at 31 st October 2022 ¹	SAA	CAA
Expected Funding Ratio (at the time horizon)	100.7%	99.1%
Risk Funding Ratio 5% Level (at the time horizon)	53.6%	53.3%
Expected Return (annualized over the time horizon)	4.8%	4.7%
5% Level Return (annualized over the time horizon)	1.2%	1.2%

Liability Driven Investment ('LDI') in its simplest form holds assets to match changes in liabilities due to changes in interest rates and inflation

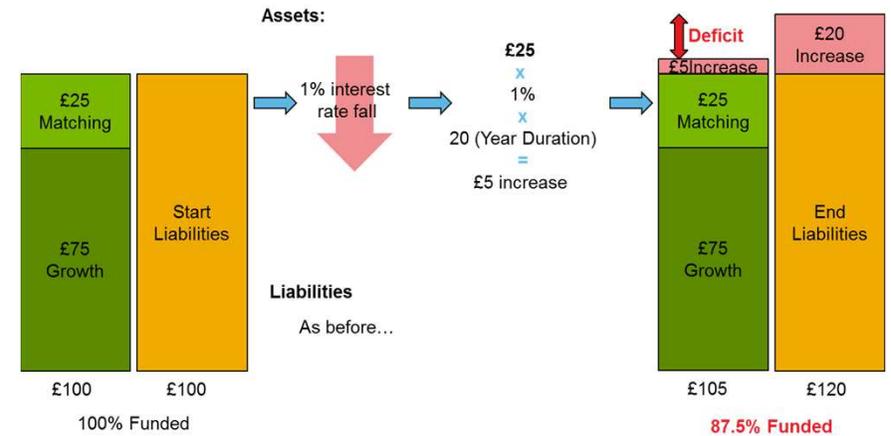
LDI tries to **reduce the volatility** in the funding level

- **decrease in the funding level due to a fall in interest rates and/or**
- **decrease in the funding level due to a increase in inflation expectations**

Assuming 100% funded, holding 100% of the portfolio inflation linked bonds with the same duration (20yr) as the liabilities, keeps the **funding level the same** when interest rates fall.



However, holding 25% of the portfolio in inflation linked bonds with the same duration (20yr) as the liabilities and 75% of the portfolio in growth assets **sees the funding level fall** when interest rates fall.



Considerations

Key Issues for Asset-Liability Study



Overall Asset Allocation (R-S vs. L-M)

- How much growth is needed in the portfolio?
- What is the tolerance for financial risks?
- What are the Fund and Sponsor's considerations?



Return-Seeking Portfolio

- How much growth is needed?
- How much liquidity is needed?
- How open is the Board to new asset classes?



Liability-Matching Portfolio

- How much asset-liability matching should we use?
- Is there an interest rate market view which should be reflected?

3

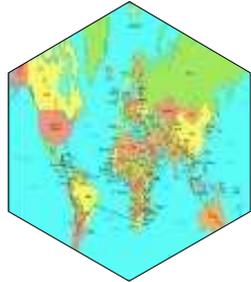
Peer Group Benchmarking



Peer Group Definitions

Peer Group 1

World Market Portfolio



- **WMP - World Market Portfolio** is the collection of all assets available to investors in proportion to their relative market value
- We estimate the total size of the global invested capital market (including Hedge Fund investments) from a U.S. investor perspective to be more than **USD \$130 trillion**

US PRS



- **US PRS** - In the United States, public sector pensions are offered by federal, state and local levels of government
- This represents #178 pension funds
- Avg AUM. \$21bn,
- **Total AUM \$ 3.6 trillion**

UK PF



- **UK PF** - This represents #24 pension funds Aon clients in the UK with Assets > £ 1bn
- Avg AUM. £4bn
- **Total AUM £96 billion**

Cyprus PF

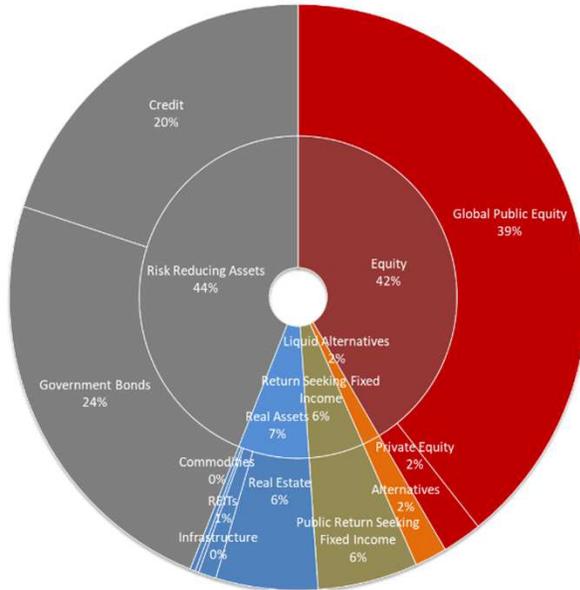


- **Cyprus PF** - This represents #5 defined benefit pension funds Aon clients in Cyprus
- Avg AUM. €150m
- **Total AUM €800 million**

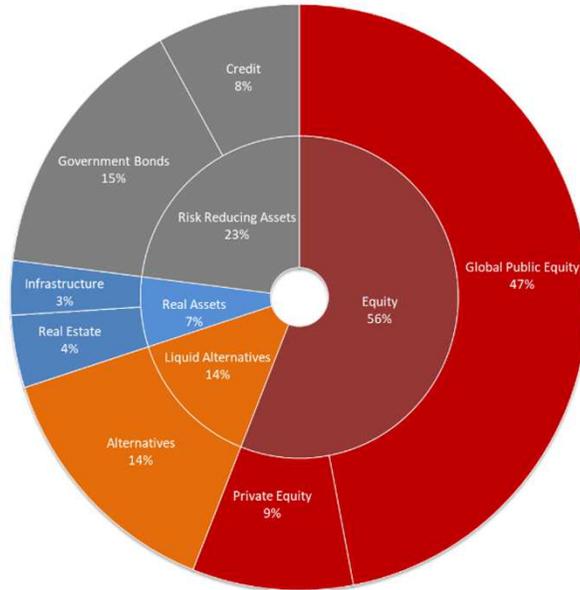
Peer Group Benchmarking

Asset Classes (1)

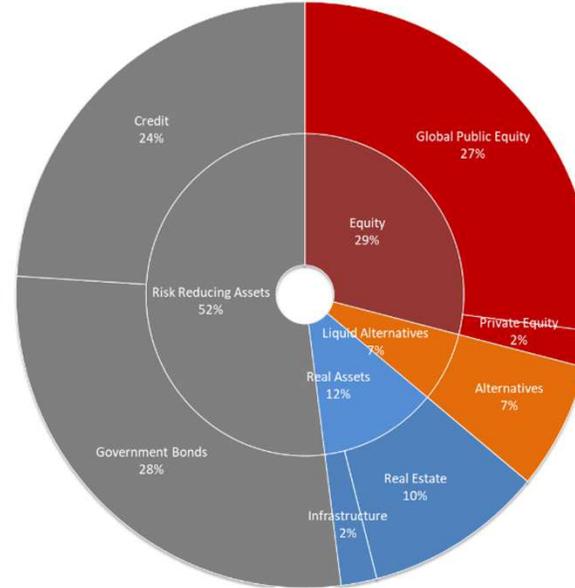
World Market Portfolio



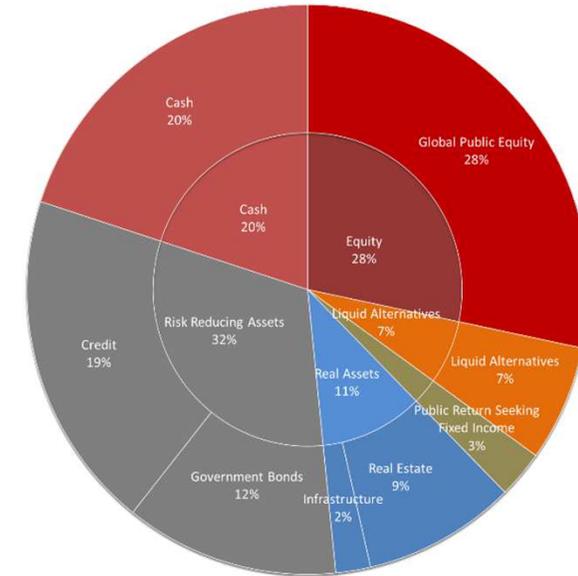
US PRS



UK PF



CYPRUS PF



- Knowledge of each asset's share of the invested capital markets is both useful information and a good starting point for investors considering the appropriate allocation to each asset class

- US PRS have a significant allocation to Equity assets (56%)
- There are major allocations to Real Assets (Real Estate & Infrastructure) and Liquid Alternatives
- Less significant allocation to Risk Reducing assets (i.e. Fixed Income)

- UK PF mainly exhibit high funding levels and LDI matching strategies, and are generally less growth oriented
- There is a significant allocation to Risk Reducing assets (i.e. Government Fixed Income and Credit) (52%)
- Allocation to equity is less significant (29%).
- Also there are allocations to Real Assets (12%)

- Cyprus Defined Benefit Pension Funds exhibit significant allocation to cash and liquid assets. There is limited exposure to illiquid or complex assets, despite the long-time investment horizons and governance structures.
- The main source of growth is Global Public Equity (28%). Another major allocation is the Risk Reducing Assets (31%).

Peer Group Definitions

Peer Group 2 – Individual Funds

- The most relevant case studies for CYTA PF are liability-driven portfolios – in which asset allocation typically focuses on maximizing expected surplus (assets – liabilities) and managing surplus volatility. This recognition of liabilities in the investment process can enhance the focus on sustainability – although some risks (e.g., longevity) can remain difficult to hedge
- Among funds with DB components, case studies help illustrate different approaches to asset allocation & governance, as well as a range of commonalities

Case studies considered:

A

Canada Pension Plan



D

California Public Employees' Retirement System



B

Första AP-fonden (AP1)



E

ATP (Arbejdmarkedets TillaegsPension)



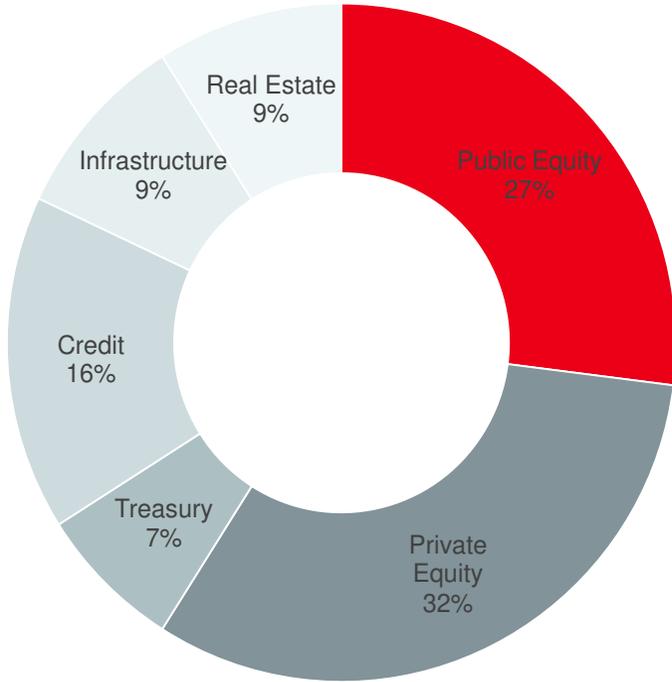
C

Stichting Pensioenfonds ABP





**CPP
INVESTMENT
BOARD**

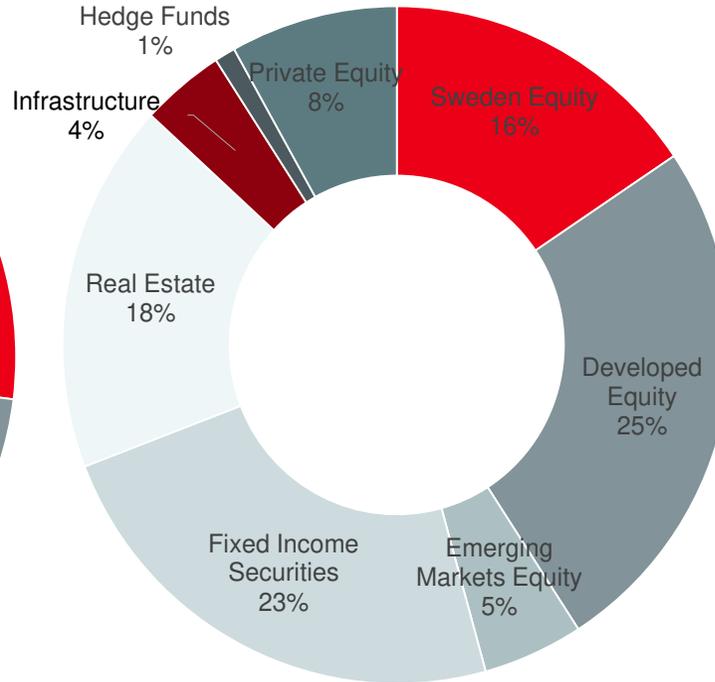


- No liquid alternative investments (ie hedge funds)
- Sizable allocation to real assets

Region:	Canada
Type of Fund	Defined Benefit Pension Fund
Beneficiaries	Enrolled employees in Canada
Assets Under Management	\$539 bn (as at 31 st Mar 22)

Investment Objective: "invest its assets with a view to achieving a maximum rate of return, without undue risk of loss, having regard to the factors that may affect the funding of the Canada Pension Plan"

**AP FÖRSTA
AP-FONDEN**

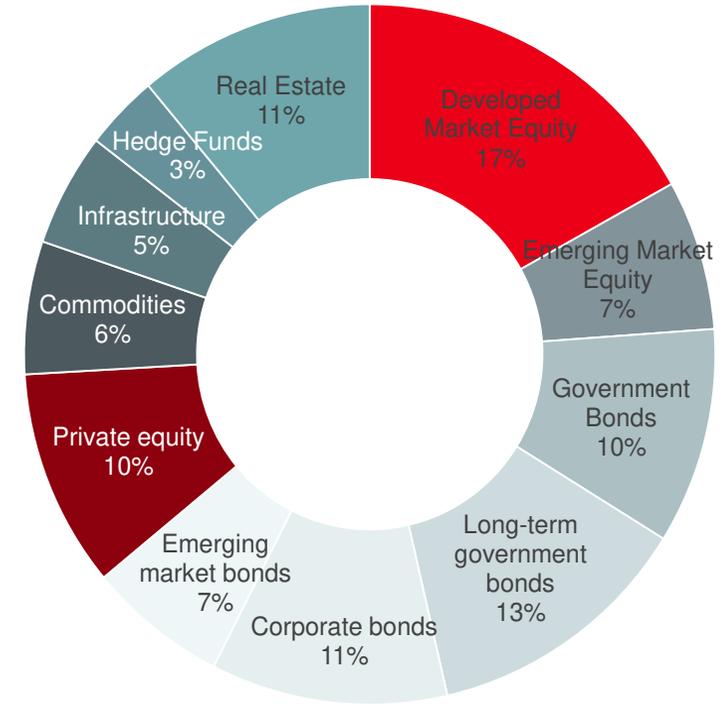


- Allocation similar to European peers with diversification into real assets to maintain real returns and match liability profile
- Allocation to Real assets is noticeable

Region:	Sweden
Type of Fund	National Pension System
Beneficiaries	All Employees
Assets Under Management	\$41 bn (as at 30 th Sep 22)

Investment Objective: "Achieve a high return in the long run. Funds should be invested in an exemplary way through responsible investment and responsible conduct. Fund should be sufficiently prepared to transfer funds to the Swedish Pensions Agency"

ABP

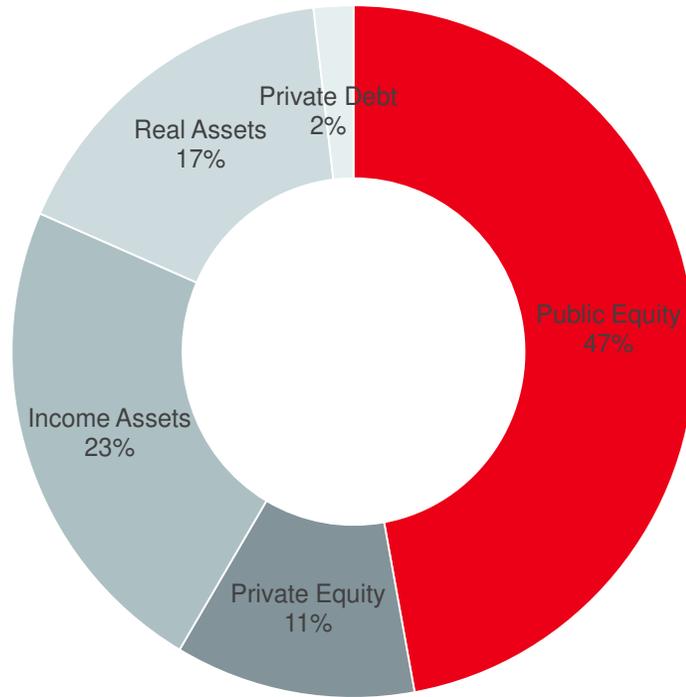


- Well diversified portfolio in many return seeking sub-strategies
- Allocation to real assets used to maintain real returns to match liability profile

Region:	Netherlands
Type of Fund	Defined Benefit Pension Fund
Beneficiaries	Government & Education
Assets Under Management	€460 bn (as at 30 th Sep 22)

Investment Objective: "is to achieve a maximum realistic long-term return for the participants and former participants in the pension fund"

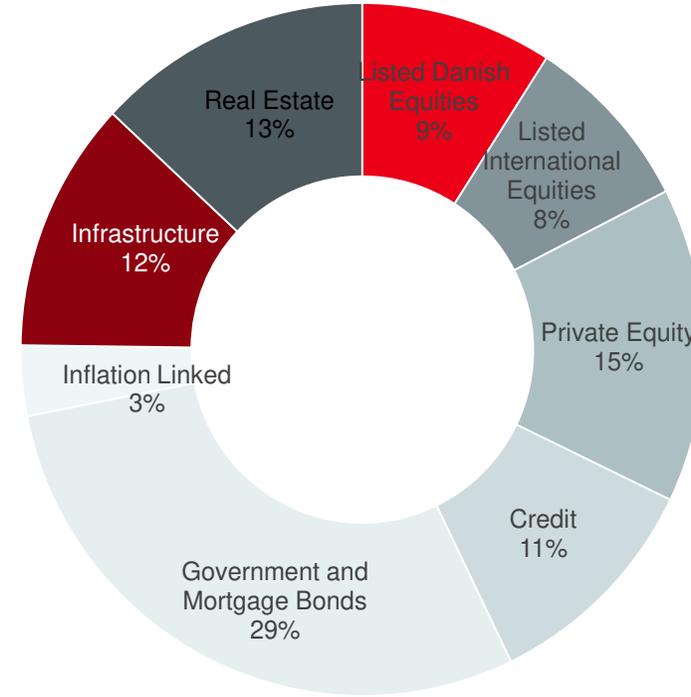




- No liquid alternative investments (i.e hedge funds)
- Allocation to Real assets is noticeable

Region:	California, USA
Type of Fund	Public Pension Fund
Beneficiaries	Government Sector
Assets Under Management	\$430 bn (as at 31 st Oct 22)

Investment Objective: "is to generate returns at an appropriate level of risk to provide members and beneficiaries with benefits as required by law"



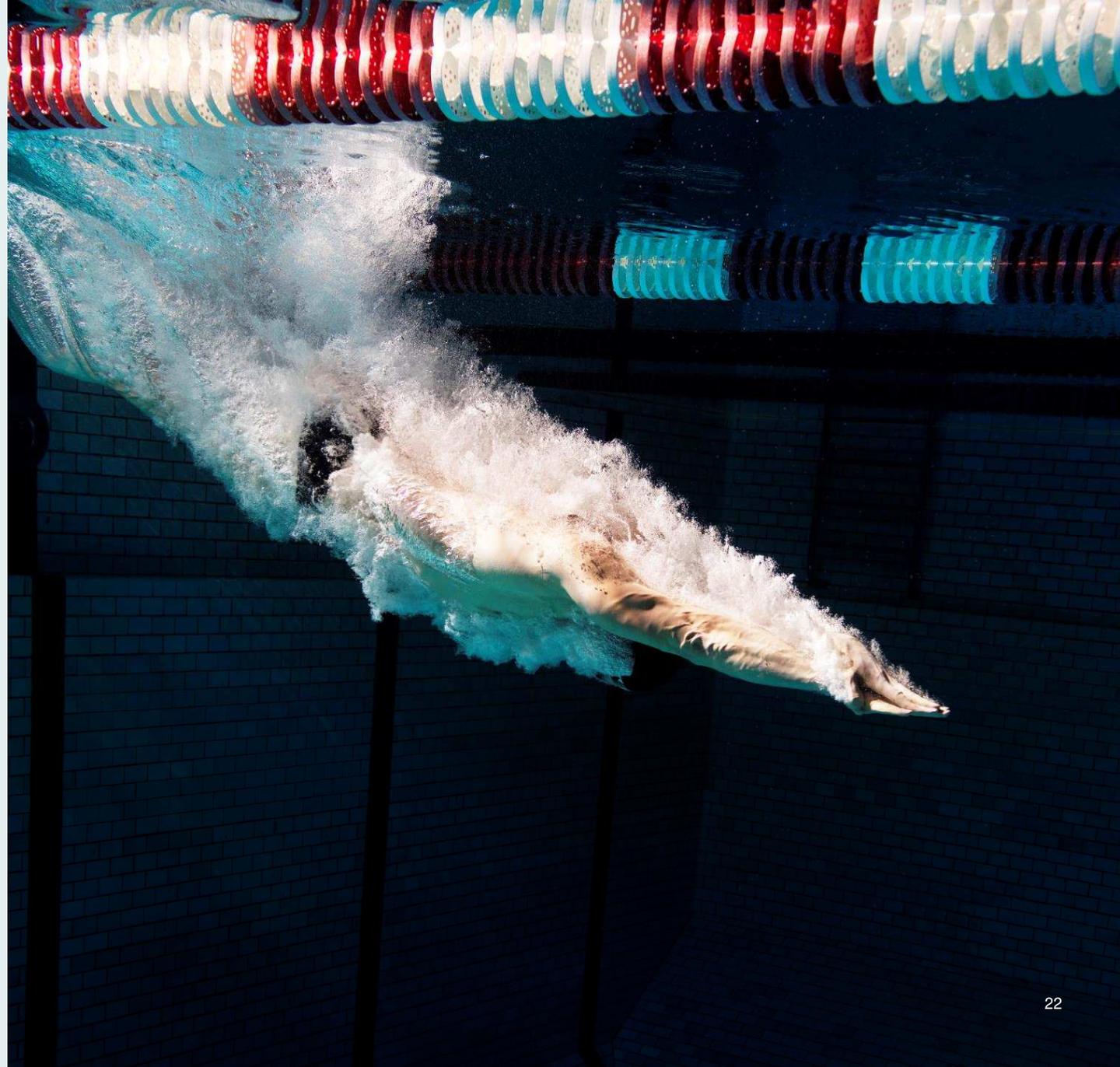
- Allocation similar to European peers with diversification into real assets to maintain real returns and match liability profile
- No liquid alternative investments (ie hedge funds)

Region:	Denmark
Type of Fund	Defined Benefit Pension Fund
Beneficiaries	Both Private & Public sector
Assets Under Management	\$50 bn (as at 30 th Jun 22)

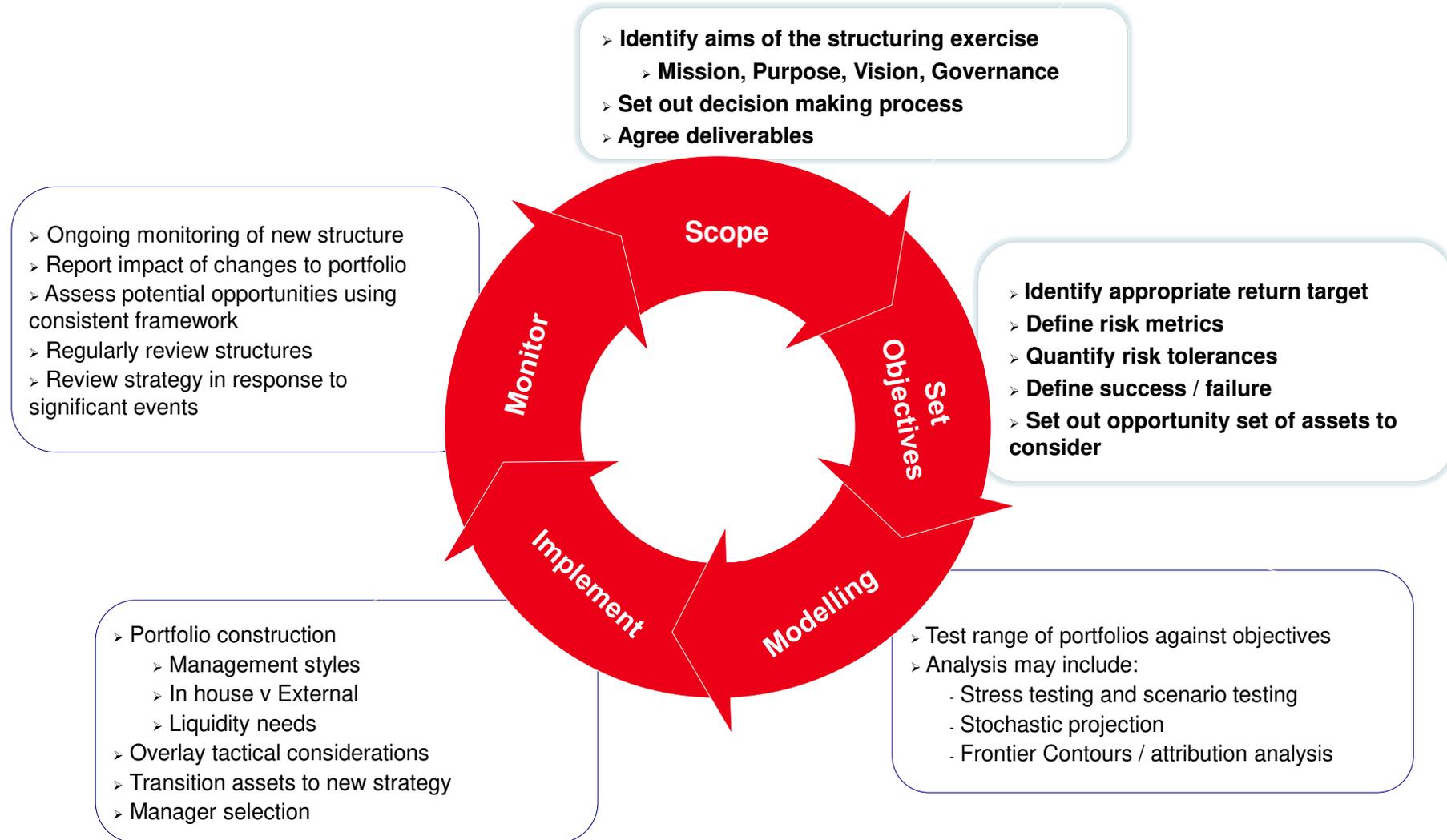
Investment Objective: "generate a return that will allow, in part, the building of reserves for, e.g., financing increased life expectancy, such that ATP secures pensions for a whole lifetime, and to increase the guaranteed pensions, thereby safeguarding the real value for pensioners"

4

Investment Beliefs, Metrics, Objectives and Constraints



Investment Governance and Strategy



Investment Beliefs

As set in previous study – Trustees' input / confirmation required

Statement of Investment Beliefs
<p>Governance</p> <p>The Trustees strives to continuously improve the quality of its investment decision-making process and thus would follow an effective governance.</p>
<p>Strategic Asset Allocation (SAA)</p> <p>Investors with a long-term horizon can outperform more short-term focused investors over the long-run</p> <p><i>Asset allocation decisions have the most impact on long-term performance and thus the Trustees place a lot of value in developing the SAA.</i></p>
<p>Medium Term Asset Allocation (MTAA)</p> <p>Over attention to the short term (tactical by managers) and to the very long term (strategic by institutional investors) has left the medium term (~12 to 36 months) largely unexploited as a source of outperformance.</p> <p>By not needing to focus unduly short term the Fund will maintain a MTAA review to add value in the medium term.</p> <p><i>MTAA can be used to enhance returns</i></p>
<p>Rebalancing</p> <p><i>Disciplined re-balancing is required to ensure opportunities are not missed.</i></p>

Investment Beliefs

As set in previous study – Trustees' input / confirmation required

Statement of Investment Beliefs

Risk Premia & Asset Classes to be used

Real assets (Equities, Alternatives) provide a higher return than bonds and cash in the long-term i.e. an equity risk premium exists - taking investment risk is rewarded. All asset classes are appropriate but the Trustees aim to receive adequate level of education on the unfamiliar asset classes to enable it to make informed decisions.

The Trustees have set a maximum limit of 10% allocation to Hedge Funds due to the complexity of this asset class.

Active vs Passive

Passive and actively managed portfolios are suitable investment strategies; the determination of whether to use a passive or active portfolio is dependent on the expected market efficiency of an asset class.

Success with active management requires strong conviction on the part of the investor, based on robust research, best expressed through: a significant allocation to alternative investments and highly active traditional portfolios typically operating with broad, unconstrained mandates. For clients who choose to minimize complexity or cost, passive traditional portfolios offer efficient capture of market returns.

The Trustees acknowledge that both active and passive management are appropriate, and in order to minimize costs and complexity, they have set a maximum allocation to actively managed strategies to 75% of total equities' investments and to 50% of total bonds' investments.

Investment Beliefs

As set in previous study – Trustees' input / confirmation required

Statement of Investment Beliefs

Currency Hedging

For equity investments, the currency effect on the combined volatility of an unhedged Global Equity portfolio is effectively swamped by the underlying foreign shares volatility in the long-term. In addition, economic theory states that long-term “real” currency returns are a zero-sum game. What this means is that in the long-term, an investor’s return from exposure to foreign currency will be zero after adjusting for inflation movements. In conclusion, the effects of currency risk on the risk-return profile of the Global Equity portfolio are not significant in the long-term.

For fixed income investments, the currency risk swamps the underlying bond volatility. The total portfolio risk increases dramatically when the currency risk is left unhedged. This significant increase in risk not resulting from the underlying risk and return characteristics of the global bond market should clearly be avoided. If not, then the investment in global fixed interest will have more in common with an investment in currencies than in bonds.

The currency exposure is hedged within Global Bonds where the currency fluctuations may change the volatility nature of this investment significantly. Currency hedging is also used for Hedge Funds.

Investment Beliefs

As set in previous study – Trustees' input / confirmation required

Statement of Investment Beliefs

Fund Manager Selection

Specialist managers will on average outperform generalists over the longer term. However, the outperforming active managers may differ from time to time.

The Trustees use a range of fund managers to diversify manager risk. Unless passive management is implemented, the Trustees undertake not to invest more than 5% of the Fund's assets to any manager, and each asset class has to be implemented with a minimum of 3 managers, unless the asset class represents less than 10% of Fund's assets in which scenario a minimum of 2 managers is required.

If passive management is implemented, the asset class has to be implemented with a minimum of 2 managers and no maximum allocation of Fund's assets to any manager is set.

The Trustees have set a minimum requirement for appropriate managers' strategies to invest in, to have at least €500m assets under management. The specific instruments or vehicles (i.e. mutual funds) that belong to such strategies are permitted to have less than €500m assets under management.

Investment Beliefs

As set in previous study – Trustees' input / confirmation required

Statement of Investment Beliefs

Risk Management

The Trustees recognizes that the Fund can be exposed to several sources of risk, all of which ought to be addressed in setting investment policy. Risk should be considered in a holistic approach in order to maximize return per unit of risk and not waste risk budgets.

Investment risk is reduced by diversification. Diversification, both across and within asset classes, is the primary risk control element

Diversification at several levels is ideal:

- By Security type
- By Geography
- By Sector
- By Issuer

Risks which are not expected to be rewarded should not be taken

Concentration risk will be avoided as much as possible in all asset classes.

By accessing the full global opportunity set improves outcomes through enhanced portfolio diversification and efficiency

The use of diversified mutual funds is suggested for effective and efficient diversification

Home Bias

Investment in global markets is beneficial.

Legal Constraints & other constraints

Legal	Max Permitted by Law, %
Assets denominated in any one foreign currency	10
Total assets denominated in foreign currency	30
Total investment in shares and non-government bonds	70
Assets denominated in total issuance of each bond issuer	10
Assets denominated in issued share capital of each listed company	5
Exposure to each property	10
Assets in non-regulated markets	40
Exposure to alternative investments (excluding property)	15

Investment Objectives



Strategic Objective

- To invest prudently so that all benefit promises can be met at an acceptable level of risk



Time Horizon

- A time horizon of 10, for the optimization process of the key metrics of the ALM



Primary Risk/Return Objective

- **Maximize** the Funding Ratio at the Time Horizon subject to a maximum risk measured by the minimum Funding Ratio achieved with 95% probability over the Time Horizon (Risk 5% Level Funding Ratio)
- In targeting the above return, we can observe **other risk metrics** such as:
 - Expected (Average) Return over the time horizon (nominal or real)
 - Minimum Return achieved with 95% probability over the time horizon (risk metric, nominal or real)
 - Volatility of returns
 - Probability of Returns > Inflation



Constraints

- **Minimum Cash Liquidity:** The Fund has currently set a 3% minimum allocation to cash
- **Home Bias / Local Property Constraint:** The Fund would take all necessary steps not to reach the maximum level for this asset class although they recognize that an increase in value may result due to the particular circumstances of the Fund. It is the Trustees intention not to actively pursue any investment move or initiative that increases the Fund's position and exposure in this particular asset class.
- **Other Specific Constraints:** Set other specific/self-imposed constraints (such as limit on illiquid assets).

5

Capital Market Assumptions and Asset Liability Management Study



Setting Assumptions



Capital Market Assumptions

As of 31 October 2022

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AON

- Aon’s asset class return, volatility and correlation assumptions
- Long-term forward looking assumptions
- Best estimates (50/50 better or worse)
- Produced quarterly
- Globally consistent (same assumptions used by Aon clients wherever they are located)
 - Regional assumptions modelled in consistent manner (no “home country bias”)
- These are separate from our Medium Term Views
- Forward looking, reflecting current market pricing/valuations
 - Important as current market environment is very different from historical “average” experience
- Based on consensus expectations rather than extreme subjective views
 - Unless we think clearly unrealistic
- Standard assumptions do not allow for manager alpha other than hedge funds and private equity
 - Alpha allowed for at second stage where appropriate

Capital Market Assumptions

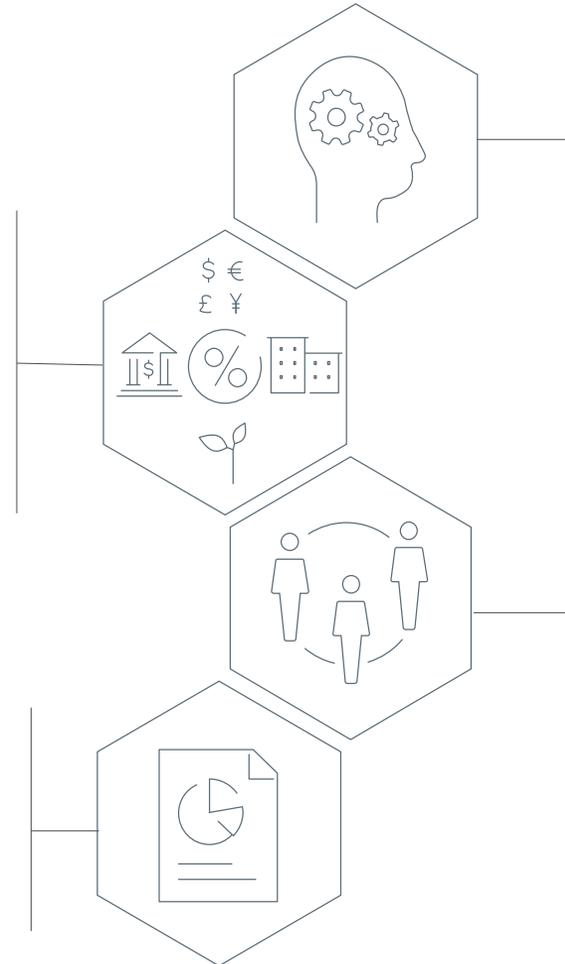
Return, risk and correlation expectation

Coverage

- 10 and 30 year time horizons
- Equities, bonds, currencies and alternatives
- Excludes manager value added, with the exception of hedge funds and private equity assumptions

Application

- Strategic Asset Allocation
- Asset-Liability Modelling
- Actuarial Valuations



Philosophy

- Long-term forward looking,
- Reflect current market valuations
- Best estimates (50/50 better or worse)
- Based on consensus expectations rather than extreme subjective views

Governance

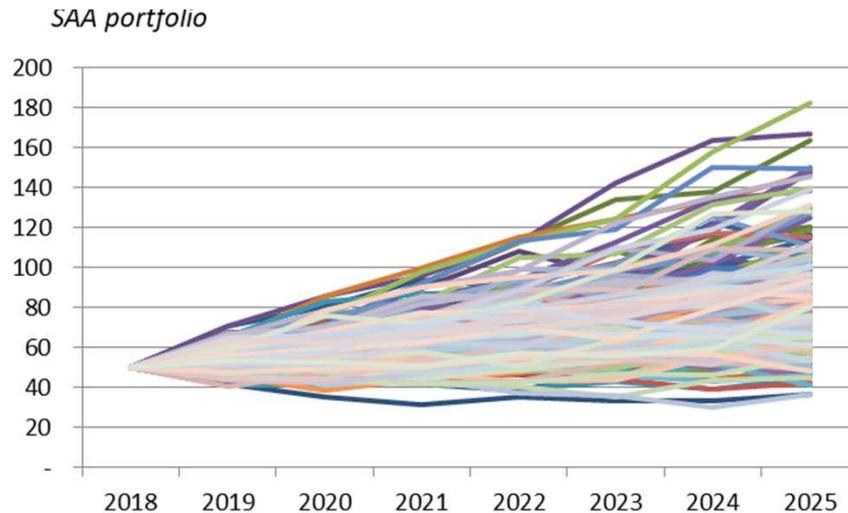
- Overseen by Global Capital Market Assumptions Committee, comprised of senior individuals across Retirement and Investment in the UK, US and Canada
- Assumptions are updated quarterly

ALM - Stochastic results

Stochastic projections

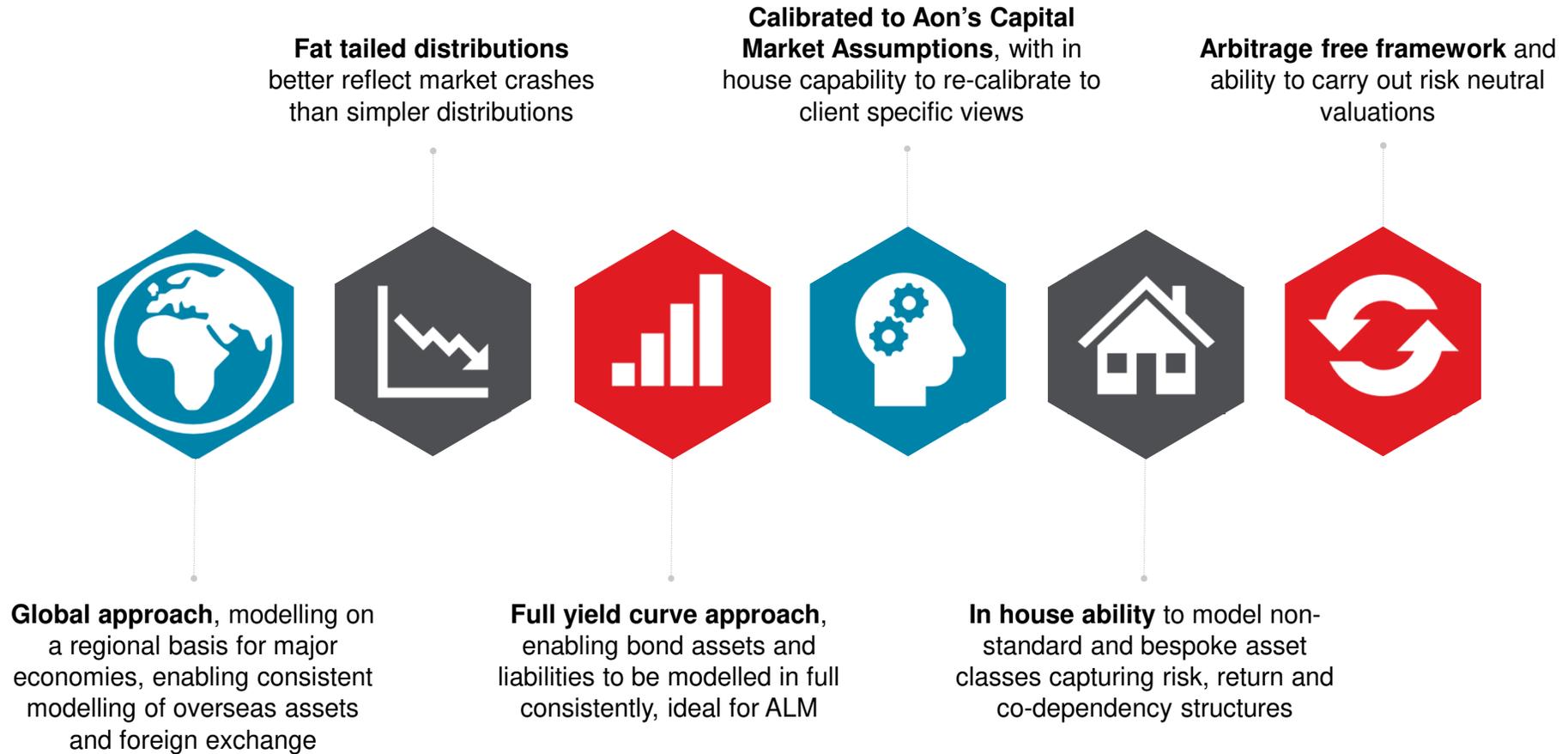
Example stochastic projection—5000 simulations

Having identified candidate portfolios, we use the stochastic model to analyze 5,000 projections per portfolio over the next 10 years. This stochastic simulation allows the analysis of future results under a range of possible future scenarios. It allows a probability distribution of outcomes that can provide useful insights in assessing the risk of each portfolio.



- Plotting thousands of simulations in one graph is impossible to interpret
- For each key financial measure we rank simulations in ascending order, how the results in the form of five scenarios
 - **Very good** - expect 95% of the results to lie below it i.e. a 1 in 20 chance of the result being as good or better
 - **Good** - expect 75% of the results to lie below it i.e. a 1 in 6 chance of the result being as good as this or better
 - **Central** - the central result, so that half the results are expected to be better and half worse.
 - **Poor** - expect 75% of the results to lie above it i.e. a 1 in 6 chance of the result being as bad as this or worse
 - **Very poor** - expect 95% of the results to lie above it i.e. a 1 in 20 chance of the result being as bad as this or worse
- The path of a given outcome will follow a much less smooth pattern however, as illustrated by the five scenarios

Main Features of Aon ALM Model



Capital Market Assumptions

As at 31 October 2022, in EUR

Indicator/Asset Class/Sub-Strategy	Return: Expected (Mean) ¹	Risk: 5% Level Return ²	Volatility of Returns ³
Equity Assets			
Global Equity	7.0%	-3.1%	19.9%
Infrastructure Equity	6.7%	-2.6%	19.5%
Private Equity	9.6%	-6.4%	28.9%
Bond Assets			
European Government Bonds	2.8%	0.9%	7.0%
Investment Grade Bonds	4.8%	1.3%	7.6%
Absolute Return Bond Funds	5.0%	2.2%	4.1%
High Yield Debt	6.2%	1.5%	12.4%
Private Debt	5.6%	1.4%	10.0%
Alternative Assets			
Global Property	4.7%	-2.7%	13.1%
Local Property	1.8%	-7.4%	16.0%
Hedge Funds	5.2%	0.6%	9.9%
Cash & Inflation			
Cash	2.8%	0.6%	2.5%
Inflation	2.3%	0.6%	-

¹Nominal 10-year Expected Annualized Mean Returns

²Nominal Return achieved (z% p.a.) with 95% probability over the 10-year horizon

³Volatility measured as the Annual Standard Deviation of Returns over the 10-year horizon

Projected/hypothetical performance is no guarantee of future results, and is for illustrative purposes only.

All expected returns are geometric (long-term compounded; rounded to the nearest decimal) and net of investment fees. This document is intended to document Aon's forward-looking expected returns for asset classes. The views expected in this report are forward-looking expectations based on informed historical results. There can be no guarantee that any of these expectations will become actual results. This is not a managed portfolio and there are no actual assets associated with the model performance presented.

Changes in Capital Market Assumptions

As at 31 October 2022 vs 30 September 2019 (previous ALM Study), in EUR

Indicator/Asset Class/Sub-Strategy	Return: Expected (Mean) ¹	Risk: 5% Level Return ²	Volatility of Returns ³
Equity Assets			
Global Equity	0.5%	1.9%	-0.4%
Infrastructure Equity	0.4%	0.4%	2.0%
Private Equity	-	-	-
Bond Assets			
European Government Bonds	3.2%	2.4%	4.4%
Investment Grade Bonds	3.7%	3.4%	1.9%
Absolute Return Bond Funds	3.1%	3.8%	-1.5%
High Yield Debt	-	-	-
Private Debt	-	-	-
Alternative Assets			
Global Property	-0.2%	0.3%	-0.1%
Local Property	1.5%	3.5%	-4.9%
Hedge Funds	2.5%	3.2%	0.9%
Cash & Inflation			
Cash	3.3%	2.3%	2.5%
Inflation	0.6%	0.5%	

¹Change in nominal 10-year Expected Annualized Mean Returns between 30/9/19 & 31/10/22

²Change in nominal Return achieved (z% p.a.) with 95% probability between 30/9/19 & 31/10/22

³Change in volatility measured as the Annual Standard Deviation of Returns between 30/9/19 & 31/10/22

Projected/hypothetical performance is no guarantee of future results, and is for illustrative purposes only.

All expected returns are geometric (long-term compounded; rounded to the nearest decimal) and net of investment fees. This document is intended to document Aon's forward-looking expected returns for asset classes. The views expected in this report are forward-looking expectations based on informed historical results. There can be no guarantee that any of these expectations will become actual results. This is not a managed portfolio and there are no actual assets associated with the model performance presented.

Asset Class Correlations

- The matrix below illustrate part of the representative correlations assumed in our modelling work.
- Correlations are highly unstable and vary greatly over time. This feature is captured in our modeling, where we employ a more complex set of correlations involving different scenarios.
- Our correlations are forward-looking and not just historical averages. In particular, we think that in many ways the experience of this millennium has been quite different from the previous 20 years, being more cyclical in nature with less strong secular trends. This has many implications. For example, the equity/government bond correlation in the table below is negative, which also incorporates the feature that this correlation is negative in stressed environments.

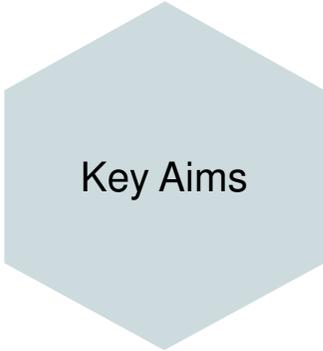
Correlation Table	1	2	3	4	5	6	7	8	9	10	11
1 Global Equity	100%	51%	-9%	6%	14%	26%	26%	35%	57%	5%	10%
2 Infrastructure Equity		100%	-2%	11%	11%	10%	11%	15%	19%	6%	9%
3 European Government Bonds			100%	21%	31%	45%	13%	-2%	-5%	38%	-4%
4 Absolute Return Bond Funds				100%	24%	13%	13%	6%	5%	40%	15%
5 Global Investment Grade Bonds					100%	47%	48%	8%	27%	31%	8%
6 High Yield Debt						100%	60%	17%	37%	23%	2%
7 Private Debt							100%	15%	38%	21%	11%
8 Global Property								100%	25%	14%	8%
9 Hedge Funds									100%	16%	5%
10 Cash										100%	40%
11 CPI											100%

6

Developing an Optimal Investment Strategy



Considerations in Developing Candidate Portfolios



Key Aims

- The main objective of portfolios considered, is to maximize the effectiveness of the asset classes in a diversified portfolio. Allocating to multiple asset classes requires greater governance oversight and often comes at the expense of simplicity and liquidity.
- As mentioned earlier, whilst mathematical models assist our judgement, we do not use these to drive the recommendations as we believe a model cannot capture all real world test and qualitative factors.
- Using the qualitative factors below, qualitative considerations compliment our quantitative analyses in deriving portfolio recommendations.

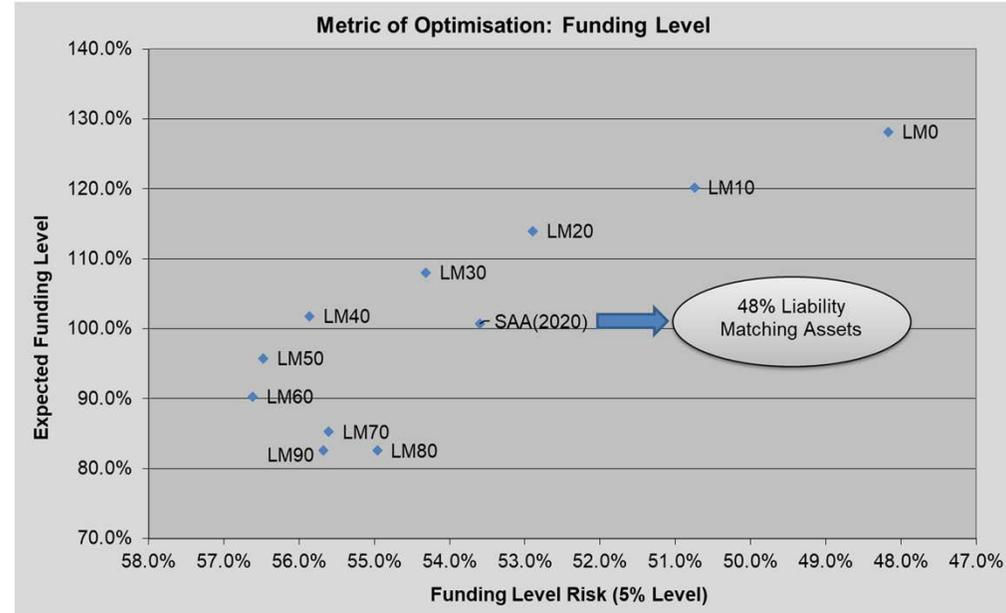
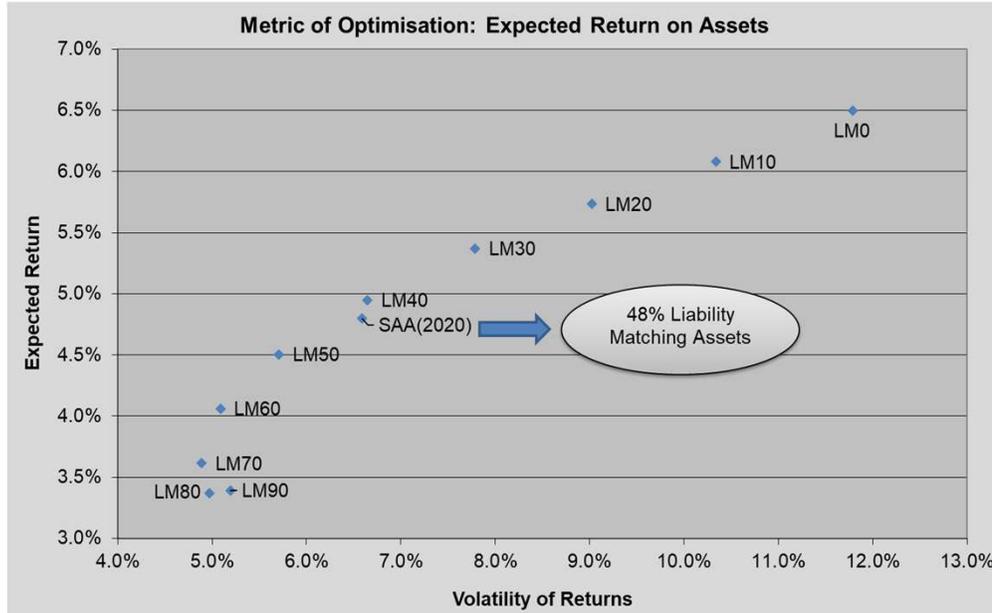


Qualitative Criteria

- A number of criteria were used in developing asset class positions for the candidate portfolios:
 - **Risk Tolerance** and **Return target** e.g. Portfolios less efficient than the current SAA do not align with Investment Objectives
 - **Investment horizon** and ability to capture high funding ratios and returns over **long periods**
 - **Time, resources** and ability to exploit Fund's tolerance for **complexity** and **illiquidity**
 - **Liquidity**: To be closely monitored while gradually implementating.
 - Ability of the asset class to provide **diversification** benefits
 - **Peer practices**

Asset-Liability Efficient Frontier

Risk / Reward Analysis



	Expected Return	5% Level Return	Expected FL	5% FL	A/L Hedge Ratio ¹	Sharpe Ratio
Current Asset Allocation (CAA)	4.7%	1.2%	99.1%	53.3%	14.7%	42.9%
Strategic Asset Allocation (SAA)	4.8%	1.2%	100.7%	53.6%	15.7%	42.5%
Model Portfolio Efficient Frontier						
60% Liability Matching Assets	4.1%	1.8%	90.3%	56.6%	29.5%	40.5%
50% Liability Matching Assets	4.5%	1.6%	95.8%	56.5%	24.6%	43.9%
40% Liability Matching Assets	4.9%	1.5%	101.8%	55.9%	19.7%	44.4%
30% Liability Matching Assets	5.4%	1.2%	108.0%	54.3%	14.7%	43.3%

Key Takeaways:

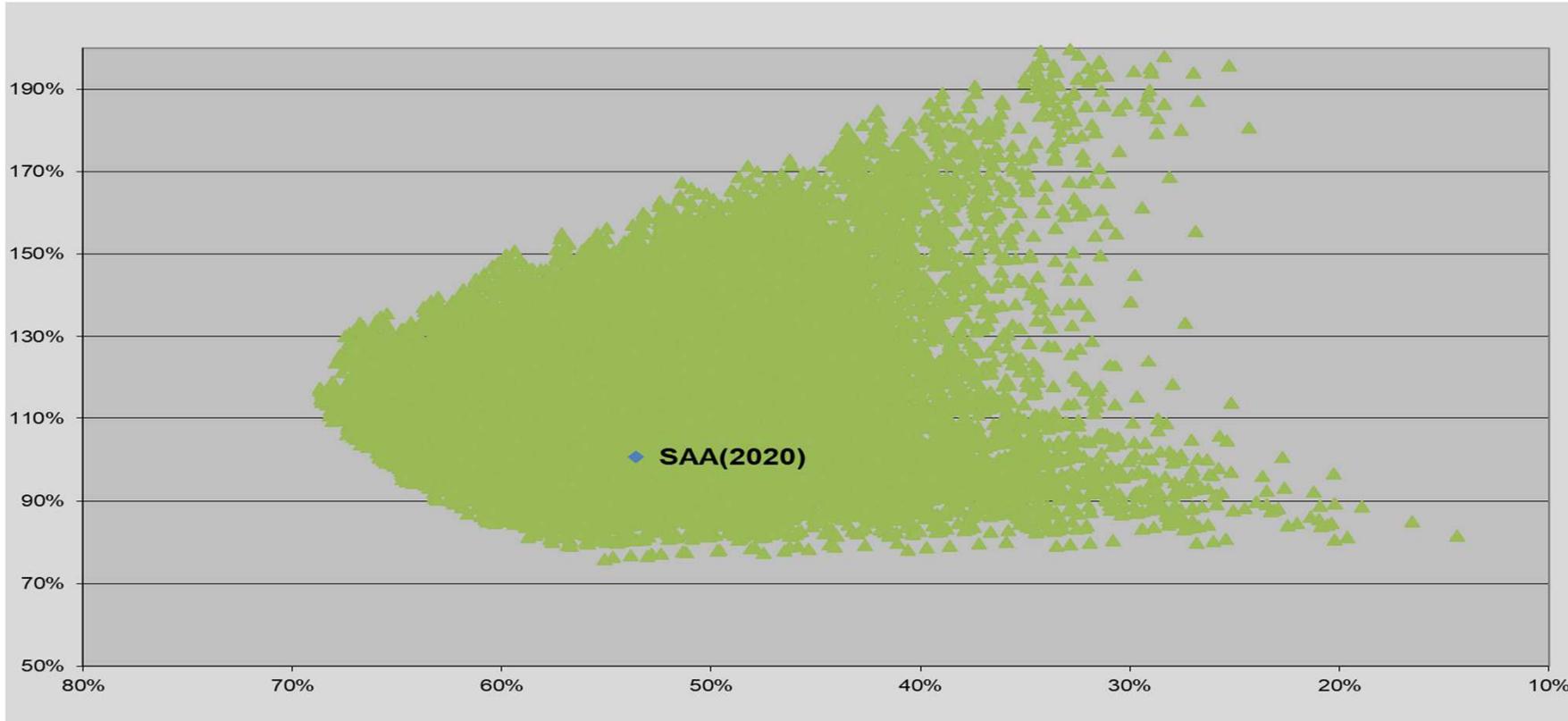
- Portfolios shown is starting point for asset allocation
 - Primary return-seeking asset is global public equity
 - Primary liability-matching asset is government and investment grade bonds
 - Diversification of public equity with exposures to real assets, private equity / debt potentially reduces risk
- Declining marginal benefit of adding additional liability-matching assets when the return-seeking allocation reaches 50-60% (especially when metric of optimization is Funding Level)



Model Output – Funding Level

No Constraints

Increasing Expected Funding Level

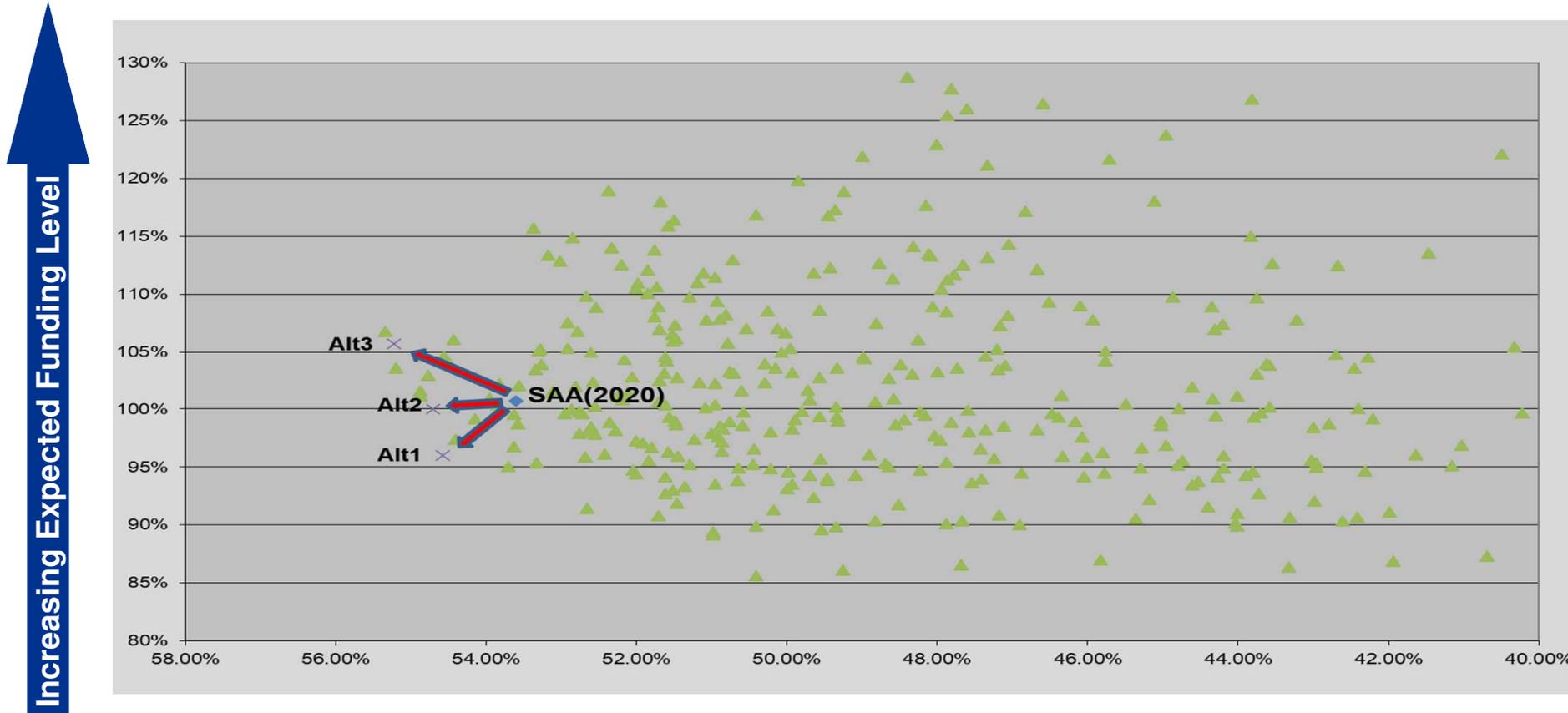


Increasing Funding Level Risk (5% Level)

- The cloud above shows a graphical representation of the Funding Level profile of each possible strategy.
- The y-axis shows the Expected Funding Level at the time horizon (i.e. 10 years) and the x-axis shows the Risk on the Funding Level, measured as the minimum Funding Level to be achieved at the time horizon (i.e. 10 years), with 95% probability.

Model Output – Funding Level

Existing Constraints (Pragmatic, Legal & Other Specific Constraints)



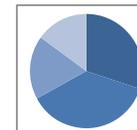
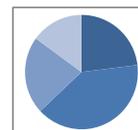
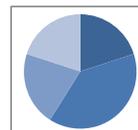
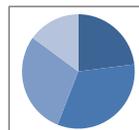
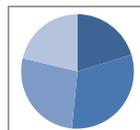
Increasing Funding Level Risk (5% Level)

- The above output considers the existing pragmatic (e.g. local real estate allocation to be maintained), legal and other specific constraints that apply to the Fund and each asset class. The green dots represent possible strategies that can be effectively achieved under such constraints set.
- The y-axis shows the Expected Funding Level at the time horizon (i.e. 10 years) and the x-axis shows the Risk on the Funding Level, measured as the minimum Funding Level to be achieved at the time horizon (i.e. 10 years), with 95% probability.

Developing Model Portfolios

Illustrative Summary of Results

Equity Assets
Bond Assets
Alternative Assets
Cash Assets

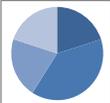


Metric Results	CAA	SAA(2020)	Alt1	Alt2	Alt3
Expected Funding Level	99.1%	100.7%	96.0%	100.0%	105.7%
5th Percentile Funding Level	53.3%	53.6%	54.6%	54.7%	55.2%
Expected Return (Nominal Mean)	4.7%	4.8%	4.5%	4.8%	5.2%
5th Percentile Return (Nominal)	1.2%	1.2%	1.3%	1.3%	1.3%
Volatility of Returns	6.2%	6.6%	5.9%	6.3%	7.3%
Sharpe Ratio	42.9%	42.5%	41.5%	43.8%	43.8%
ALLOCATIONS %					
Equity Assets	20.2%	23.0%	20.0%	23.0%	30.0%
Global Equity	14.0%	15.0%	15.0%	18.0%	21.0%
Listed Infrastructure	6.2%	8.0%	5.0%	5.0%	7.0%
Global Private Equity	0.0%	0.0%	0.0%	0.0%	2.0%
Bond Assets	31.4%	33.0%	39.0%	40.0%	37.0%
European Government Bonds	13.8%	16.5%	25.0%	20.0%	15.0%
Investment Grade Bonds	9.1%	8.3%	14.0%	12.0%	10.0%
Absolute Return Bond Funds	8.5%	8.3%	0.0%	8.0%	8.0%
High Yield Debt	0.0%	0.0%	0.0%	0.0%	2.0%
Private Debt	0.0%	0.0%	0.0%	0.0%	2.0%
Alternative Assets	27.2%	29.0%	21.0%	22.0%	18.0%
Global Property	9.6%	7.0%	6.0%	5.0%	4.0%
Local Property	11.9%	13.0%	11.0%	11.0%	11.0%
Hedge Funds	5.7%	9.0%	4.0%	6.0%	3.0%
Cash Assets	21.2%	15.0%	20.0%	15.0%	15.0%
Cash	21.2%	15.0%	20.0%	15.0%	15.0%
Total	100%	100%	100%	100%	100%
Return-Seeking Assets	47.4%	52.0%	41.0%	45.0%	52.0%
Liability-Matching Assets	52.6%	48.0%	59.0%	55.0%	48.0%

Developing Model Portfolios: Alternative 1 (Conservative)

Illustrative Efficient Portfolio with 59% Liability-Matching Assets & High Liquidity

Equity Assets	
Bond Assets	
Alternative Assets	
Cash Assets	



Metric Results	Alt1
Expected Funding Level	96.0%
5th Percentile Funding Level	54.6%
Expected Return (Nominal Mean)	4.5%
5th Percentile Return (Nominal)	1.3%
Volatility of Returns	5.9%
Sharpe Ratio	41.5%
ALLOCATIONS %	
Equity Assets	20.0%
Global Equity	15.0%
Listed Infrastructure	5.0%
Global Private Equity	0.0%
Bond Assets	39.0%
European Government Bonds	25.0%
Investment Grade Bonds	14.0%
Absolute Return Bond Funds	0.0%
High Yield Debt	0.0%
Private Debt	0.0%
Alternative Assets	21.0%
Global Property	6.0%
Local Property	11.0%
Hedge Funds	4.0%
Cash Assets	20.0%
Cash	20.0%
Total	100%
Return-Seeking / Liability Matching	
Return-Seeking Assets	41.0%
Liability-Matching Assets	59.0%
Public/Private	
Public Markets	100.0%
Private Markets	0.0%
Liquidity	
Illiquid	11.0%
Quasi-Liquid	6.0%
Liquids	83.0%



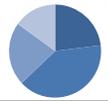
- Alternative1 is the most conservative among the alternative portfolios developed as it exhibits the lowest volatility figure (measured as the 1-year standard deviation of returns)
- This is a highly liquid alternative portfolio which maintains allocation to the existing asset classes as the current SAA (2020)
- Existing exposure to local real estate is maintained at 11% (actual allocation 31st October 2022)
- The Expected Funding Level at the time horizon is 96.0%, while the 5% Funding Level Risk is 54.6%.
- The Expected Return of this portfolio is 4.5% per annum, and the 5% Return is 1.3% per annum.
- Compared to SAA (2020), this is a less risky portfolio (measured by 5% Funding Level Risk, 5% Return and volatility of returns)

Changes vs SAA (2020)	
Equity Assets	-3%
Global Equity	0%
Listed Infrastructure	-3%
Global Private Equity	0%
Bond Assets	6%
European Government Bonds	9%
Investment Grade Bonds	6%
Absolute Return Bond Funds	-8%
High Yield Debt	0%
Private Debt	0%
Alternative Assets	-8%
Global Property	-1%
Local Property	-2%
Hedge Funds	-5%
Cash Assets	5%
Cash	5%
Total	0%
Return-Seeking / Liability Matching Assets	
Return-Seeking Assets	-11%
Liability-Matching Assets	11%
Public/Private	
Public Markets	0%
Private Markets	0%
Liquidity	
Illiquid	-2%
Quasi-Liquid	-1%
Liquids	3%

Developing Model Portfolios: Alternative 2 (Target 100% FL)

Illustrative Efficient Portfolio with 55% Liability-Matching Assets & High Liquidity

Equity Assets	
Bond Assets	
Alternative Assets	
Cash Assets	



Metric Results	Alt2
Expected Funding Level	100.0%
5th Percentile Funding Level	54.7%
Expected Return (Nominal Mean)	4.8%
5th Percentile Return (Nominal)	1.3%
Volatility of Returns	6.3%
Sharpe Ratio	43.8%
ALLOCATIONS %	
Equity Assets	23.0%
Global Equity	18.0%
Listed Infrastructure	5.0%
Global Private Equity	0.0%
Bond Assets	40.0%
European Government Bonds	20.0%
Investment Grade Bonds	12.0%
Absolute Return Bond Funds	8.0%
High Yield Debt	0.0%
Private Debt	0.0%
Alternative Assets	22.0%
Global Property	5.0%
Local Property	11.0%
Hedge Funds	6.0%
Cash Assets	15.0%
Cash	15.0%
Total	100%
Return-Seeking / Liability Matching	
Return-Seeking Assets	45.0%
Liability-Matching Assets	55.0%
Public/Private	
Public Markets	100.0%
Private Markets	0.0%
Liquidity	
Illiquid	11.0%
Quasi-Liquid	5.0%
Liquids	84.0%

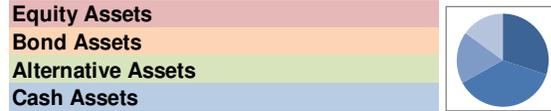


- Alternative 2 portfolio is a highly liquid alternative portfolio which maintains allocation to the existing asset classes as the current SAA (2020).
- We observe a declining marginal benefit of adding additional liability-matching assets when the return-seeking allocation reaches 50-60% (in-line with the analysis in page 41). This portfolio offers 55% allocation to liability-matching assets.
- This portfolio targets 100% Funding Level at the time horizon, while the 5% Funding Level Risk is 54.7%
- The Expected Return of this portfolio is 4.8% per annum, and the 5% Return is 1.3% per annum.
- Existing exposure to local real estate is maintained at 11% (actual allocation 31st October 2022)
- Compared to SAA (2020), this is a less risky portfolio (measured by 5% Funding Level Risk, 5% Return and volatility of returns)

Changes vs SAA (2020)	
Equity Assets	0%
Global Equity	3%
Listed Infrastructure	-3%
Global Private Equity	0%
Bond Assets	7%
European Government Bonds	4%
Investment Grade Bonds	4%
Absolute Return Bond Funds	0%
High Yield Debt	0%
Private Debt	0%
Alternative Assets	-7%
Global Property	-2%
Local Property	-2%
Hedge Funds	-3%
Cash Assets	0%
Cash	0%
Total	0%
Return-Seeking / Liability Matching Assets	
Return-Seeking Assets	-7%
Liability-Matching Assets	7%
Public/Private	
Public Markets	0%
Private Markets	0%
Liquidity	
Illiquid	-2%
Quasi-Liquid	-2%
Liquids	4%

Developing Model Portfolios: Alternative 3 (Private Markets)

Exposure to Private Markets & High Yield Debt



Metric Results	Alt3
Expected Funding Level	105.7%
5th Percentile Funding Level	55.2%
Expected Return (Nominal Mean)	5.2%
5th Percentile Return (Nominal)	1.3%
Volatility of Returns	7.3%
Sharpe Ratio	43.8%

ALLOCATIONS %	
Equity Assets	30.0%
Global Equity	21.0%
Listed Infrastructure	7.0%
Global Private Equity	2.0%
Bond Assets	37.0%
European Government Bonds	15.0%
Investment Grade Bonds	10.0%
Absolute Return Bond Funds	8.0%
High Yield Debt	2.0%
Private Debt	2.0%
Alternative Assets	18.0%
Global Property	4.0%
Local Property	11.0%
Hedge Funds	3.0%
Cash Assets	15.0%
Cash	15.0%
Total	100%

Return-Seeking / Liability Matching	
Return-Seeking Assets	52.0%
Liability-Matching Assets	48.0%
Public/Private	
Public Markets	96.0%
Private Markets	4.0%
Liquidity	
Illiquid	15.0%
Quasi-Liquid	4.0%
Liquids	81.0%



- Alternative 3 portfolio explores entry-level allocations to Private Equity and Private Debt. It also explores allocation to High Yield Debt.
- We observe a declining marginal benefit of adding additional liability-matching assets when the return-seeking allocation reaches 50-60% (in-line with the analysis in page 41). This portfolio offers 48% allocation to liability-matching assets.
- The Expected Funding Level at the time horizon is 105.7%, while the 5% Funding Level Risk is 55.2%.
- The Expected Return of this portfolio is 5.2% per annum, and the 5% Return is 1.3% per annum.
- Existing exposure to local real estate is maintained at 11% (actual allocation 31st October 2022)
- Compared to SAA (2020), this is a less risky portfolio (measured by 5% Funding Level Risk and 5% Return)

Changes vs SAA (2020)	
Equity Assets	7%
Global Equity	6%
Listed Infrastructure	-1%
Global Private Equity	2%
Bond Assets	4%
European Government Bonds	-2%
Investment Grade Bonds	2%
Absolute Return Bond Funds	0%
High Yield Debt	2%
Private Debt	2%
Alternative Assets	-11%
Global Property	-3%
Local Property	-2%
Hedge Funds	-6%
Cash Assets	0%
Cash	0%
Total	0%
Return-Seeking / Liability Matching Assets	
Return-Seeking Assets	0%
Liability-Matching Assets	0%
Public/Private	
Public Markets	-4%
Private Markets	4%
Liquidity	
Illiquid	2%
Quasi-Liquid	-3%
Liquids	1%

Benchmarks for Implementation and Monitoring

All current benchmarks are considered appropriate

Indicator/Asset Class/Sub-Strategy	Benchmark	Appropriate	Proposed Alternative
Equity Assets			
Global Equity	MSCI All Country World Index (in Euro)	✓	
Infrastructure Equity	FTSE Developed Core Infrastructure 50/50 Index (in Euro)	✓	
Private Equity	n/a		Burgiss Global PE or MSCI World + 3%
Bond Assets			
European Government Bonds	FTSE EMU Government Bond Index	✓	
Investment Grade Bonds	Bloomberg Barclays Global Aggregate – Corporates Index (Hedged in Euro)	✓	
Absolute Return Bond Funds	Euribor 3M + 1,5%	✓	
High Yield Debt	n/a		Bloomberg Barclays Global High Yield
Private Debt	n/a		Credit Suisse Leveraged Loan
Alternative Assets			
Global Property	MSCI PEPFI Index	✓	
Local Property	n/a		
Hedge Funds	HFRI Fund Weighted Diversified Index	✓	
Cash & Inflation			
Cash	Euribor 3M	✓	
Inflation	Consumer Price Index (CPI)		

Strategic Asset Allocation & Permitted Ranges

Illustrative for Portfolio Alternative 3

Asset Class	Target Allocation %	Permitted Ranges %
Equity Assets	30.0%	15.0% - 45.0%
Global Equity	21.0%	14.0% - 28.0%
Infrastructure Equity	7.0%	2.0% - 12.0%
Private Equity	2.0%	0.0% - 4.0%
Bond Assets	37.0%	17.0% - 57.0%
European Government Bonds	15.0%	5.0% - 25.0%
Investment Grade Bonds	10.0%	5.0% - 15.0%
Absolute Return Bond Funds	8.0%	3.0% - 13.0%
High Yield Debt	2.0%	0.0% - 4.0%
Private Debt	2.0%	0.0% - 4.0%
Alternative Assets	18.0%	8.0% - 28.0%
Global Property	4.0%	0.0% - 10.0%
Local Property	11.0%	6.0% - 16.0%
Hedge Funds	3.0%	0.0% - 10.0%
Cash Assets	15.0%	5.0% - 55.0%
Cash	15.0%	5.0% - 55.0%

7

Additional Risk Analysis: Economic & Climate Change Scenarios



Description of Economic Scenarios

Themes	Categories	Description
 <p>Optimistic – Positive outlook</p>	<ul style="list-style-type: none"> Blue Skies – Robust economic recovery and moderate inflation 	<ul style="list-style-type: none"> The evolution of the pandemic and the healthcare policy response is similar to the base case initially. However, more rapid and widespread roll out of vaccines helps infection rates fall more quickly, allowing a strong post-pandemic recovery, while large fiscal stimulus and economic policies support stronger growth.
 <p>Low Demand – Negative outlook</p>	<ul style="list-style-type: none"> Recession – Recession followed by recovery Dark Skies – Deep protracted recession with no rebound 	<ul style="list-style-type: none"> A resurgence of covid-19 infections driven by new variants and low vaccine take up necessitates further lockdown measures, as existing vaccines prove less effective and it takes time to develop, test and distribute updated vaccines. The effects of the pandemic worsen as new mutations of the virus create persistent disruption to the global economy. New restrictions and regional lockdowns are required to stem infections, hampering economic activity.
 <p>Topical – Often talked about scenarios that may be positive or negative</p>	<ul style="list-style-type: none"> High Inflation – Higher growth and loose money push up energy and commodity prices causing inflation Stagflation – Policy rates rise faster than expected, driving a sharp increase in bond yields 	<ul style="list-style-type: none"> The post-pandemic economic recovery continues to gain traction, with stronger than expected economic growth. A long-lasting Russia-Ukraine war and Covid-19 restrictions in China lead to ongoing supply chain disruptions and higher commodity and energy price rises compared to the base case. Low inventories and supply shortages lead to high levels of inflation.

Climate change risk – an introduction

Climate change is one of the highest concern risks facing the world over the next 10 years, as identified by the World Economic Forum in each of its last 5 years' risk assessments.

This is even more relevant today...

The world's climate is already 1°C warmer today, on average, than it was relative to pre-industrial levels. We are currently on a 4.1-4.8°C warming path relative to pre-industrial levels by the end of this century, with catastrophic consequences for ecosystems and humanity.

Physical Risks

The risks that occur as a result of physical events, such as extreme weather



Opportunities

Associated with the transition to a green / low-carbon economy.



Transition Risks

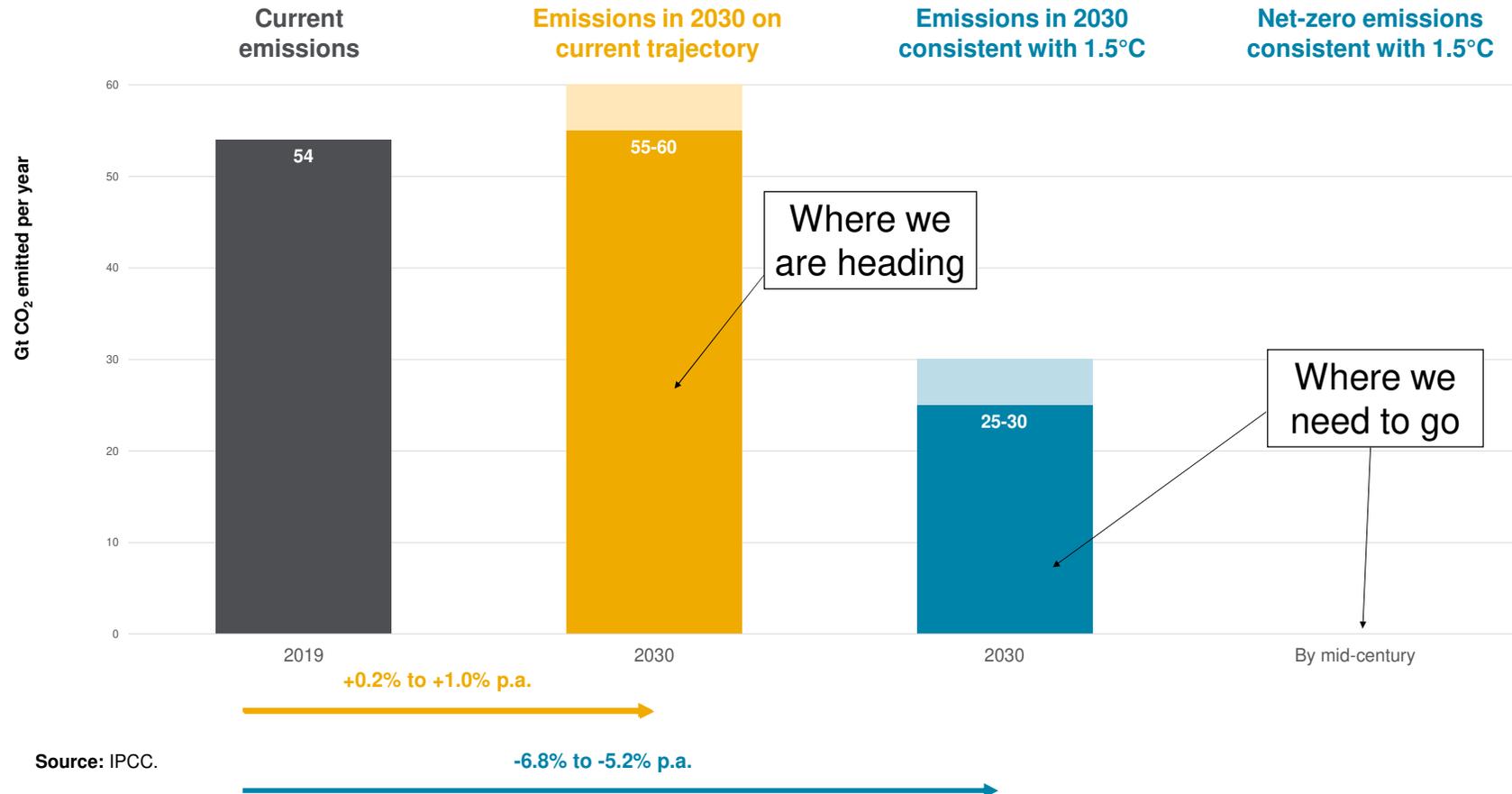
The risk associated with realignment of our economic system towards low-carbon, climate resilient or carbon-positive solutions, including changes in political policies



Winners and losers will emerge as part of the transition, creating risks but also opportunities

The world is not on track to limit temperature increases to 1.5°C above pre-industrial levels

Carbon emissions must go to net-zero by mid-century to limit warming to 1.5°C above pre-industrial levels



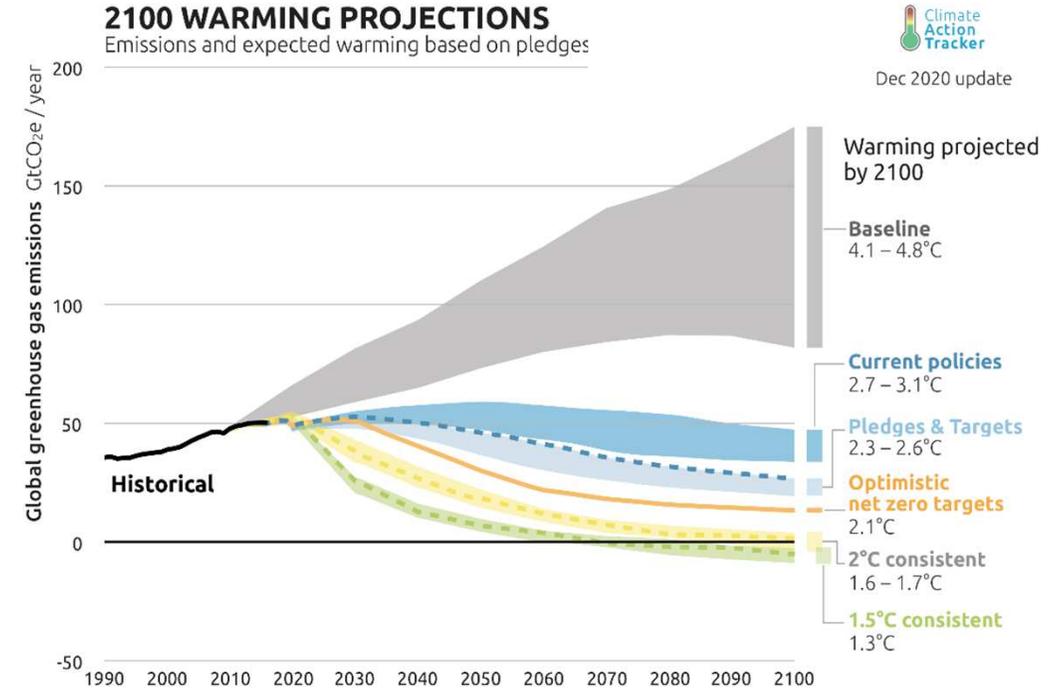
Source: IPCC.

Climate Change Scenarios

We consider four potential climate change scenarios:

- The No Mitigation scenario considers the potential impact of climate change if insufficient sustainable policy action is undertaken to manage global temperatures effectively over the next 10 years. Warming is limited to 3 to 4C.
- The Forced Green scenario explores the impact of delayed action for five years, with governments eventually forced to address greenhouse gas emissions due to increasing extreme weather events. Warming is limited to 1.5 to 2C.
- The Green Regulation scenario considers the impact of immediate, coordinated action to tackle climate change using taxes and regulation. Warming is limited to 1.3 to 2C.
- The Green Skies scenario shows how rapid advancement of green technology, private innovation and tiered environmental regulation and greenhouse gas taxes could achieve a smooth transition to a low carbon world. Warming is limited to less than 1.5C.

We contrast these scenarios against our base case scenario, which is based on long-term return views of what is currently priced into the market. Warming is limited to 2.1 to 2.3C.



Source: Climate Action Tracker, December 2020.

8

Appendix 1: Definitions



Capital Market Assumptions Methodology

Overview

- Aon's Capital Market Assumptions are our asset class return, volatility and correlation assumptions. The return assumptions are 'best estimates' of annualized returns. By this we mean median annualized returns – that is, there is a 50/50 chance that actual returns will be above or below the assumptions. The assumptions are long-term assumptions, based on a 10-year projection period and are updated on a quarterly basis. Expected returns are geometric (long-term compounded; rounded to the nearest decimal). Expected returns presented are models and do not represent the returns of an actual client account. Not a guarantee of future results. You cannot invest in an asset class directly, or within the model asset classes assumed within the Capital Market Assumptions.

Fees

- Liquid, publicly traded asset classes are invested passively at very low cost, where the fee assumption is zero. For asset classes such as emerging market debt which cannot be invested passively at very low cost, it is assumed for modeling purposes that manager alpha is offset by fees. For real estate, there is an allowance for the unavoidable costs associated with investing in a real estate portfolio. These include property management costs, trading costs and investment management expenses. For hedge funds, private equity and infrastructure, explicit fee assumptions are subtracted from expected returns; include base and performance-based fee/carry as appropriate.

Material uncertainty

- Given that the future is uncertain, there is material uncertainty in all aspects of the Capital Market Assumptions and the use of judgment is required at all stages in both their formulation and application.

Allowance for active management

- The asset class assumptions are assumptions for market returns, that is we make no allowance for managers outperforming the market. The exceptions to this are the multi-asset credit, private equity and hedge fund assumptions where, due to the nature of the asset classes, manager performance needs to be incorporated in our Capital Market Assumptions. In the case of multi-asset credit, we assume Skilled Managers¹ in rotation between asset classes and security selection. For hedge funds, we assume Average Manager² performance and for private equity we assume a High Performing Manager³.

Inflation

- When formulating assumptions for inflation, we consider consensus forecasts as well as the inflation risk premium implied by market break-even inflation rates.

Fixed income government bonds

- The government bond assumptions are for portfolios of bonds which are annually rebalanced (to maintain constant duration). This is formulated by stochastic modelling of future yield curves.

¹ Skilled Manger (Multi-Asset Credit): those managers who can generate 1%-2% of alpha net of fees, from rotation between asset classes and security selection. For our assumptions, we assume a more conservative 1% alpha net of fees.

² Average Manager (Hedge Funds): Median managers of the underlying building blocks of seven individual hedge fund strategies. Equity Long/Short (25%), Equity Market Neutral (14%), Fixed Income Arbitrage (6%), Event Driven (19%), Distressed Debt (13%), Global Macro (18%), CTAs (5%).

³ High Performance Manager (Private Equity): Managers who can gain various market factors such as US Large Cap Equity, US Small Cap Equity and US High Yield with associated risk premiums, after base and performance-based fee carry as appropriate.

Capital Market Assumptions Methodology

Inflation-linked government bonds

- We follow a similar process to that for nominal government bonds, but with projected real (after inflation) yields. We incorporate our inflation profiles to construct nominal returns for inflation-linked government bonds.

Corporate bonds

- Corporate bonds are modelled in a similar manner to government bonds but with additional modelling of credit spreads and projected losses from defaults and downgrades.

Other fixed income

- Emerging market debt and high yield debt are modelled in a similar fashion to corporate bonds by considering expected returns after allowing for losses from defaults and downgrades.

Equities

- Equity return assumptions are built using a discounted cash flow analysis. Forecast real (after inflation) cashflows payable to investors are discounted and their aggregated value is equated to the current level of each equity market to give forecast real (after inflation) returns. These returns are then converted to nominal returns using our 10-year inflation assumptions.

Private Equity

- We model a diversified private equity portfolio with allocations to leveraged buyouts, venture capital, and mezzanine and distressed investments. Return assumptions are formulated for each strategy based on an analysis of the exposure of each strategy to various market factors with associated risk premia.

Real estate / Property

- Real Estate returns are constructed using a discounted cash flow analysis similar to that used for equities but allowing for the specific features of these investments such as rental growth.

Hedge funds

- We construct assumptions for a range of hedge fund strategies (e.g., Equity Long/Short, Equity Market Neutral, Fixed Income Arbitrage, Event Driven, Distressed Debt, Global Macro, Managed Futures) based on an analysis of the underlying building blocks of these strategies. We use these individual strategies to formulate a fund of hedge funds' assumption which is quoted in the Capital Market Assumptions.

Currency movements

- Assumptions regarding currency movements are related to inflation differentials.

Volatility

- Assumed volatilities are formulated with reference to implied volatilities priced into option contracts of various terms, historical volatility levels and expected volatility trends in future.

Correlations

- Our correlation assumptions are forward-looking and result from in-house research which looks at historical correlations over different time periods and during differing economic/investment conditions, including periods of market stress. Correlations are highly unstable, varying greatly over time. This feature is captured in our modelling.

Statistics Definitions

- **Beta** – A measure of the sensitivity of a portfolio to the movements in the market. It is a measure of a portfolio's non-diversifiable or systematic risk.
- **Correlation** – Also called coefficient of correlation, it is a measure of the co-movements of two sets of returns. Indicates the degree in which two sets of returns move in tandem.
- **Sharpe Ratio** – Represents the excess rate of return over the risk-free return divided by the standard deviation of the excess return. The result is the absolute rate of return per unit of risk. The higher the value, the better the portfolio's risk-adjusted performance. For Public DB and Non-Profit clients, the expected return of Cash (1-year Treasury/Govt) is used as the risk-free return. For Corporate DB clients, a matching bond portfolio, i.e., liability proxy, is used to approximate liabilities. This liability proxy is then used to calculate the surplus return, surplus volatility and resultant Sharpe ratio.
- **Volatility (Standard Deviation)** – A statistical measure of the range of a portfolio's performance, the variability of a return around its average return over a specified time period.
- **Value At Risk** – A measure of the risk of loss on an investment portfolio. It is defined as the maximum loss not exceeded with a given probability defined as the confidence level, over a given period.
- **Drawdown** – The peak-to-trough decline during a specific record period of an investment.

9

Appendix 2: Asset Class Training



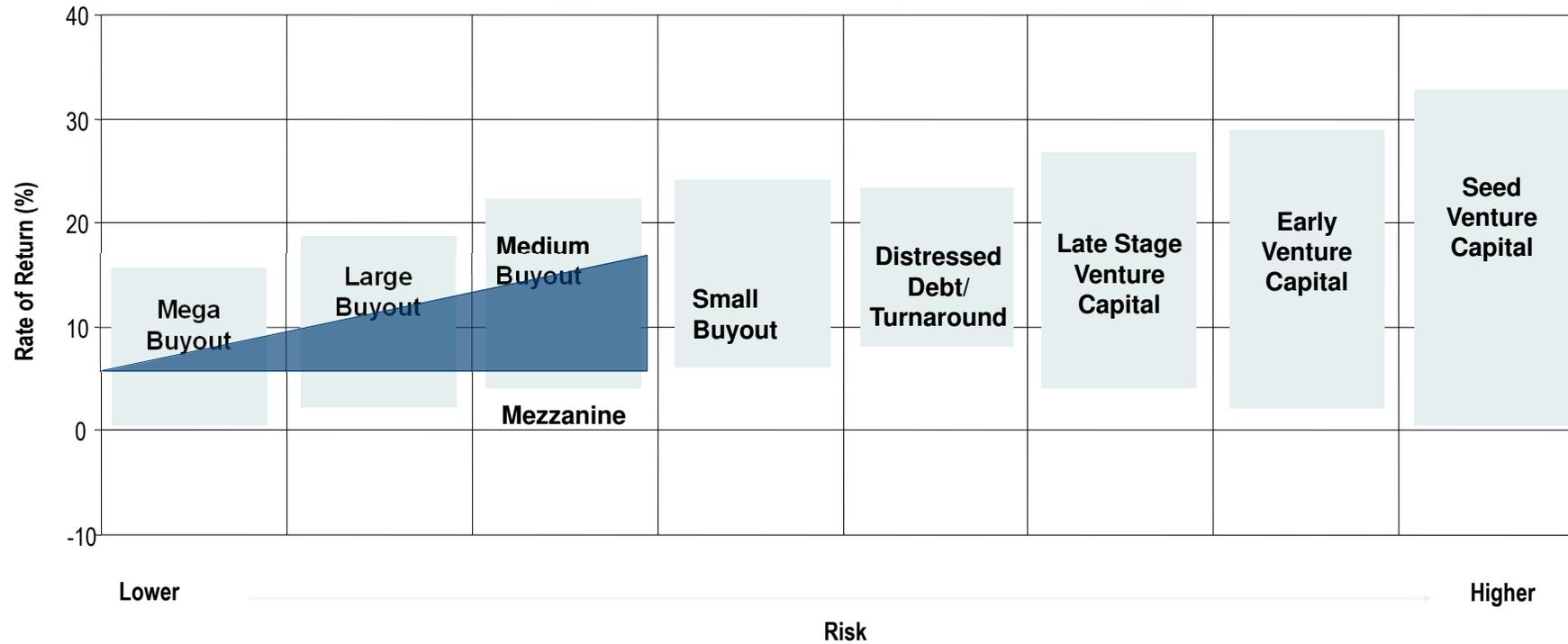
What is Private Equity

An investment in equity capital that is not quoted on a public exchange

- The oldest form of equity and was historically available only to company founders and their friends and family.
- Began growing as an investment for institutions in the 1980s through the development of private equity funds and the availability of debt to help finance company acquisitions.
- Can be invested in companies providing any type of product or service.
- Can generate excess returns to the public markets due to investment manager skill. Managers attempt to create value by:
 - Acquiring controlling and/or non-controlling interests in private companies.
 - Actively building / repositioning and selling those companies.
- Is illiquid because it is not a publicly listed security and requires significantly more time and effort to sell.
- Can have higher risk due to its illiquidity and typically smaller company size and use of leverage.

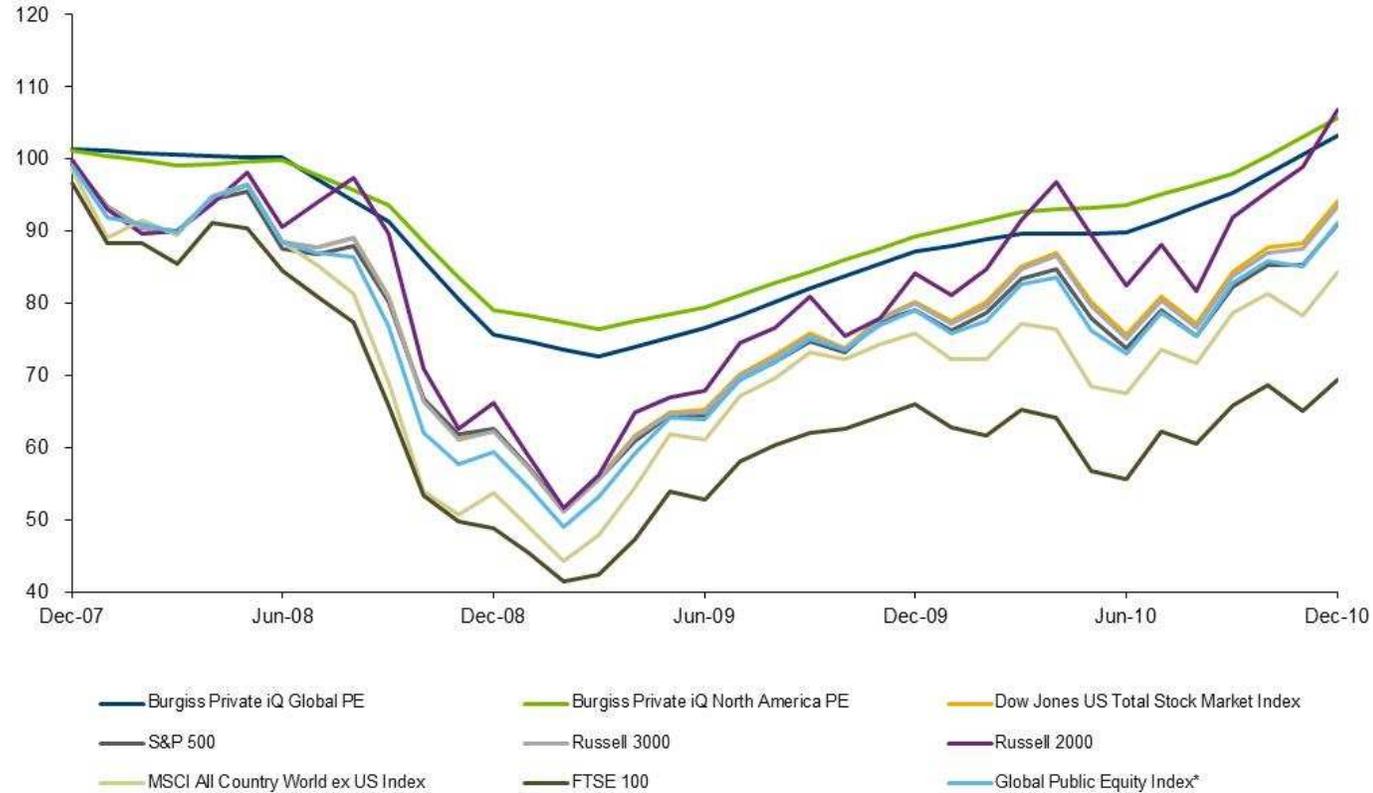
	Size	Ownership	Financials	Operational Focus	Value Generated
Public Companies	Mature	Shareholders	Publicly Disclosed	Short-term	Operational Improvements
Private Companies	Seed Stage to Mature	Founder, Management, Select employees, and Investors	Confidential	Long-term	Operational Improvements and Financial Engineering

Private Equity Risk/Return Spectrum



Benefits of Private Equity: Superior Returns

Private Equity vs. Public Performance in GFC (1)



Sources: Bloomberg, Burgiss Private iQ
(1) Calculated in USD

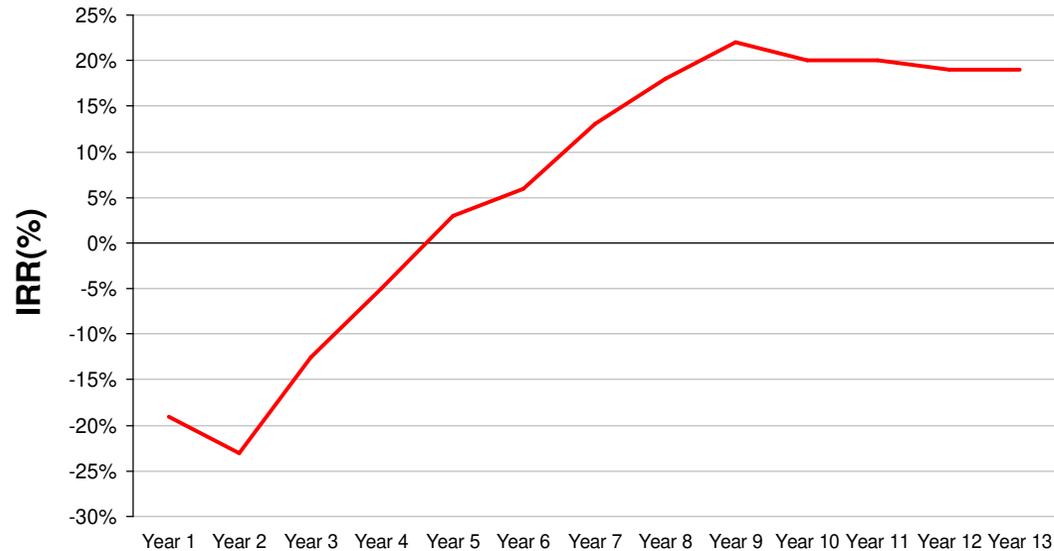
Challenges to consider

- One of the biggest concerns about incorporating Private Market investments in a portfolio is illiquidity, though the opportunity to invest in illiquid assets often translates into the very potential for higher returns and diversification that many investors seek.
- So, understanding the liquidity characteristics of the overall portfolio can help the Fund maintain their liquidity needs while maximizing the benefits of such alternative assets
- Unfortunately, simple rules of thumb are not often reliable ways to assess the risks and benefits of incorporating illiquid assets. The amount of such assets an investor can hold tends to be highly individualized, as it is heavily dependent on factors such as:

Factor	Impact
Cash inflows	Cash inflows such as contributions inject liquidity and offset spending. Higher, more reliable cash inflows—particularly in periods of stress—allow greater allocations to illiquid assets.
Spending needs	Higher levels of spending create a lower allowance for illiquid assets, while greater flexibility to reduce spending in stressful economic environments increases the ability to invest in illiquid assets.
Target Asset Allocation	One perspective is that a higher allocation to return-seeking assets can create room for large allocations to alternative assets. However, higher allocations to return-seeking assets also increase exposures to market downturns; in this respect, a lower allocation to return-seeking assets can allow for greater exposure to illiquid assets. These competing dynamics will combine to influence how the target asset allocation affects the ability to invest in illiquid alternatives.
Tolerance for breach of asset allocation targets	By their very nature, illiquid assets make rebalancing difficult. Investors who have broader ranges for asset allocation or are comfortable with short-term breaches of asset allocation targets can hold more alternatives.

J Curve

The curve generated by plotting the returns generated by a private equity or infrastructure fund against time (from inception to termination)



- Depth and shape of curve dependent on investment type and vehicle
- Until portfolio reaches maturity (at allocation target with cash distributions ~ the same rate as capital contributions) each new commitment will push the portfolio backward on the J Curve

Accessing Private Equity: Investment Vehicle Options

		Vehicle	Benefits	Concerns
		Co-Investments Investment directly in a private company along side a primary fund.	<ul style="list-style-type: none"> Lower fees High customization Accelerates time to attain targeted private equity exposure 	<ul style="list-style-type: none"> Extremely high concentration Significant time and expense to implement Usually available only to primary fund investors Short time frame for investment decisions
	+	Primary Fund Closed end, limited partnership structure that creates a portfolio of investments in private companies in accordance with a stated strategy	<ul style="list-style-type: none"> One level of fees Ability to make tactical allocations Better control of timing and amounts of capital deployment Allocations can be tailored directly to overall plan's risk appetite 	<ul style="list-style-type: none"> Requires large number of funds to manage concentration risk; A diversified portfolio available only for larger portfolios Significant time required to build & manage portfolio Cost to find managers and review legal documents
	-	Secondary Funds Closed end, limited partnership structure that purchases older investments in primary funds, fund of funds and co-investments	<ul style="list-style-type: none"> High diversification Faster investment and distribution cycle High initial returns help mitigate portfolio J-curve Can accelerate time to reach target private equity allocation. 	<ul style="list-style-type: none"> Two layers of fees; but lower than a Fund of Funds Returns highly impacted by secondary market conditions.
		Fund of Funds Closed end, limited partnership structure that creates a portfolio of investments in primary funds, and, potentially, co-investments & secondaries	<ul style="list-style-type: none"> High level of diversification Administratively efficient May provide access to specific regions or niche strategies Available for small commitments 	<ul style="list-style-type: none"> Two levels of fees reduce returns Index like returns No control of timing or amount of capital deployment No customization

What is Private Debt?

Description

- Debt that is not traded on the public debt markets and, as a result, it is more difficult to acquire and generally requires arranging the terms of the loan directly with the borrower
- Private Debt includes a wide range of forms
 - Senior secured and unsecured loans to mid-market companies
 - Infrastructure project financing
 - Investments secured by real estate assets
 - Securitized lease / loan obligations supported by a pool of assets

Return Opportunity

- Higher credit spread than traditional credit, well above corporate bonds¹
- Spreads differ for investment grade and non-investment grade
- Private Debt is more difficult to access, so yield spreads have not been compressed to the extent of liquid corporate bonds

Diversification

- Low correlation with equities and bonds

Private Debt Considerations

Terms and Structure

	Private Debt Characteristics
Illiquidity	<ul style="list-style-type: none">▪ Very limited liquidity to trade these types of loans
Higher Fees	<ul style="list-style-type: none">▪ Fees vary widely depending on vehicle, strategy and return target▪ Range from 0.70% to 2.00%, plus a performance fee¹
Structure	<ul style="list-style-type: none">▪ Two types of structures:<ul style="list-style-type: none">– Closed-ended fund with no ability to redeem before end of term– Open-ended fund with redemption at the discretion of the manager▪ Limited # of Buy-rated managers
Cash Flows	<ul style="list-style-type: none">▪ Produces regular cash flows
Volatility / Downside Risk	<ul style="list-style-type: none">▪ Portfolio is likely to experience a small # of defaults or restructuring▪ Recovery has been high historically

¹Source: The 2021 Preqin Private Capital Fund Terms Advisor report.– As of January 31 2021 – Fee range represents investment manager fees related to direct lending for the private debt asset class and excludes any potential performance fees the manager may charge.

Role of Private Debt

1

Private debt in basic terms is typically **debt that is not traded in the public markets.**

Because of this, the terms of the debt are directly negotiated between the borrower and the creditor.

- Low correlation with equities and bonds
- Higher credit spreads than traditional public fixed income
- Typically consists of non-investment grade bonds

2

Private debt **lifecycle is similar to that of private equity**

(Fundraising, Sourcing/Managing, Harvesting) with key differences:

- Capital lock up is shorter – fund life typically ranges from 5-10 years
- Current income stream plays a more significant role
- Offers illiquidity premium over public fixed income

3

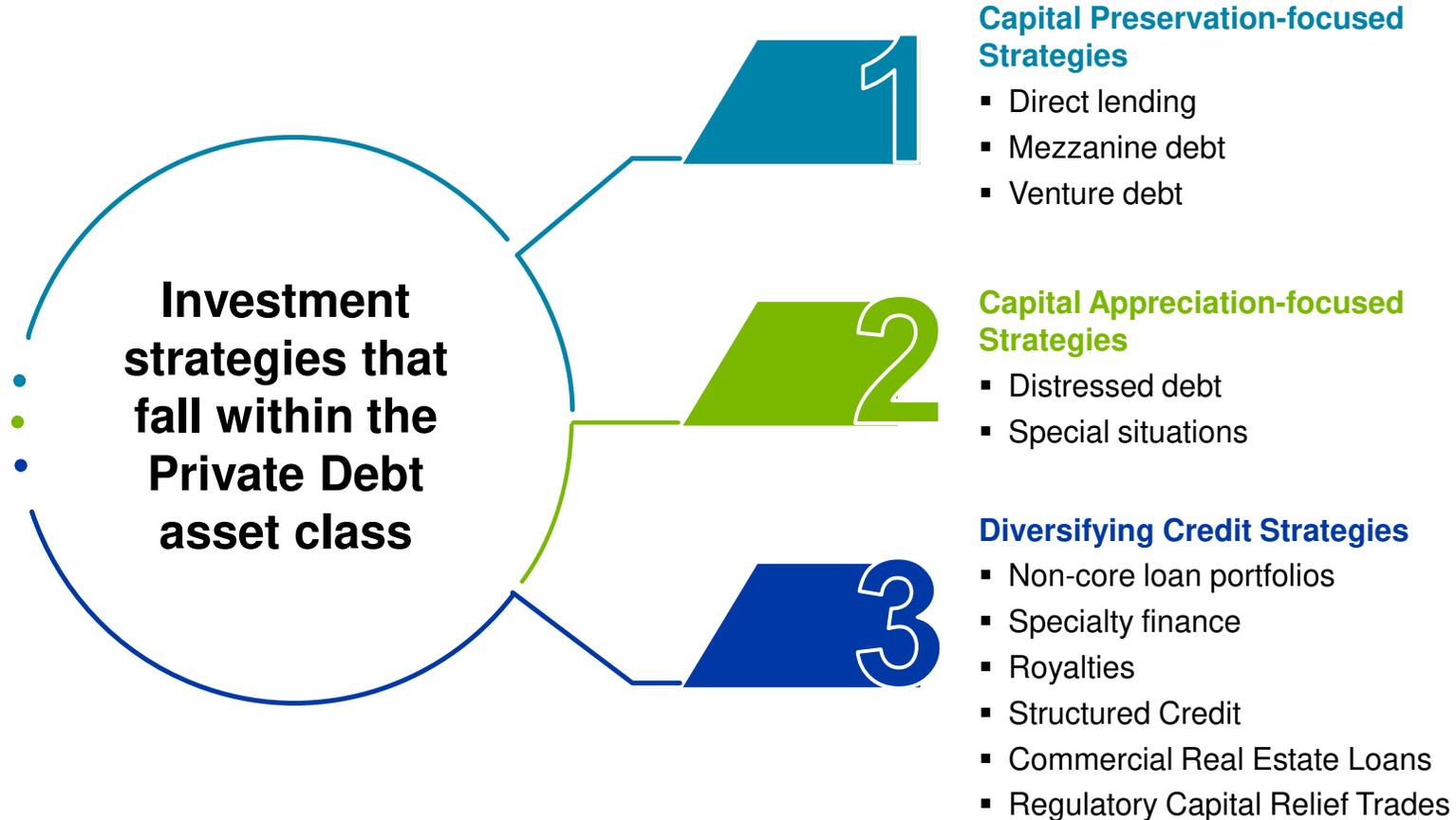
Private debt **managers seek to either lend or acquire debt with attractive terms that offer an illiquidity premium over public fixed income markets.**

Some strategies focus on establishing protective rights to influence company operations, while other strategies focus on building a portfolio of quality assets at discounted prices to hold to maturity.

Role and Purpose in a Portfolio

Illiquid return-seeking credit, providing complementary access to economic activity, with current income and the potential for capital appreciation over different market cycles

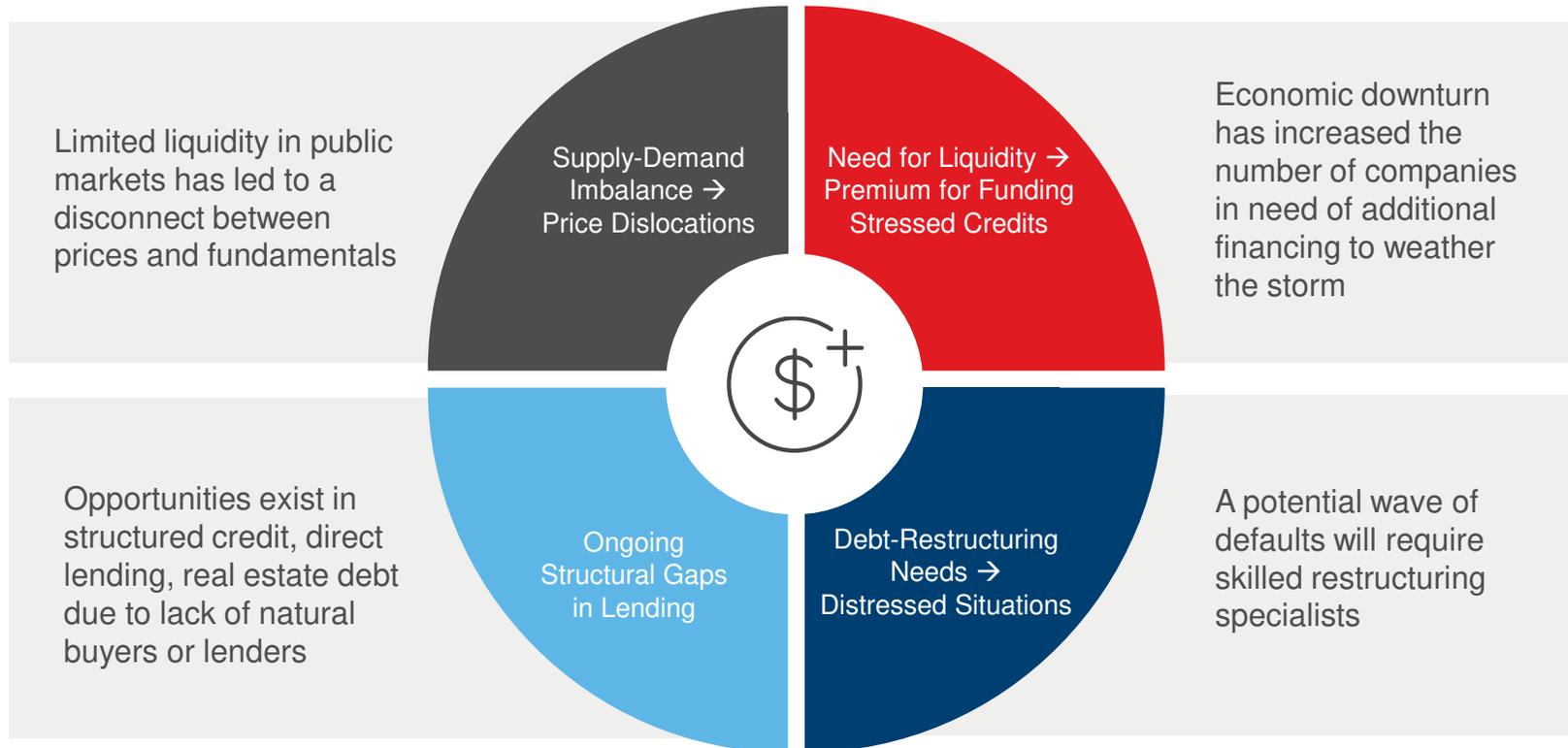
Private Debt Sub-Strategies



Private Credit Offers Potential for Higher Absolute and Risk-Adjusted Returns

Excess Supply → Lack of Demand → Liquidity Premium → Debt Restructuring Needs

→ Potentially Higher Risk-Adjusted Returns



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