LOMBARD ODIER
INVESTMENT MANAGERS

All Roads' application for institutional investors

Solutions insights

For professional investor use only • Multi-Asset March 2018

A NEXT GENERATION MULTI-ASSET FUND

All Roads is a multi-asset/diversified growth strategy that aims to build on the best of the array of existing multi-asset approaches to provide a highly effective tool for institutional investors. Lombard Odier's own Swiss employee pension fund (LOPF) entrusts a substantial part of its assets to the All Roads strategy. For LOPF, All Roads is a core, liquid, return-generating engine that targets a stable return path within a maximum level of acceptable loss.[1,2]

WHAT IS COVERED IN THIS PAPER?

We demonstrate the potential benefits of All Roads for different categories of institutional clients, as follows:

1. A defined benefit pension scheme
2. Two defined contribution pension scheme member profiles
3. A closed life with-profits book
4. A general insurer with a medium risk profile

The case studies provided in this document are for illustrative purposes only and do not purport to be recommendation of an investment in, or a comprehensive statement of all of the factors or considerations which may be relevant to an investment in, the referenced securities. The case studies have been selected to illustrate the investment process undertaken by the Manager in respect of a certain type of investment, but may not be representative of the Fund's past or future portfolio of investments as a whole and it should be understood that the case studies of themselves will not be sufficient to give a clear and balanced view of the investment process undertaken by the Manager or of the composition of the investment portfolio of the Fund now or in the future.

THE DETAILS

- **Inception year:** 2012
- **Target return:** cash + 3% to 5%[2]
- **Risk target:** maximum drawdown of 10% over 12 months[2]
- **Allocates dynamically across traditional asset classes:** equities, bonds and commodities
- **Liquid and transparent implementation**
- **Assets under management:** segregated and pooled mandates run by the multi-asset team exceed USD 6

THE RELEVANCE FOR INVESTORS

- Downside protection[1,2] through our proprietary drawdown protection technology
- Low running costs and competitive fees
- Daily liquidity
- Full asset transparency can be offered
- Helps reduce "regret risk" – risk of missing out on a continuing upward trending market – with the comfort of an enhanced process that aims to bank gains in the event of a market reversal
- Good fit for under-hedged liability-aware schemes: dynamic duration risk management would increase (reduce) duration when rates are falling (rising) at a time "when the solvency position of" an under-hedged client is deteriorating (improving)

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[1] Capital protection/capital preservation represents a portfolio construction goal and cannot be guaranteed.

[2] Target performance/risk represents a portfolio construction goal. It does not represent past performance/risk and may not be representative of actual future performance/risk.

CASE STUDY 1: A DEFINED BENEFIT PENSION SCHEME

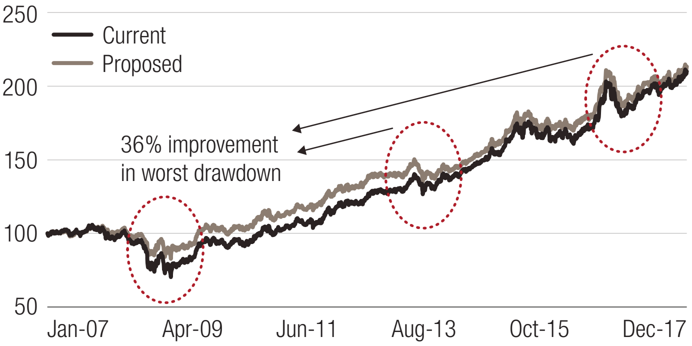
Improved resilience to market shocks on both asset and economic funding level

We tested how allocating to All Roads might impact a typical defined benefit pension scheme with 50% growth assets and 50% matching assets.

We replaced 20% (portfolio-level) of equities within the growth asset allocation with All Roads. We set an arbitrary initial economic funding level of 80% and analysed the impact of changes in investment markets. The back-test showed a similar return over the 10-year period but a material improvement in the drawdown experienced by both the asset and the funding level of the hypothetical scheme. This is in line with our focus of delivering returns similar to other diversified growth funds in the market (cash + 3% to 5%) with a material reduction in both the volatility and drawdown risk.

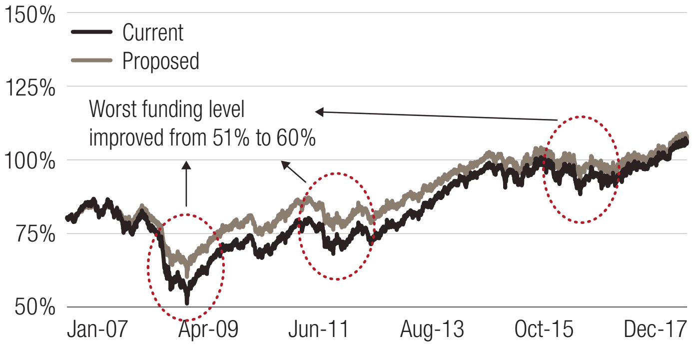
We believe the drawdown risk consideration makes the All Roads approach particularly important for the defined benefit market and see various applications for All Roads, especially for schemes that are cashflow negative and/or have weak sponsors (low tolerance for material extensions to recovery plans due to large drawdowns).

Figure 1 – Cumulative performance



Source: LOIM.

Figure 2 – Funding level



Source: LOIM.

Table 1 – Table of statistics

	CURRENT	PROPOSED
ASSET-ONLY PERSPECTIVE		
Annual return	7.0%	7.2%
Volatility	9.9%	8.7%
Sharpe ratio	0.54	0.64
Maximum drawdown	-33.7%	-21.6%
FUNDING RATIO		
Starting value	80.0%	80.0%
Average	107.3%	109.1%
Worst	51.2%	60.2%
Ending value	103.6%	105.4%
Volatility	14.6%	13.6%

Notes: Performance gross and based on historical returns (except for All Roads which is partially back-tested and net – see below for more information) assuming annual rebalancing to the target allocation. Past performance is not a guarantee of future results.

Asset returns and funding ratio changes are back-tested on a daily frequency by running the original and revised asset allocations through a model balance sheet with a liability proxy such that a funding ratio of 80% is met on 24 January 2007. Indices used: equities: MSCI World Gross TR USD Index (M2WO Index) hedged to GBP; credit: IBOXX GBP OVERALL AA15+ (A1EW6Z); gilts: FTSE Actuaries Govt Securities TR 15+ Years (FTFIBGH); property: UK IPD TR All Properties (IPDMZPR).

All Roads is back-tested for the EUR IA Share Class NAV hedged to GBP before January 2012 and the actual performance of LOARIAE LX Equity hedged GBP is used since January 2012.

Liabilities are modelled by discounting a hypothetical fixed cashflow series that runs for 100 years using the gilts discount curve (GUKGX Index series on a smoothed basis, extrapolated for >50 terms). A 50% hedge ratio of the liability duration was assumed using interest rate swaps on a continuous basis.

Analysis period: 24 January 2007 to 29 December 2017.

Target performance/risk represents a portfolio construction goal. It does not represent past performance/risk and may not be representative of actual future performance/risk.

CASE STUDY 2: A DEFINED CONTRIBUTION PENSION SCHEME

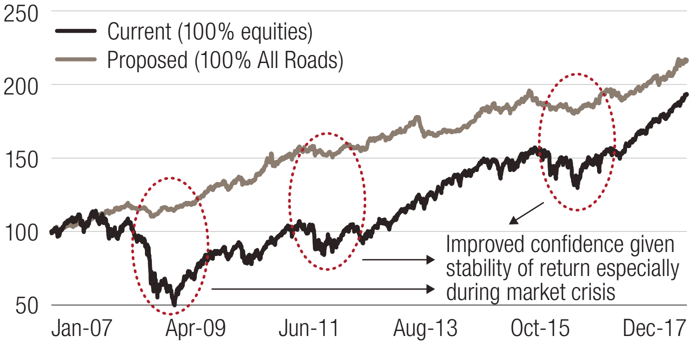
Protecting member benefits and improving confidence with stable outcomes

We tested the impact of including All Roads in the portfolios of two sample members:

- A young member invested in either 100% global equities ("current") or 100% All Roads ("proposed"), over a period with material market shocks (2007 to 2017)
- A mid-50's member on a life-styling path over a period of 10 years, where the pension investments evolved from 100% equities ("current") or 100% All Roads ("proposed") at the start, in each case moving towards a 75% bonds + 25% cash combination at the end

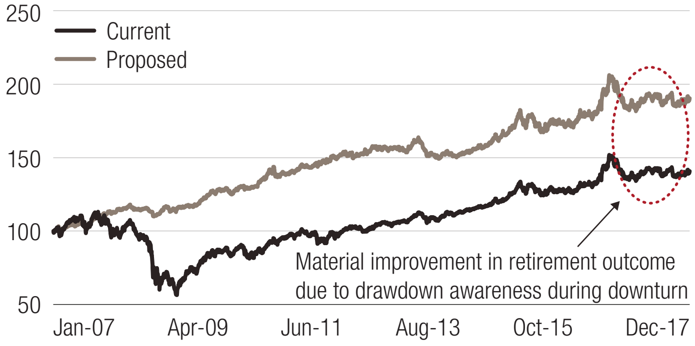
The outcome – in terms of returns, volatility and drawdowns – for members in different stages of investing improved over this back-testing period. The aim of All Roads is to deliver cash + 3% to 5% returns (similar to other diversified growth funds), which becomes especially important where there is a risk of a market slowdown. Further refinement for an improved member experience could also be made by varying exposure to the three drawdown target variations of All Roads to reflect the changing risk appetite of defined contribution members.

Figure 3 – Young member



Source: LOIM.

Figure 4 – Life-styling member



Source: LOIM.

Table 2 – Table of statistics

	YOUNG MEMBER		LIFE-STYLING MEMBER	
	CURRENT	PROPOSED	CURRENT	PROPOSED
Annual return	6.2%	7.3%	3.2%	6.0%
Volatility	17.3%	5.05%	12.9%	6.4%
Sharpe ratio	0.27	1.14	0.12	0.70
Maximum drawdown	-56.5%	**-8.1%**	-50.2%	**-11.9%**[1]

Notes: Performance gross and based on historical returns (except for All Roads which is partially back-tested and net – see below for more information) assuming annual rebalancing to the target allocation. Past performance is not a guarantee of future results.

Asset returns for the Young Member are based on 100% equities (current) and 100% All Roads (Proposed). For the Life-styling member, the back-tested allocation evolves from 100% equities or All Roads in Year 1 to 75% gilts + 25% cash in Year 10, reducing the allocation to equities by 10% each year. Indices used: equities: MSCI World Gross TR USD Index (M2WO Index) hedged to GBP; gilts: FTSE Actuaries Govt Securities TR 15+ Years (FTFIBGH); cash: UK Cash Indices Libor 3mth TR (UKC0TR03).

All Roads is back-tested for the EUR IA Share Class NAV hedged to GBP before January 2012 and the actual performance of LOARIAE LX Equity hedged GBP is used since January 2012.

Analysis period: 24 January 2007 to 29 December 2017.

[1] Higher drawdown for life-styling member versus young member is explained by the life-styling member's high allocation to bonds when GBP bond prices experienced a sharp drawdown towards the end of 2016. However, the rate rises at the end of 2016 would have also brought the sample life-styling member benefits in terms of better annuity rates.

Target performance/risk represents a portfolio construction goal. It does not represent past performance/risk and may not be representative of actual future performance/risk.

CASE STUDY 3: A CLOSED LIFE WITH-PROFITS BOOK

A fairer payout to policyholders and less chance of a shareholder "burn-through"

We considered a hypothetical closed with-profits book with 60% equities and property/40% fixed interest, where All Roads replaced 25% (portfolio-level) of equities in the growth bucket.

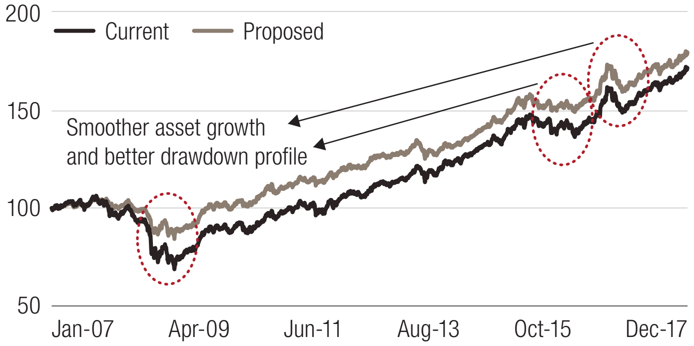
Key observations:

- Higher returns at lower risk
- Improved liquidity buffer to avoid forced sale
- Cost of guarantees, requirement for smoothing and capital are reduced due to diversification and effective drawdown management

These improvements can potentially boost the orderly run-off of a mid-sized, closed with-profits book faced with increasing overheads and a downward spiral of returns. The enhanced returns and liquidity could help the company avoid capital strains and/or excessive bond matching in the latter stage of the fund's lifecycle.

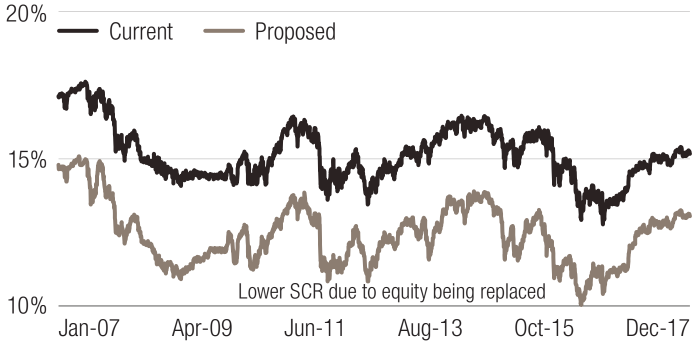
We note that asset allocations and guarantee levels can vary across European countries. However, the principle of using All Roads to diversify a portfolio and target improved drawdown protection and lower volatility (in assets and capital requirements) would continue to apply.

Figure 5 – Cumulative net return[1]



Source: LOIM. [1] Return net of cost of guarantees, smoothing and capital.

Figure 6 – Market risk SCR[1] as % of investment assets



Source: LOIM. [1] Solvency Capital Requirement.

Table 3 – Table of statistics

	CURRENT	PROPOSED
Annual return[1]	5.9%	6.1%
Volatility[1]	8.1%	5.9%
Maximum drawdown[1]	-35.1%	**-20.2%**
Liquidity ratio[2]	70%	**82.5%**
Cost of guarantees, smoothing and capital[2]	0.8%	0.6%
Annual net return (A)	5.1%	5.5%
Solvency capital requirement for market risks as % of investment assets, averaged over the back-testing period (B)[3]	15.1%	12.4%
Return-on-SCR (A/B)	0.34	0.44

Notes:

[1] Performance gross and based on historical returns (except for All Roads which is partially back-tested and net – see below for more information) assuming annual rebalancing to the target allocation. Past performance is not a guarantee of future results.
Portfolio return is modelled on a daily frequency by running the original (50% equities, 20% credit, 20% gilts and 10% property) and revised asset allocations (25% equities replaced with All Roads) through the back-testing period January 2007 to December 2017. Indices used: equities: MSCI World Gross TR USD Index (M2WO Index) hedged to GBP; credit: IBOXX £OVERALL AA15+ (A1EW6Z); gilts: FTSE Actuaries Govt Securities TR 15+ Years (FTFIBGH); property: UK IPD TR All Properties (IPDMZPR); All Roads is back-tested for the EUR IA Share Class NAV hedged to GBP before January 2012 and the actual performance of LOARIAE LX Equity hedged GBP since January 2012. In calculating the net annualised return we deducted the cost of guarantees, smoothing and capital.

[2] Liquidity Ratio is calculated as % of assets with daily or better liquidity: gilts, All Roads, 75% of credit and 50% of equities. We apply scaling factors to adjust for the volatility and drawdown risk of different asset classes. Cost of guarantees, smoothing and capital is estimated based on the running volatility and drawdown profile of the investment portfolio.

[3] SCR market risk is estimated using Solvency II standard formula for interest rate, equity, property and spread risks, where a 50% Loss Absorbing Ratio is assumed on equity, property and spread risks due to the Loss Absorbing Capacity of Technical Provisions; and a 60% hedge ratio (as % of liability DV01) for interest rate risk is assumed and the P&L from the hedge is taken into consideration in our modelling.

Analysis period: 24 January 2007 to 29 December 2017.

Target performance/risk represents a portfolio construction goal. It does not represent past performance/risk and may not be representative of actual future performance/risk.

CASE STUDY 4: A GENERAL INSURANCE INVESTOR

Return enhancement and mitigation of underwriting volatility

Under certain circumstances, such as a period of adverse large claims, general insurance underwriting profits may have large swings year-on-year. To improve balance-sheet stability and reduce the impact of underwriting losses, we believe general insurers would benefit from a review of their investment and capital management policies to target an enhancement of returns whilst keeping investment risk at a manageable level.

We considered a general insurance company with 70% invested in investment grade bonds, 10% in cash and 20% in non-core assets such as equities, high-yield bonds and property. We then looked at two scenarios, where:

- 10% of non-core assets is invested in All Roads
- The entire non-core investment is in All Roads

Key observations for this study:

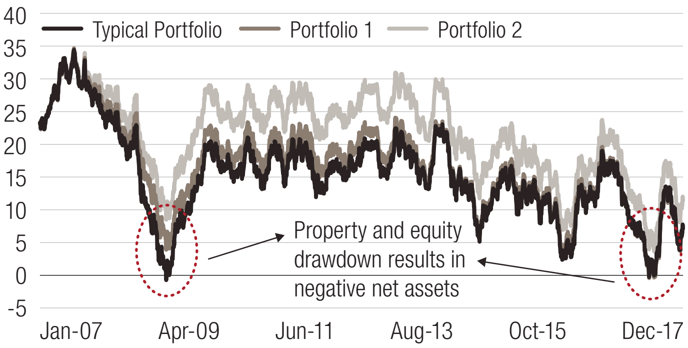
- An improvement in returns with lower portfolio volatility
- Materially reduced drawdown
- Material improvement in probability that the investor does not run out of their net assets (total assets less total insured liability value)
- Reduced solvency capital requirement

Introducing All Roads would have resulted in a similar return with less risk as measured by volatility and drawdown for portfolio 1 (improved return for portfolio 2). All Roads would also not have had a material capital impact and may have even improved the capital position. This would have been a good result for a general insurer.

All Roads therefore provided the safe return enhancement needed to boost the accounting profit of this hypothetical company.

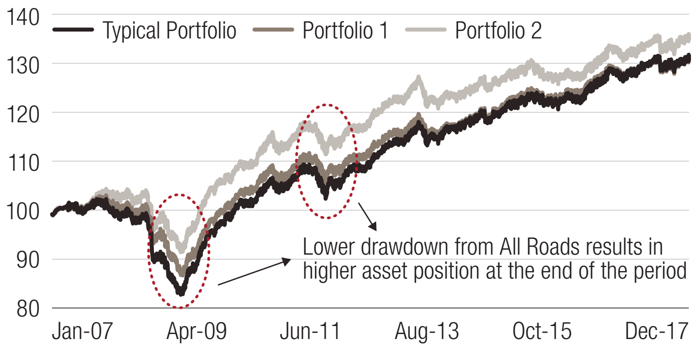
The fund has daily liquidity similar to high quality bonds, but is more capable of manoeuvring risk when credit and interest rate markets are suffering shocks due to its dynamic drawdown and duration management technology.

Figure 7 – General insurance net assets



Source: LOIM.

Figure 8 – General insurance total assets



Source: LOIM.

Table 4 – Table of statistics

	TYPICAL PORTFOLIO	PORTFOLIO 1	PORTFOLIO 2
Annual return	2.5%	2.5%	2.8%
Total asset volatility	7.5%	7.4%	7.2%
Sharpe ratio	0.12	0.12	0.16
Maximum drawdown	-19.14%	-15.87%	-12.45%
Estimated gross market solvency capital requirement	10.6%	9.8%	10.1%

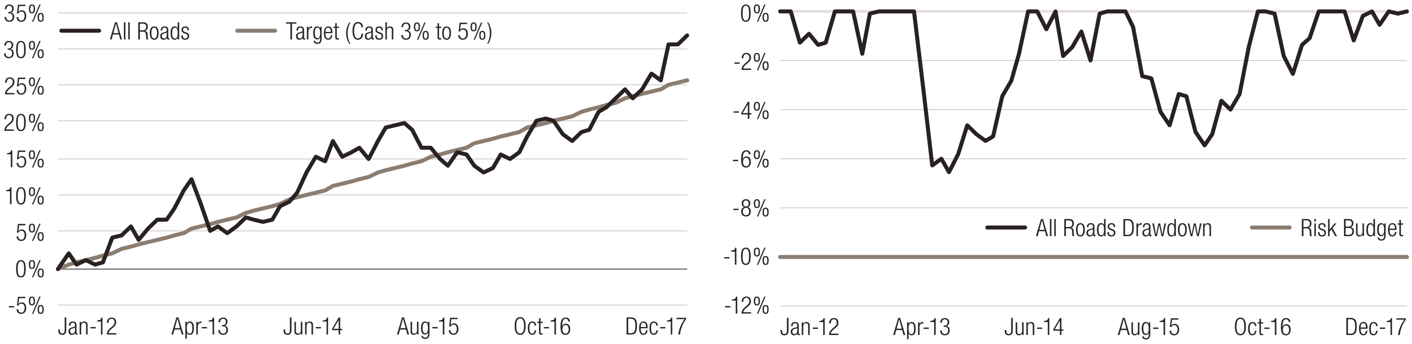
Analysis period: 24 January 2007 to 29 December 2017.
Solvency capital requirement calculated based on the standard formula as per the European Insurance and Occupational Pensions Authority Solvency II regulation.
Performance gross and based on historical returns (except for All Roads which is partially back-tested and net – see below for more information) assuming annual rebalancing to the target allocation.
General insurance net assets determined by taking the difference between investment assets and insurance liabilities adjusted for premiums, claims and expenses.
Typical portfolio allocation: 70% in short-dated investment grade bonds, 10% in cash, 10% in property, 5% in high yield bonds and 5% in equity.
Portfolio 1 allocation: 70% in short-dated investment grade bonds, 10% in cash, 10% in property, 10% in All Roads.
Portfolio 2 allocation: 70% in short-dated investment grade bonds, 10% in cash, 20% in All Roads.
Indices used: short dated investment grade bonds: IBOXX OVERALL A 3 – 5Y TR (A1EW7C); cash: UK Cash Indices Libor 3mth TR (UKC0TR03); property: UK IPD Total return All Property (IPDMZPR); high yield: Barclays Global High Yield TR Hedge GBP(LG30TRGH); equity: MSCI World Gross TR USD (M2WO).
All Roads is back-tested for the EUR IA Share Class NAV hedged to GBP before January 2012 and the actual performance of LOARIAE LX Equity hedged GBP is used since January 2012.
Analysis period: 24 January 2007 to 29 December 2017.
Target performance/risk represents a portfolio construction goal. It does not represent past performance/risk and may not be representative of actual future performance/risk.

CONCLUSION

We strongly believe All Roads is better equipped than traditional diversified growth funds and risk parity funds to navigate volatile market environments. The dynamic duration management feature increases its applicability for a variety of institutional investors, in our view.

The strategy design incorporates a combination of a wide range of risk premia, dynamism due to market opportunities (trends) and an explicit awareness of a drawdown budget. The end result is a relatively smooth return and lower risk (and in particular, lower drawdown) profile that could benefit institutional investors. The end result is shown in the performance chart below.

Figure 9 – LO Funds–All Roads – fund performance since inception[1, 2]



Source: LOIM.
Past performance is not a guarantee of future results.
[1] Fund inception date: 24 January 2012.
[2] Dividend accumulated institutional share class, NA, net performance in EUR. Cash index: EONIA.
Analysis period: 01 January 2012 to 29 December 2017.
Target performance/risk represents a portfolio construction goal. It does not represent past performance/risk and may not be representative of actual future performance/risk.