Knowledge Series

Portfolio Optimisation Papers

July 2025

NZFunds

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The NZ Funds Knowledge Series explores the academic foundations of portfolio construction that set NZ Funds apart as a leading New Zealand-based Wealth Manager

A. Gold Overlay

Abstract

Conventional portfolio theory encourages diversification across asset classes to improve risk-adjusted returns.

60/40 equity/bond portfolio has long been a benchmark for diversified investing (Markowitz, 1952).

Rising debt levels, inflation concerns and low interest rates motivate investors to explore alternatives.

Portfolio Construction

Study of maintaining 100% notional exposure to global equities via MSCI World.

While adding gold through a COMEX Gold futures overlay at 10%, 20% and 30%.

Comparison of return, volatility, drawdown risk and Sharpe ratio (risk-adjusted returns).

Portfolio Construction

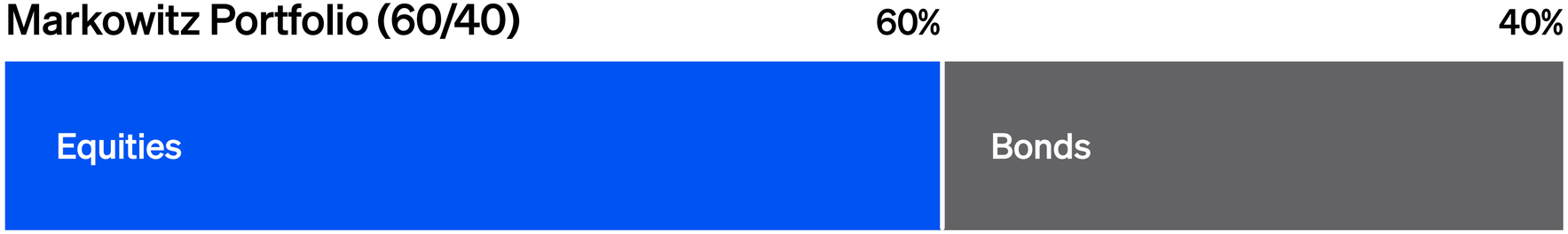
Equity Portfolio with Gold Futures Overlay



Standard Equity Portfolio

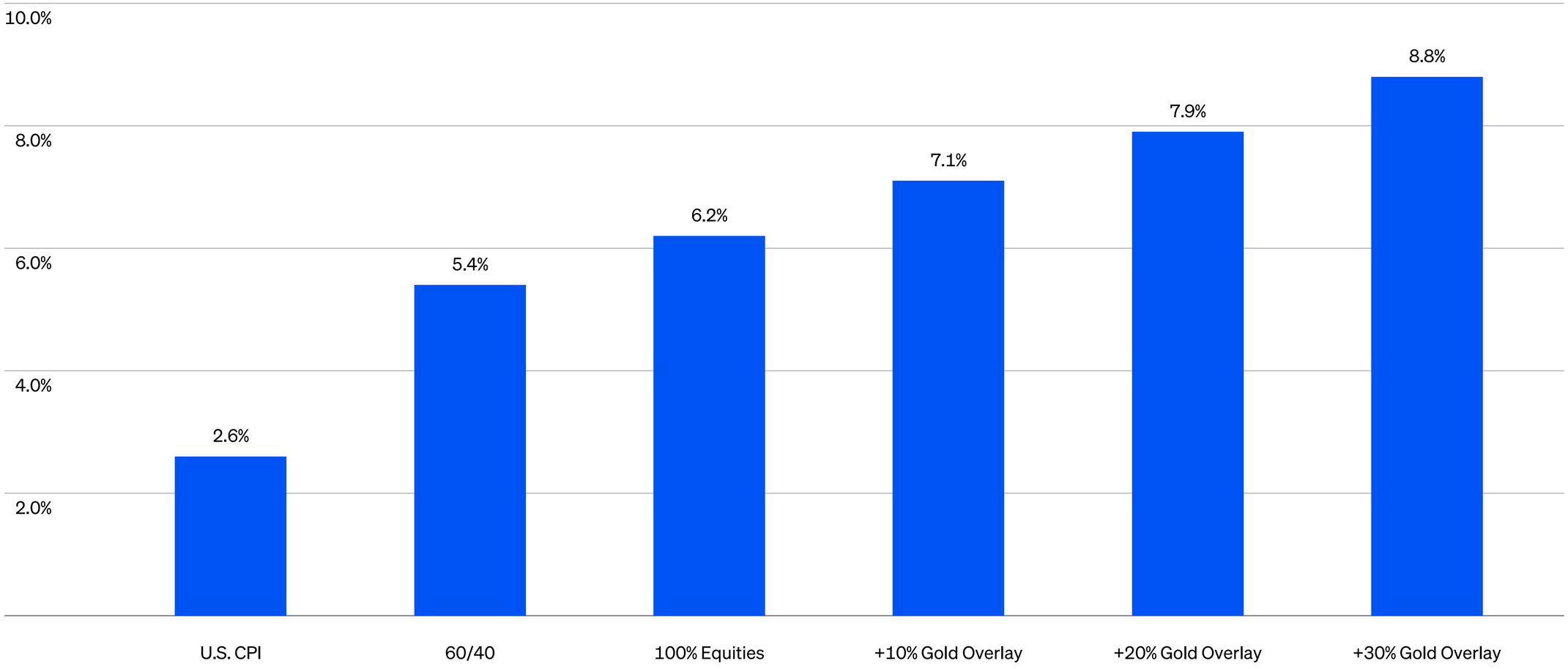


Markowitz Portfolio (60/40)



Returns/CAGR*

Portfolio results from 2000-2025 (9 July)



* Compound Average Growth Rate.

NZ Funds calculations.

Portfolio Overview

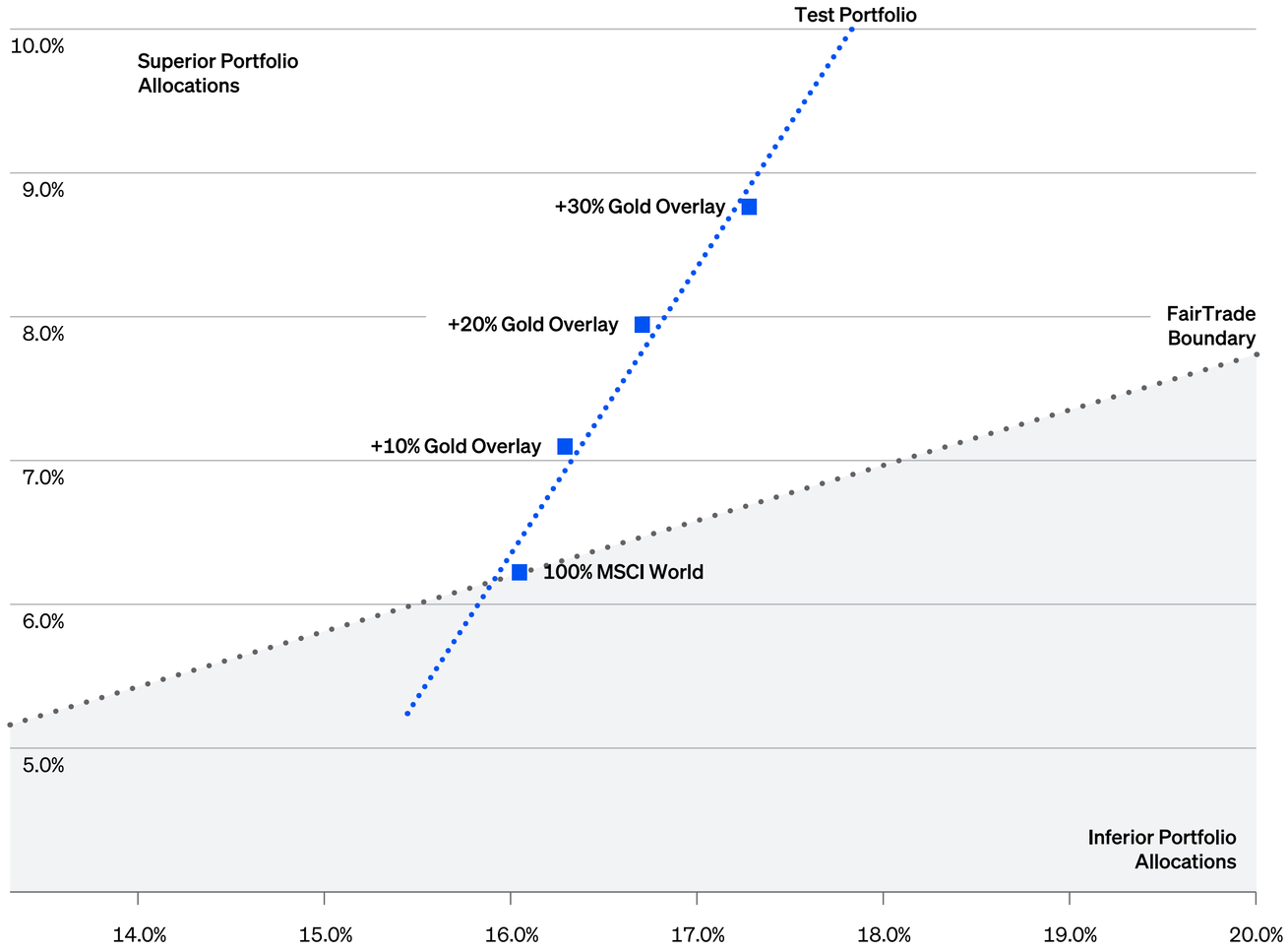
Portfolio results from 2000-2025 (9 July)

Portfolio Summary	CAGR	Volatility	Sharpe ratio	Dot.com Drawdown (2000 to 2002)	GFC Drawdown (2007 to 2009)	Covid-19 Drawdown (2020)	Ukraine Drawdown (2022)	Cumulative Return (2000 to 2025)
100% MSCI World	6.2%	16.1%	0.39	-49.8%	-57.8%	-34.0%	-26.1%	365%
+10% Gold Overlay	7.1%	16.3%	0.43	-49.6%	-57.2%	-34.0%	-26.8%	473%
+20% Gold Overlay	7.9%	16.7%	0.47	-49.4%	-56.6%	-34.1%	-27.4%	601%
+30% Gold Overlay	8.8%	17.3%	0.51	-49.1%	-56.0%	-34.1%	-28.1%	751%
U.S. CPI	2.6%	-	-	-	-	-	-	92%
Delta	**+2.6%**	**+1.2%**						**+385%**

NZ Funds calculations.

Risk vs Return

Portfolio results from 2000-2025 (9 July)

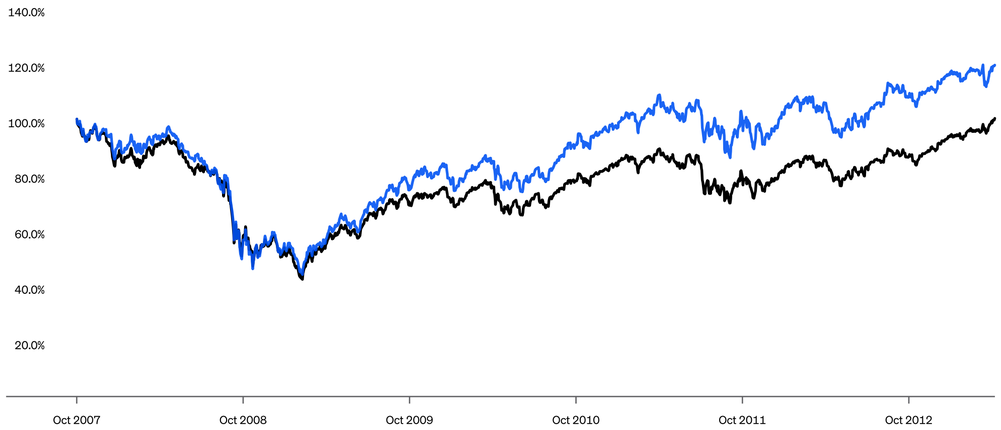


NZ Funds calculations.

Drawdown

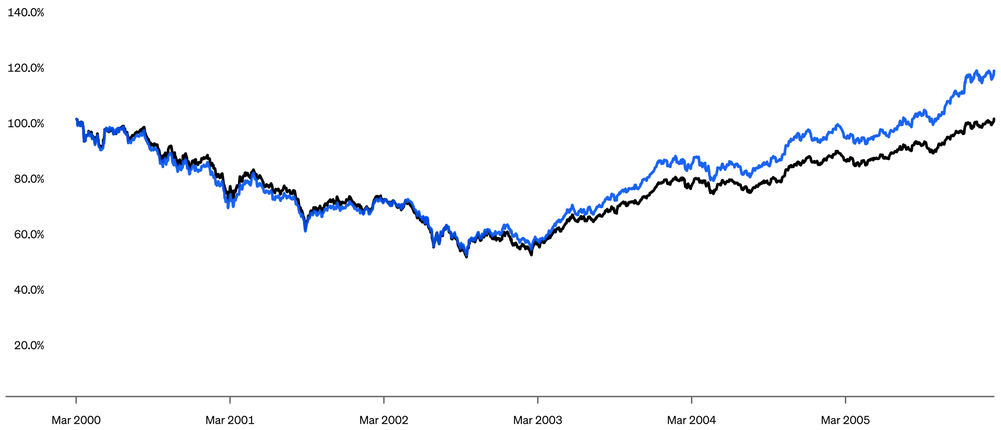
Portfolio results from 2000-2025 (9 July)

GFC

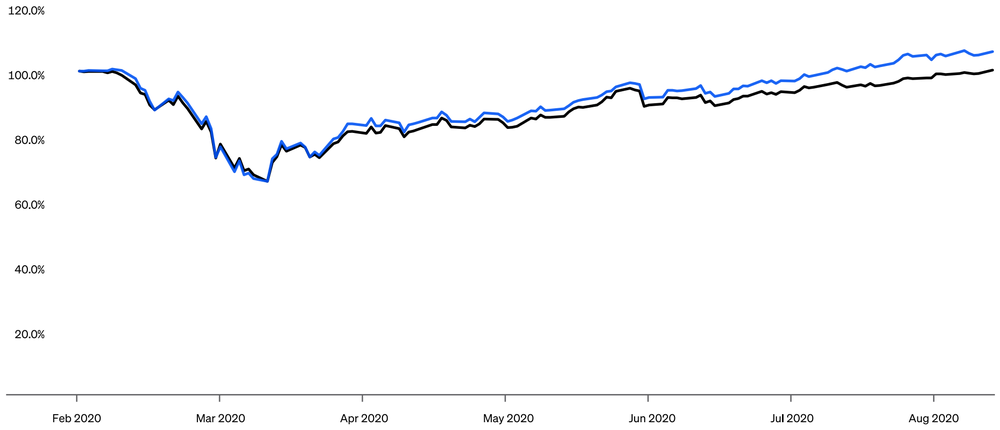


Dot.com

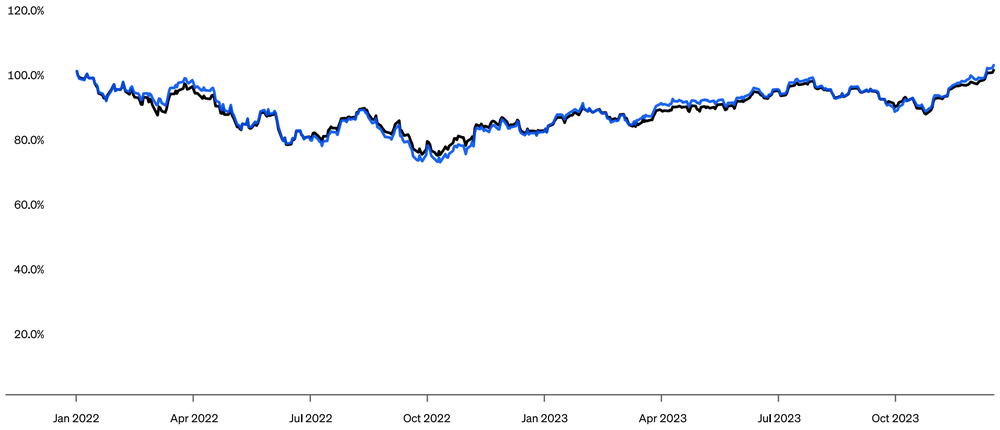
MSCI World +30% Gold Overlay



Covid-19



Ukraine Invasion



NZ Funds calculations.

Conclusion

Overlaying 100% equities with gold futures presents a compelling diversification alternative to bonds for thoughtful investors.

Portfolio returns are enhanced from 6.2% p.a. to 8.8% p.a. while volatility increases by less than the additional units of return thanks to gold's low correlation with equities.

Systemic risk (drawdown) remains largely unchanged, while cumulative return compounds into a meaningfully higher number.

B. Multi-Asset Overlay

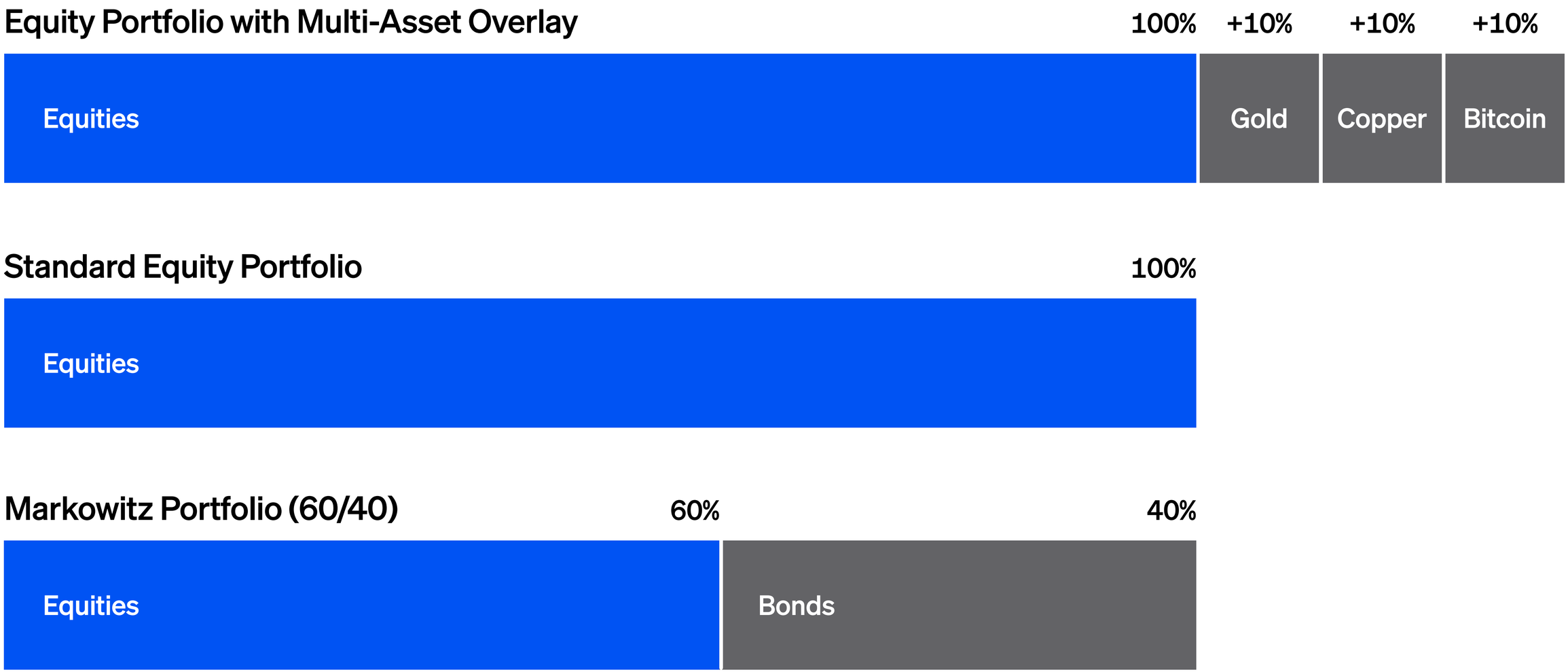
Abstract/Portfolio Construction

Study of maintaining 100% notional exposure to global equities via MSCI World.

While adding gold, copper, and Bitcoin through a multi-asset futures overlay at 10% per asset.

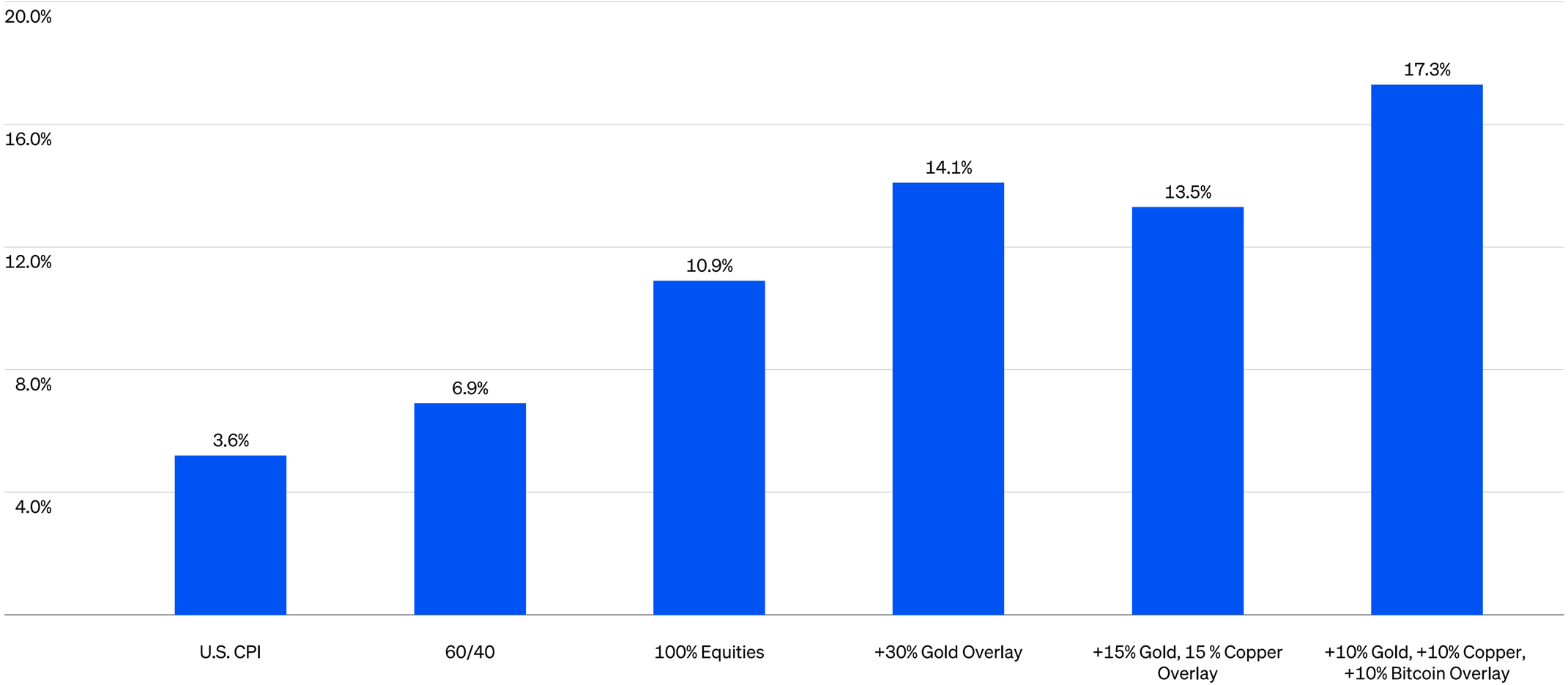
Comparison of returns volatility, drawdown risk and Sharpe ratio (risk-adjusted returns).

Portfolio construction



Returns/CAGR*

Portfolio results from 2018-2025 (9 July)



* Compound Average Growth Rate.

NZ Funds calculations.

Portfolio Overview

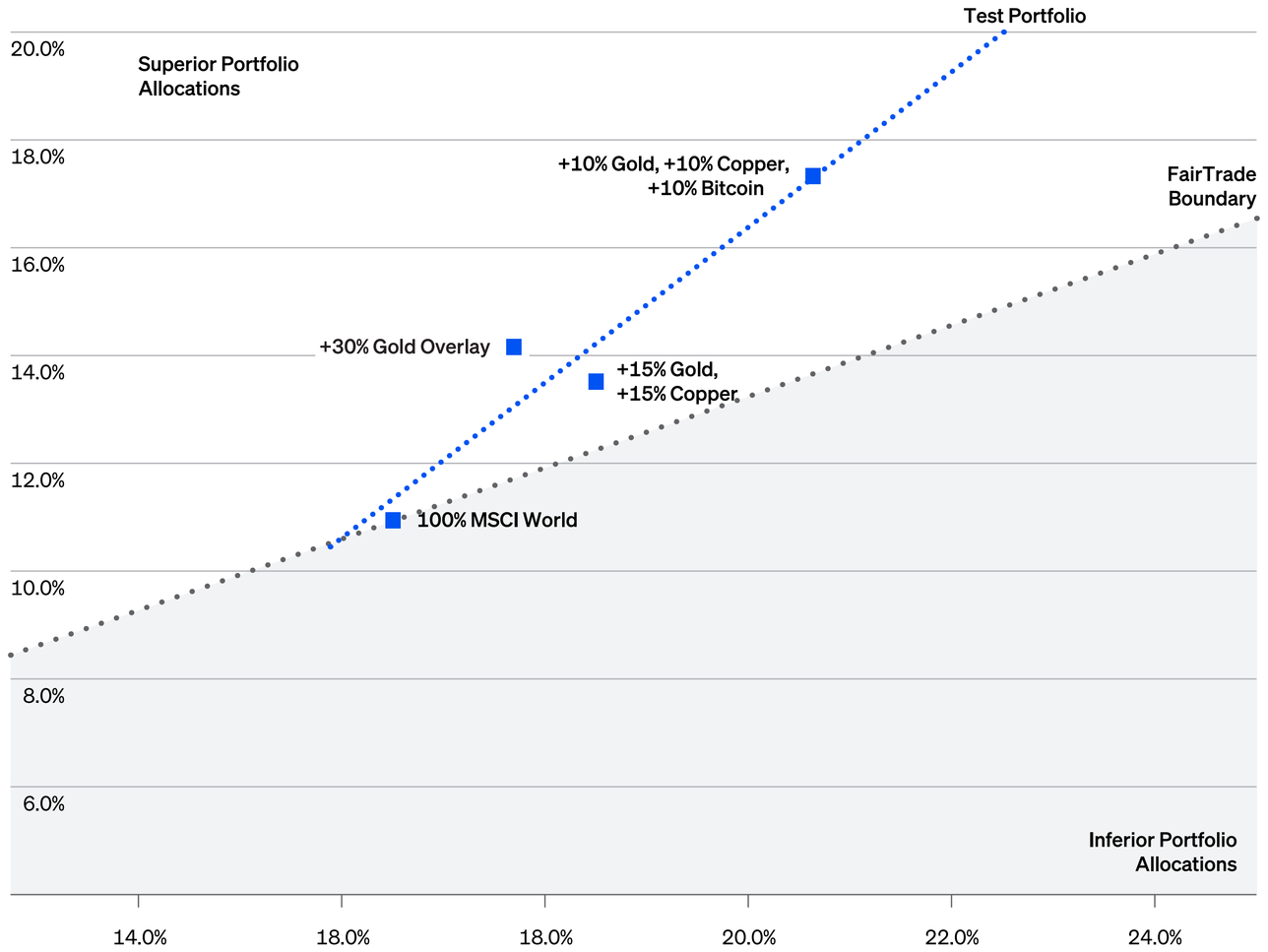
Portfolio results from 2018-2025 (9 July)

Portfolio Summary	CAGR	Volatility	Sharpe ratio	Covid-19 Drawdown (2020)	Ukraine Drawdown (2022)	Cumulative Return (2018 to 2025)
100% MSCI World	10.9%	16.5%	0.66	-26.1%	-34.0%	118%
+10% Gold Overlay	14.1%	17.7%	0.80	-28.1%	-34.1%	171%
+15% Gold, +15% Copper	13.5%	18.5%	0.73	-29.9%	-36.2%	159%
+10% Gold, +10% Copper, +10% Bitcoin	17.3%	20.6%	0.84	-34.1%	-38.6%	232%
U.S. CPI	3.6%	-	-	-	-	31%
Delta	**+6.4%**	**+4.1%**				**+114%**

NZ Funds calculations.

Risk vs Return

Portfolio results from 2018-2025 (9 July)

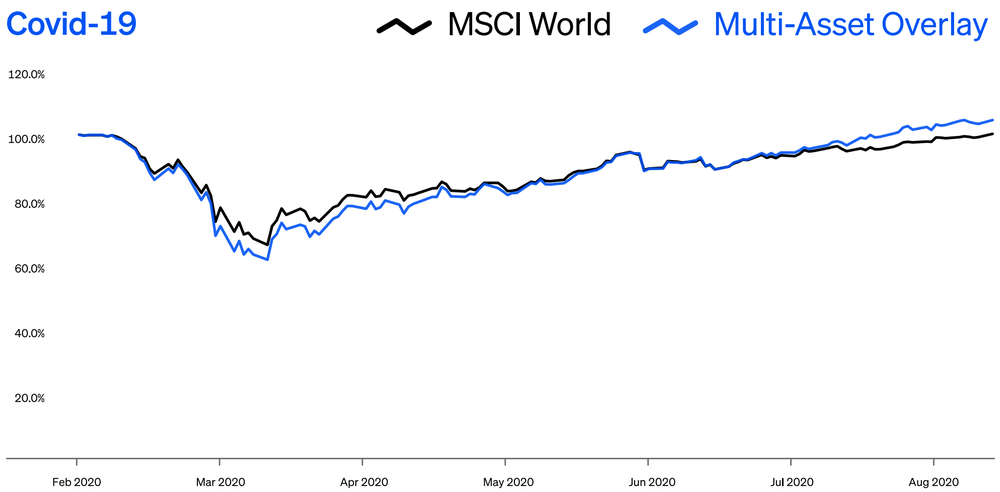


NZ Funds calculations.

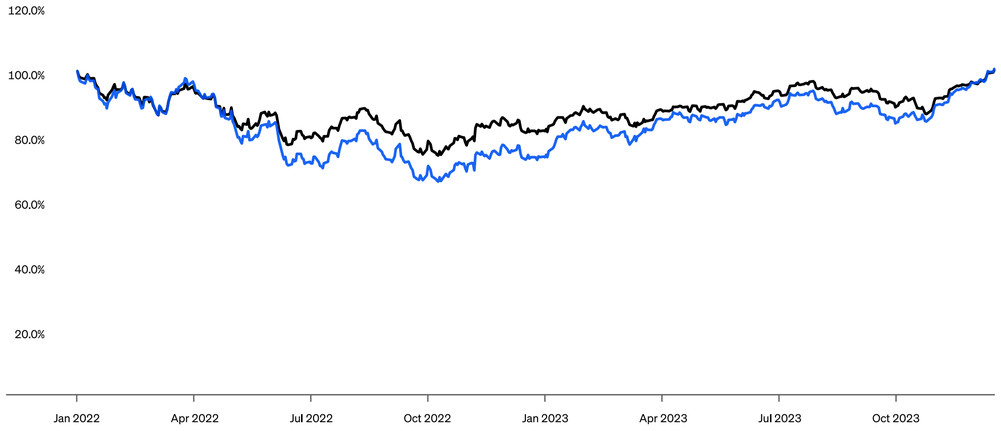
Drawdown

Portfolio results from 2018-2025 (9 July)

Covid-19



Ukraine Invasion



NZ Funds calculations.

Conclusion

Overlaying 100% equities with Multi-Asset futures presents a compelling diversification alternative to bonds.

Portfolio returns are enhanced from 10.9% p.a. to 17.3% p.a. while volatility increases by less than the additional units of return thanks to gold, copper & Bitcoin's low correlation with equities.

Systemic risk (drawdown) is elevated in some drawdowns but not others, while cumulative return compounds into a meaningfully higher number.

C. Downside Mitigation

Abstract

Study of leveraging the equity risk premium using futures while simultaneously adding asymmetric tail risk protection.

Different leverage ratios were combined with different notional weights to Universa being a tail risk hedging specialist.

Comparison of return, volatility, drawdown risk, Sharpe ratio and long-term cumulative returns.

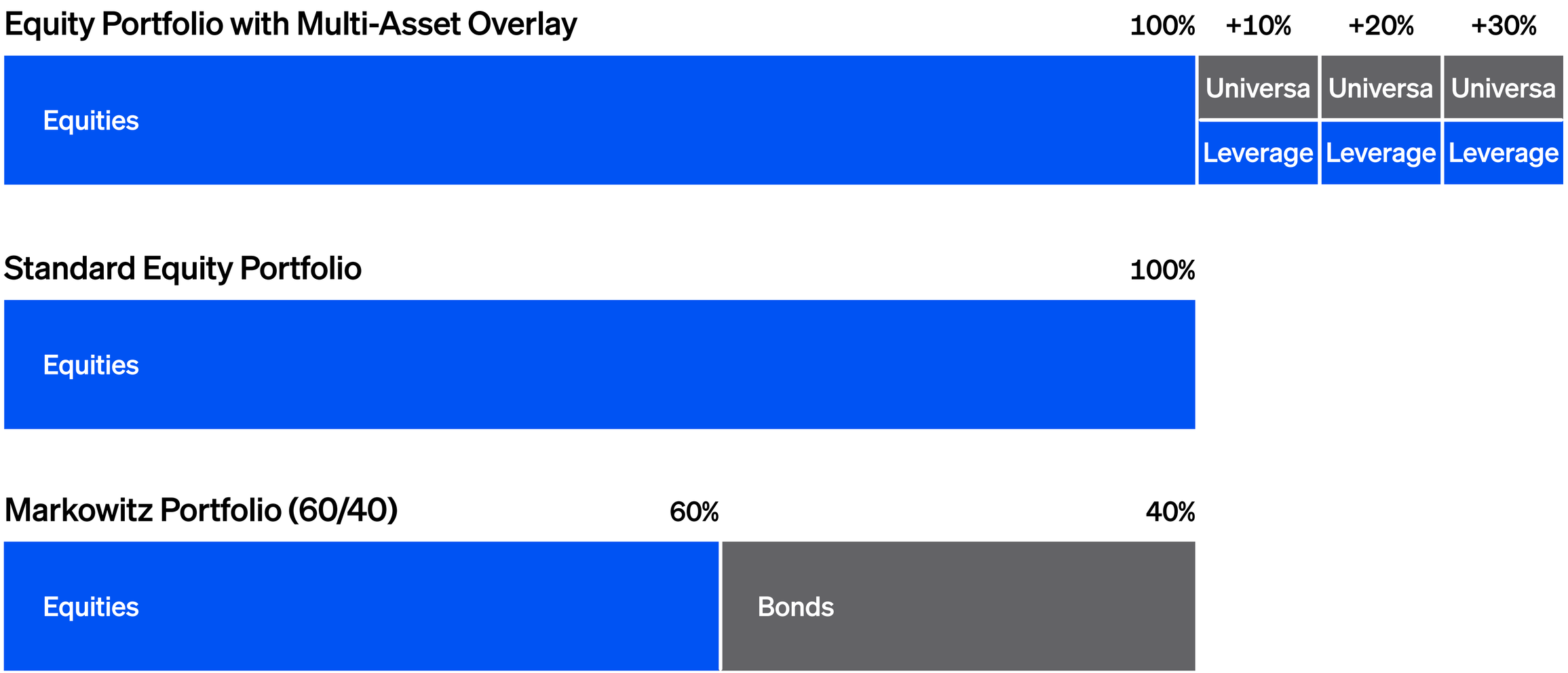
Portfolio construction

Portfolios were constructed with notional equity allocations ranging from 100% to 130% in the MSCI World Index.

Each equity portfolio was paired with a scalable allocation of 0% to 30% in Universa's convex tail risk hedge.

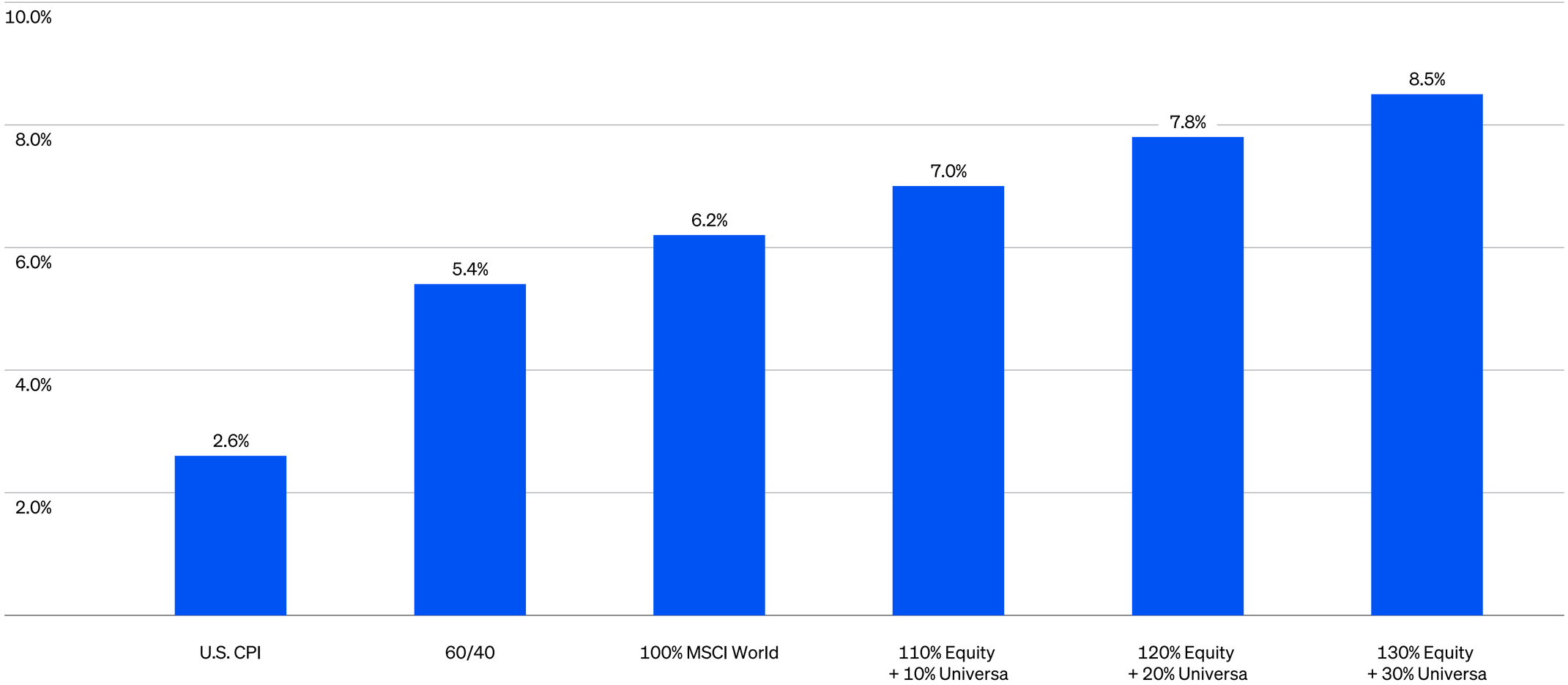
The objective was to evaluate whether the combination of leveraged global equities and convex tail risk protection improves long-term returns.

Portfolio construction



Returns/CAGR*

Portfolio results from 2000-2025 (9 July)



* Compound Average Growth Rate.

NZ Funds calculations.

Portfolio Overview

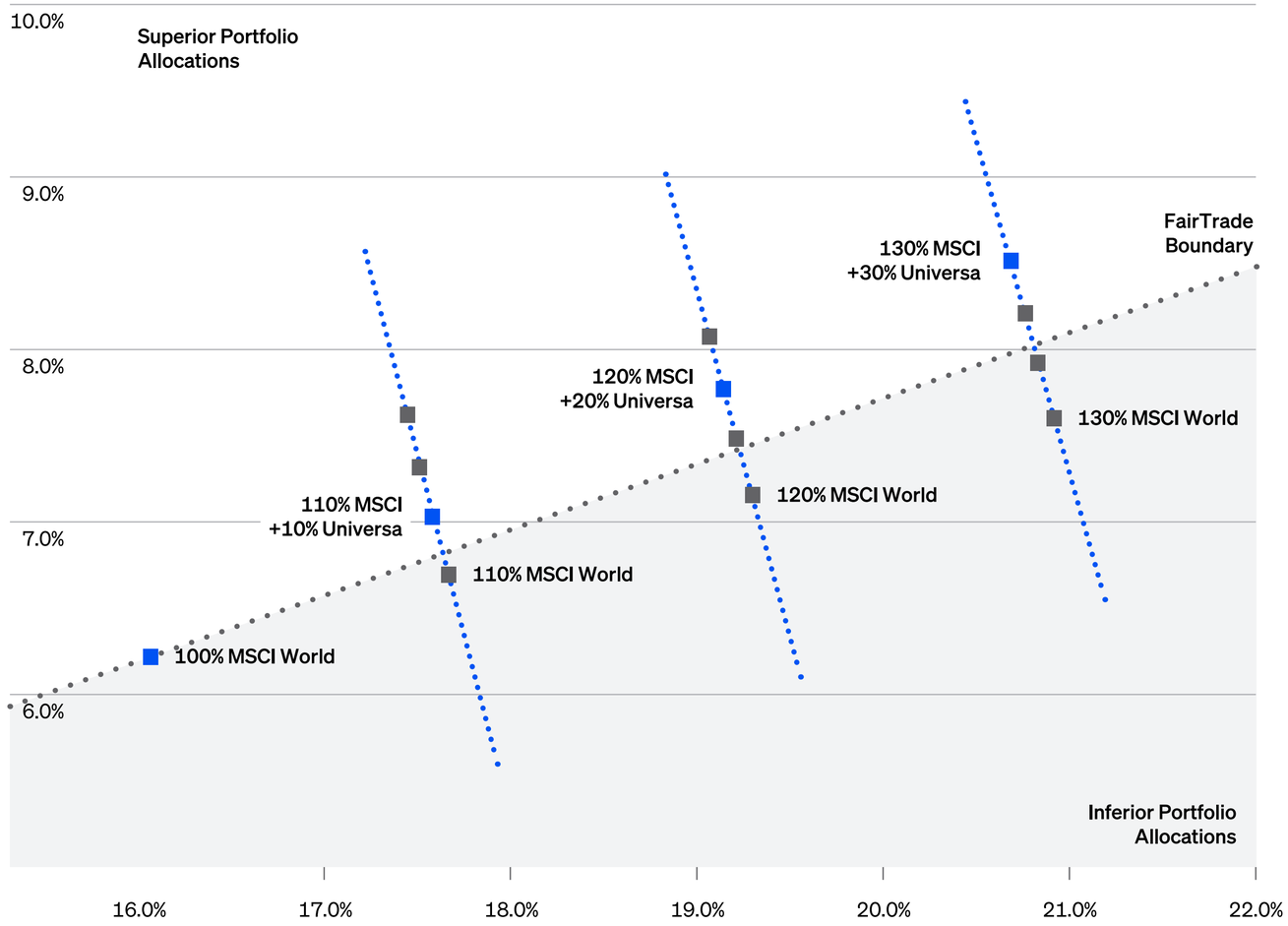
Portfolio results from 2000-2025 (9 July)

Portfolio Summary	CAGR	Volatility	Sharpe ratio	Dot.com Drawdown (2000-02)	GFC Drawdown (2007-09)	Covid-19 Drawdown (2020)	Ukraine Drawdown (2022)	Cumulative Return (2000 to 2025)
100% MSCI World +0% Universa Protection	6.2%	16.1%	0.39	-49.8%	-57.8%	-34.0%	-26.1%	365%
110% MSCI World +10% Universa Protection	7.0%	17.6%	0.40	-51.2%	-60.0%	-34.8%	-28.6%	464%
120% MSCI World +20% Universa Protection	7.8%	19.1%	0.41	-52.7%	-62.2%	-35.5%	-30.9%	578%
130% MSCI World +30% Universa Protection	8.5%	20.6%	0.41	-54.1%	-64.3%	-36.3%	-33.3%	708%
U.S. CPI	2.6%	-	-	-	-	-	-	92%
Delta	**+2.3%**	**+4.6%**						**+343%**

NZ Funds calculations.

Risk vs Return

Portfolio results from 2000-2025 (9 July)

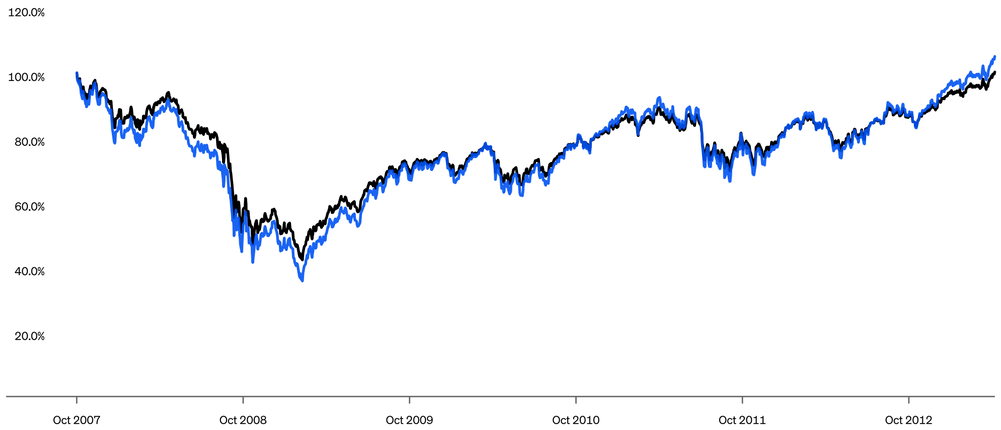


NZ Funds calculations.

Drawdown

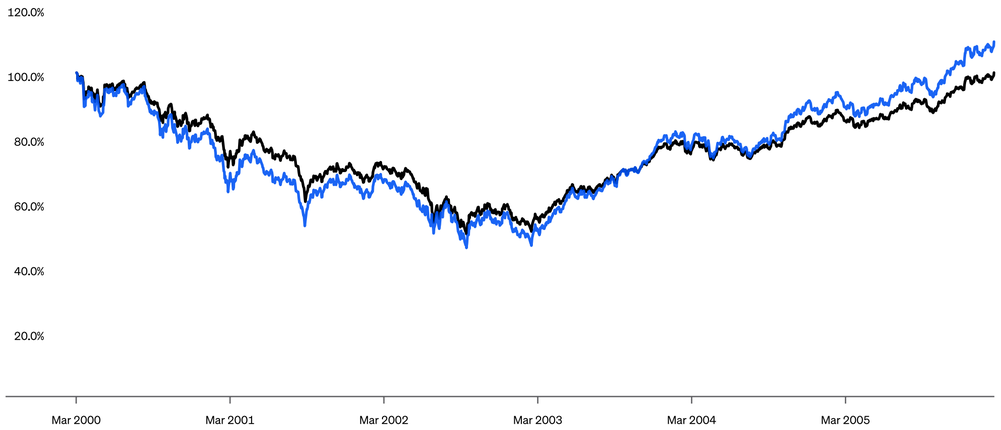
Portfolio results from 2000-2025 (9 July)

GFC

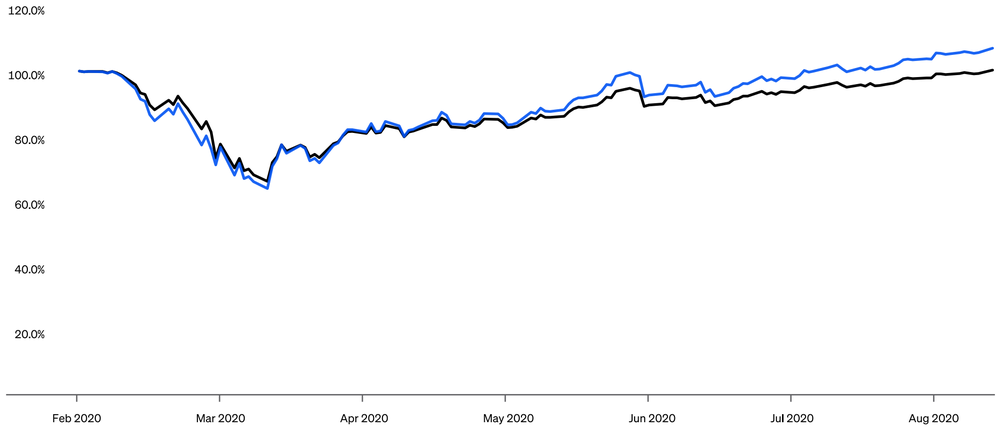


Dot.com

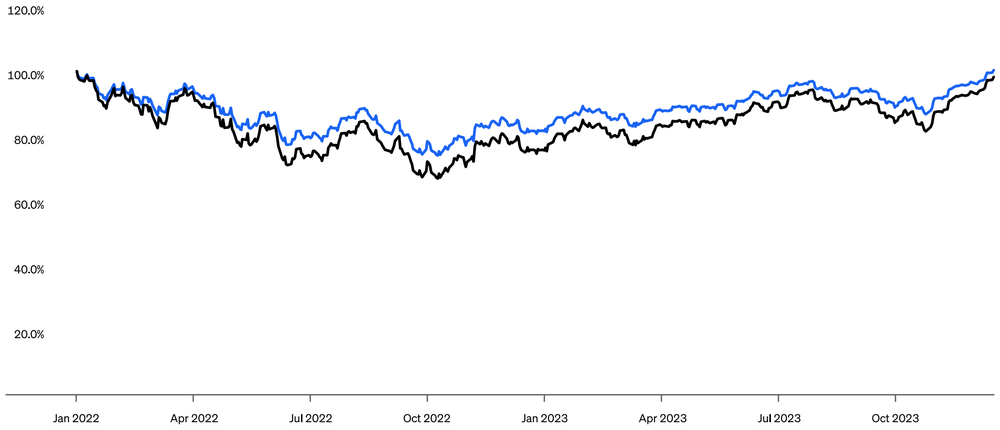
MSCI World Universa Overlay



Covid-19



Ukraine Invasion



NZ Funds calculations.

Conclusion

Integrating convex tail risk hedging with leveraged equity exposure is a resilient framework for enhancing equity risk premium while mitigating systemic risk.

Portfolio returns are enhanced from 6.2% p.a. to 8.5% p.a. while volatility increases by less than the additional units of return thanks to Universa's negative correlation with equities.

Systemic risk (drawdown) is elevated but only marginally given the inclusion of moderate leverage, while cumulative returns are meaningfully higher.

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