



**CASE STUDY:**  
**Using AI To Manage Your**  
**Corporate 401K Plan**

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## CASE STUDY: Using AI to Manage your Corporate 401K Plan

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Lumenai stands at the forefront of modern investment management by blending advanced artificial intelligence with proven financial strategies. For corporations, this means a more efficient way to manage 401(k) retirement funds, leading to better growth over time. For employees, it offers a personalized investment path, aiming to maximize returns for their retirement. In essence, Lumenai strives to simplify and enhance the 401(k)-retirement planning process for companies and their teams alike.

### **About Lumenai:**

Lumenai's investment engine is powered ETS Asset Management Factory, and offers a distinct and tailored investment service designed for discerning investors, fiduciaries, and advisors. With its robust lineage in quantitative/AI investing since 1987, the ETS team consists of over 60 seasoned professionals, encompassing data scientists, engineers, and physicists. Having adeptly managed over \$7B in AUM for distinguished clients such as HSBC, Rothschild Bank, and BNP Paribas, ETS's pedigree in the industry is unrivaled.

### **Application to 401(k) Plans:**

Lumenai employs the ETS Chameleon model to refine 401(k) Plans by:

1. Fund Selection: Strategically pinpointing top-ranked mutual funds to maximize returns.
2. Portfolio Management: Actively curating four distinctive portfolios tailored to various risk profiles - from Conservative to Very Aggressive.

## Target Retirement Solutions

# Chameleon

A quantitative global investment strategy.



### About Chameleon

Launched in  
January 1998

Track Record  
of 20+ years

Managing  
\$1.7B assets

Global clients,  
dedicated R&D/team

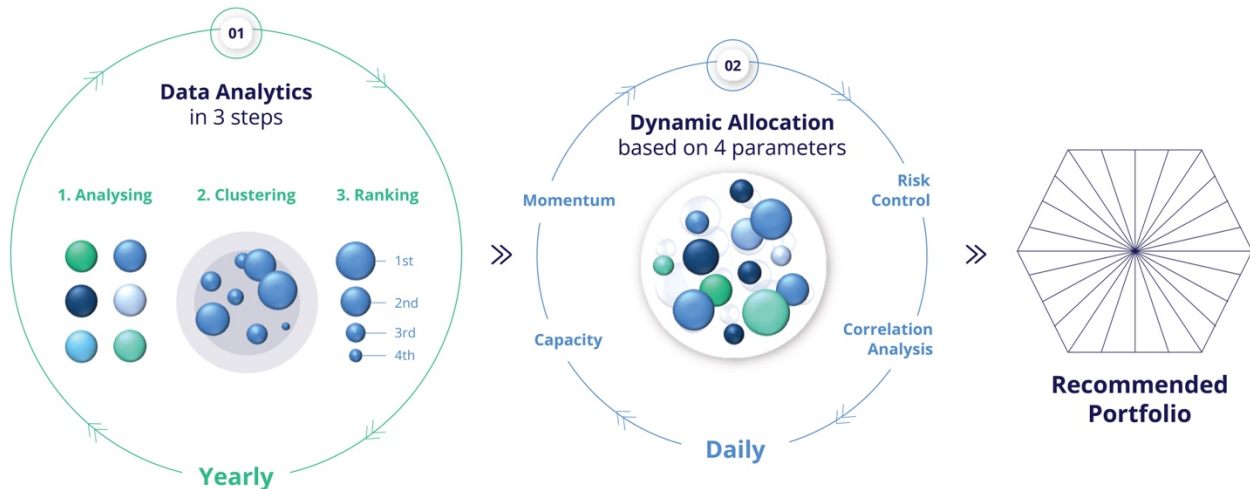
### AI Investment Process

Lumenai's investment ethos is anchored in capitalizing on global opportunities while ensuring capital preservation during market volatility. This dual-pronged approach leverages Lumenai's adaptive investing program, Chameleon:

1. **Data Analytics:** An exhaustive quantitative and qualitative analysis is employed to categorize the fund universe. Lumenai's prodigious database classifies over 12,000 fund classes and 200 ETF listings into 154 distinct investment opportunities, guaranteeing the selection of the most lucrative assets.
2. **Dynamic Allocation:** Employing a bottom-up approach, Chameleon's allocation mechanism is fluid, adjusting to daily market shifts using criteria such as momentum, risk, and correlation. Through Machine Learning, market regimes are discerned, facilitating astute decision-making and curbing unnecessary turnover.

## The Investment Process

A Quantitative Methodology with a bottom-up approach in two iterative processes



### Investment Track Record:

Chameleon's commendable track record is a testament to its prowess. Comparative charts and tables from 2000 to 2022 exhibit Chameleon's models outperforming Unit Linked and other global benchmarks, solidifying its position as a stalwart in the investment sector.

### Chameleon: Global Moderate Real Track Accumulated Returns



\*Source ETS HD. Simulated results from 31/12/1999 to 31/12/2022. Management Fee: 50bp, Transaction Fee: Obp, and NO Performance Fee. Risk free rate = 0.ETS calculations.

\*\*Source: Real results of the registered Fund. Unit Linked Moderate from Mutua Vida. Data compiled from 31/12/1999 until 31/12/2020. In this vehicle the fees are included at the underlying level.

\*\*\*Source ETS HD. Synthetic Index composed by 50% MSCI All Country World Price + 50% Xtrackers II Eurozone Gov. Bond 1-3, with LOC currency from 31/12/2022. Figures related to past performances and/or simulated performances refer to pas periods and are not reliable indicators of future results.

## Chameleon: Global Moderate Real Track Annual Returns



\*Source ETS HD. Simulated results from 31/12/1999 to 31/12/2022. Management Fee: 50bp, Transaction Fee: 0bp, and NO Performance Fee. Risk free rate = 0.ETS calculations.

\*\*Source: Real results of the registered Fund. Unit Linked Moderate from Mutua Vida. Data compiled from 31/12/1999 until 31/12/2020. In this vehicle the fees are included at the underlying level.

### Managed Portfolio Options:

Lumenai presents a suite of four AI-driven portfolios, each meticulously designed to cater to varying investment horizons and objectives:

1. **Conservative:** Crafted for those with short-term horizons (1-4 years), this option emphasizes capital preservation coupled with the potential for modest growth. Ideal for employees nearing retirement or those who prefer a more cautious approach to investment.
2. **Moderate:** Tailored for individuals looking at an intermediate-term (5-10 years) horizon, it strikes a harmonious balance between growth and preservation. Suited for employees with a moderate risk appetite who still seek meaningful growth.
3. **Aggressive:** Targeted for those with a long-term outlook (11-15 years), this option accentuates growth-oriented investments. Perfect for younger employees or those comfortable with a higher risk to achieve potentially higher returns.
4. **Very Aggressive:** Geared for the visionary investor with a very long-term horizon (15+ years), this portfolio leans heavily towards maximizing growth potential. Best suited for those who have a high risk tolerance and a long time before retirement.

## Choose Your AI Managed Portfolio

01

**Performance targets:**

4-5% annual returns  
6-8% volatility  
-10 to -15% maximum declines

**Average expected exposures:**

37% stocks  
33% bonds  
5% balanced  
7% commodity  
18% money markets

**Target Date Fund Equivalent:**

2025:

**Best For:** Short term, 1-4 years

02

**Performance targets:**

5-7% annual returns  
10-12% volatility  
-15 to -19% maximum declines

**Average expected exposures:**

66% stocks  
17% bonds  
2% balanced  
4% commodity  
10% money markets

**Target Date Fund Equivalent:**

2030:

**Best For:** Intermediate term, 5-10 years

03

**Performance targets:**

7-8% annual returns  
12-14% volatility  
-18 to -22% maximum declines

**Average expected exposures:**

76% stocks  
10% bonds  
3% balanced  
3% commodity  
7% money markets

**Target Date Fund Equivalent:**

2040:

**Best For:** Long term, 11-15 years

04

**Performance targets:**

7-10% annual returns  
13-15% volatility  
-22 to -26% maximum declines

**Average expected exposures:**

81% stocks  
9% bonds  
1% balanced  
5% commodity  
4% money markets

**Target Date Fund Equivalent:**

2050:

**Best For:** Very long term, 15+ years

Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.

For the end investor, choosing among these portfolios is straightforward. By understanding their own risk tolerance, time horizon to retirement, and investment objectives, they can select a portfolio that aligns with their personal needs. Lumenai's platform provides comprehensive insights and guidance to help each investor make an informed decision. Whether an employee is just starting their career, nearing retirement, or anywhere in between, there's a portfolio designed to meet their specific requirements. This tailored approach ensures that each individual is well-positioned to achieve their retirement goals.

### Lumenai – Conservative Managed Portfolio

**Objective:** Short-term (1-4 years). For this time horizon it's important to balance preservation of capital with the potential for modest growth. A portfolio with a higher allocation to money market funds, government bonds, floating rate, and corporate credit, and a modest allocation to quality equity investments, such as large cap, technology, and healthcare, would be appropriate. The risk target for this time horizon should be conservative to moderate.

#### Target Returns

**4% to 5%**

Annualized net

#### Target Risk

**6% to 8%**

Annualized Volatility

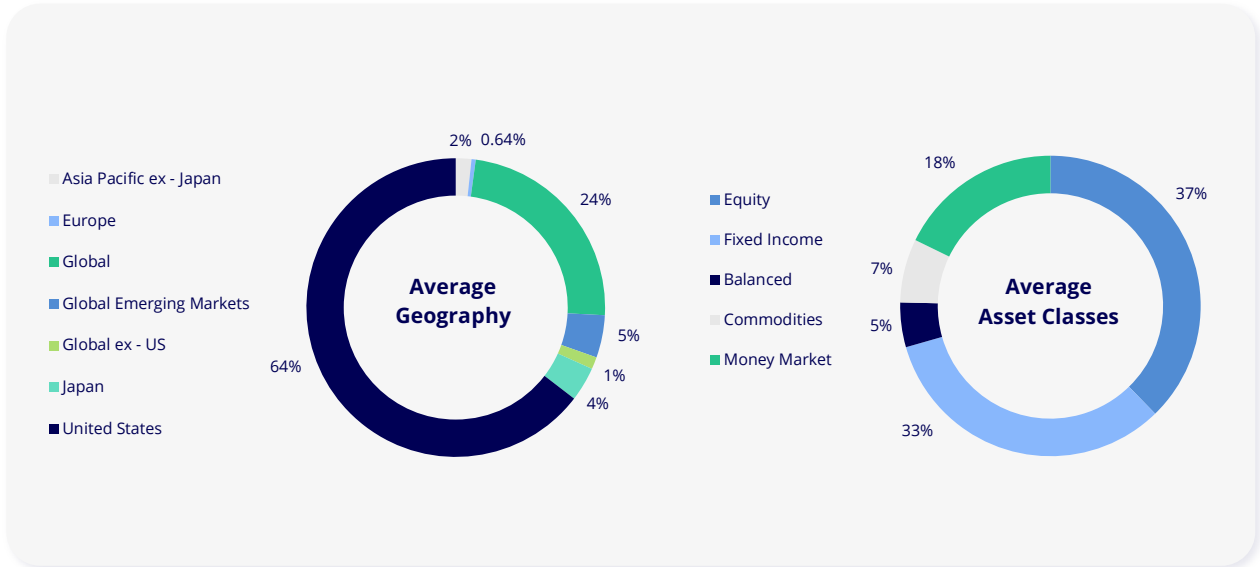
#### Target Max Drawdown

**-10% to -15%**

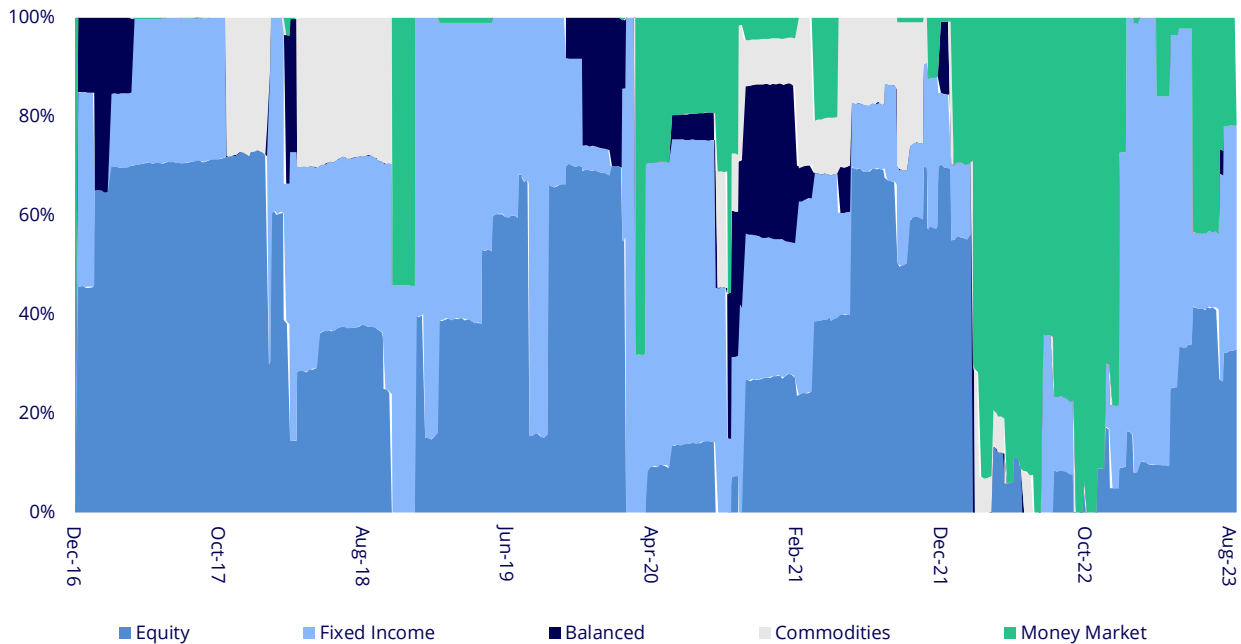
Peak to Trough Decline

### Current Holdings – As of 9/30/23

Money Market	Size (%)
T Rowe Price US Treasury Money Fund A Dis	21.70%
	<b>21.70%</b>
Fixed Income	Size (%)
T Rowe Price US High Yield Fund I Dis	14.87%
Brandywine GLOBAL - High Yield Fund Dis	14.89%
T Rowe Price Floating Rate Fund I Dis	15.53%
	<b>45.29%</b>
Equities	Size (%)
BlackRock Energy Opportunities Fund Dis	12.03%
Putnam Global Health Care Fund Dis	11.94%
Janus Henderson GI Tch and Innov Fd Dis	9.04%
	<b>33.01%</b>



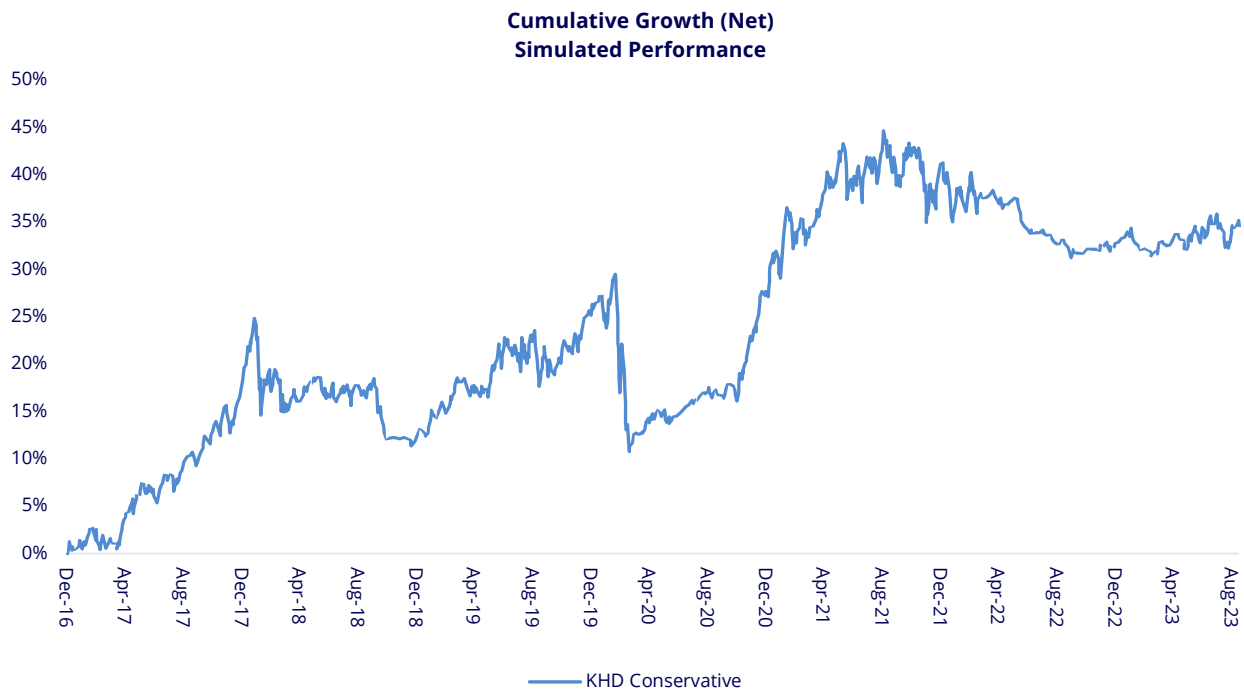
### Asset Classes Over Time



Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.



## Lumenai – Conservative Managed Portfolio



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
<b>2017</b>	0.59%	0.84%	-0.01%	2.11%	2.53%	-0.20%	1.88%	1.56%	-0.01%	3.02%	1.53%	2.19%	<b>17.19%</b>
<b>2018</b>	4.56%	-4.03%	-1.42%	0.18%	1.77%	-0.93%	0.47%	0.23%	-0.17%	-4.67%	0.00%	0.15%	<b>-4.10%</b>
<b>2019</b>	2.45%	0.23%	2.46%	-0.47%	-0.09%	2.68%	-0.36%	1.99%	-2.15%	1.30%	0.91%	2.34%	<b>11.74%</b>
<b>2020</b>	-1.43%	-5.48%	-3.74%	1.06%	0.84%	-0.23%	1.17%	1.07%	-0.30%	-0.55%	5.50%	4.31%	<b>1.73%</b>
<b>2021</b>	1.04%	2.31%	1.18%	3.15%	1.89%	-1.37%	2.04%	0.83%	-2.33%	1.99%	-3.73%	3.39%	<b>10.59%</b>
<b>2022</b>	-2.96%	1.16%	-0.84%	-0.28%	0.10%	-2.22%	-0.14%	-0.93%	-1.04%	0.52%	0.36%	0.10%	<b>-6.07%</b>
<b>2023</b>	0.88%	-1.29%	0.47%	0.14%	-0.37%	1.47%	1.03%	-1.12%	0.17%				<b>1.37%</b>

Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.

## Lumenai – Moderate Managed Portfolio

**Objective:** Intermediate-term (5-10 years). For this time horizon there is more room for growth-oriented investments. A portfolio with a moderate allocation to money markets, government bonds, floating rate, and corporate credit, and a larger allocation to quality- and growth-oriented equity investments, such as global, large caps, mid caps, technology, healthcare, energy, and natural resources would be appropriate. The risk target for this time horizon should be moderate to high.

### Target Returns

**5% to 7%**

Annualized net

### Target Risk

**10% to 12%**

Annualized Volatility

### Target Max Drawdown

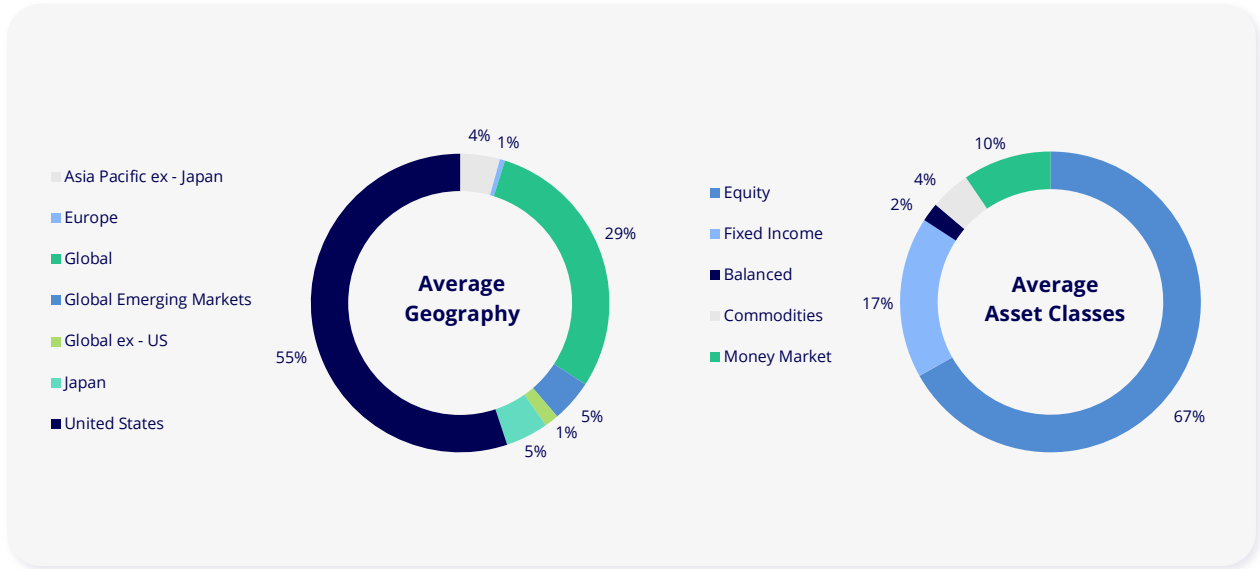
**-15% to -19%**

Peak to Trough Decline

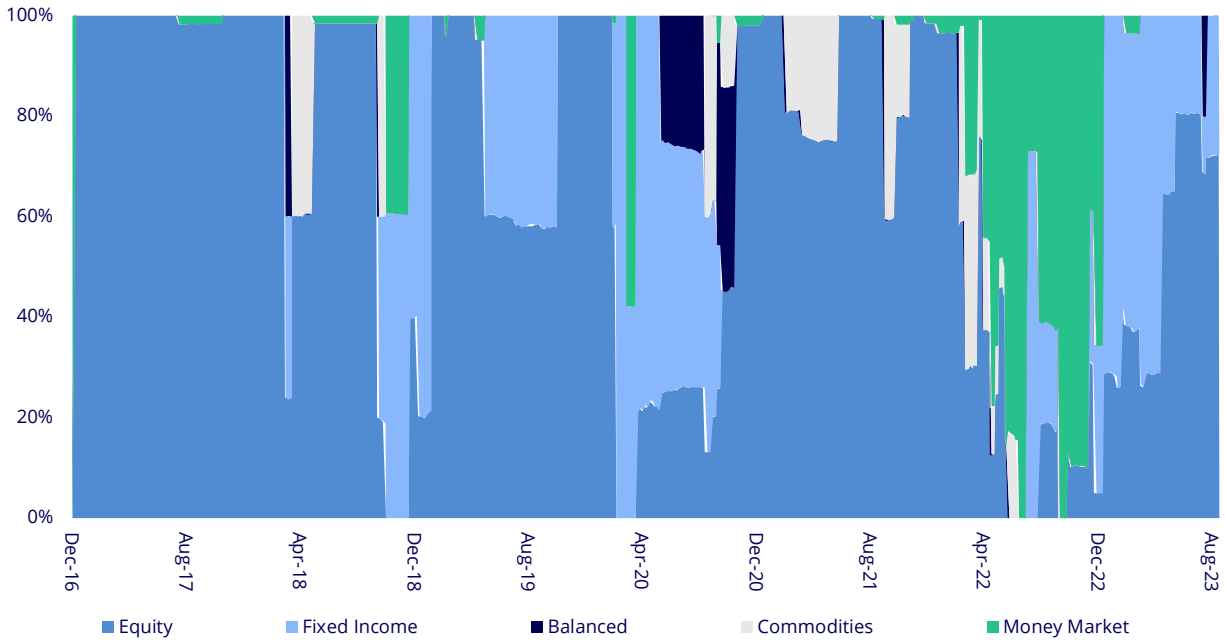
## Current Holdings – As of 9/30/23

Fixed Income	Size (%)
Brandywine GLOBAL - High Yield Fund Dis	8.04%
T Rowe Price Floating Rate Fund I Dis	19.61%
	<b>27.65%</b>
Equities	Size (%)
BlackRock Energy Opportunities Fund Dis	20.48%
Cohen & Steers MLP & Energy Opportunity Fund Dis	17.78%
Janus Henderson GI Tch and Innov Fd Dis	20.23%
Victory Nasdaq-100 Index Fund Dis	7.20%
Columbia Small Cap Index Fund Dis	6.66%
	<b>72.35%</b>

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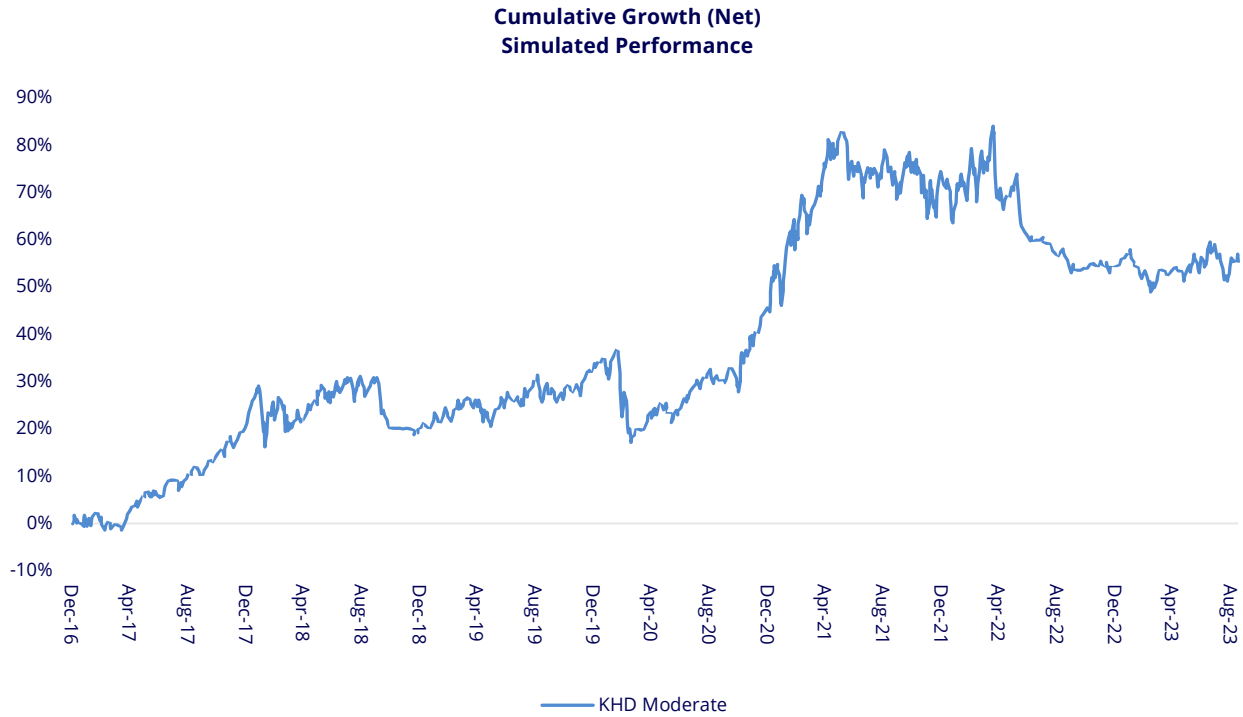


### Asset Classes Over Time



Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.

## Lumenai – Moderate Managed Portfolio



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
<b>2017</b>	-0.30%	0.53%	-0.37%	2.44%	3.17%	-0.13%	3.14%	1.60%	-0.16%	3.84%	2.74%	1.73%	<b>19.66%</b>
<b>2018</b>	5.70%	-2.82%	-1.16%	0.06%	4.54%	0.46%	2.48%	-0.96%	0.33%	-7.58%	-0.05%	0.25%	<b>0.60%</b>
<b>2019</b>	2.43%	-0.59%	1.72%	0.97%	-3.29%	3.11%	-0.54%	4.38%	-2.55%	1.11%	0.44%	2.92%	<b>10.29%</b>
<b>2020</b>	-1.63%	-6.13%	-2.30%	2.09%	1.85%	-0.32%	3.64%	2.60%	-1.35%	-1.88%	7.72%	5.98%	<b>9.87%</b>
<b>2021</b>	0.14%	8.10%	4.05%	6.62%	3.21%	-4.04%	0.47%	0.82%	-3.54%	2.82%	-3.83%	4.23%	<b>19.77%</b>
<b>2022</b>	-3.95%	4.01%	0.25%	-3.30%	0.76%	-5.70%	-0.40%	-2.23%	-2.25%	0.76%	0.84%	-0.66%	<b>-11.59%</b>
<b>2023</b>	1.64%	-2.85%	0.56%	-0.05%	-0.71%	2.67%	1.91%	-2.58%	0.13%				<b>0.58%</b>

Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.

## Lumenai – Aggressive Managed Portfolio

**Objective:** Long-term (11-15 years): For this time horizon, the focus can be on growth-oriented investments. A portfolio with a lower allocation to money markets, government bonds, and corporate credit, and a larger allocation to quality- and growth-oriented equity investments, such as global, large caps, mid caps, technology, healthcare, energy, and natural resources, would be appropriate. The risk target for this time horizon should be high to very high.

### Target Returns

**7% to 8%**

Annualized net

### Target Risk

**12% to 14%**

Annualized Volatility

### Target Max Drawdown

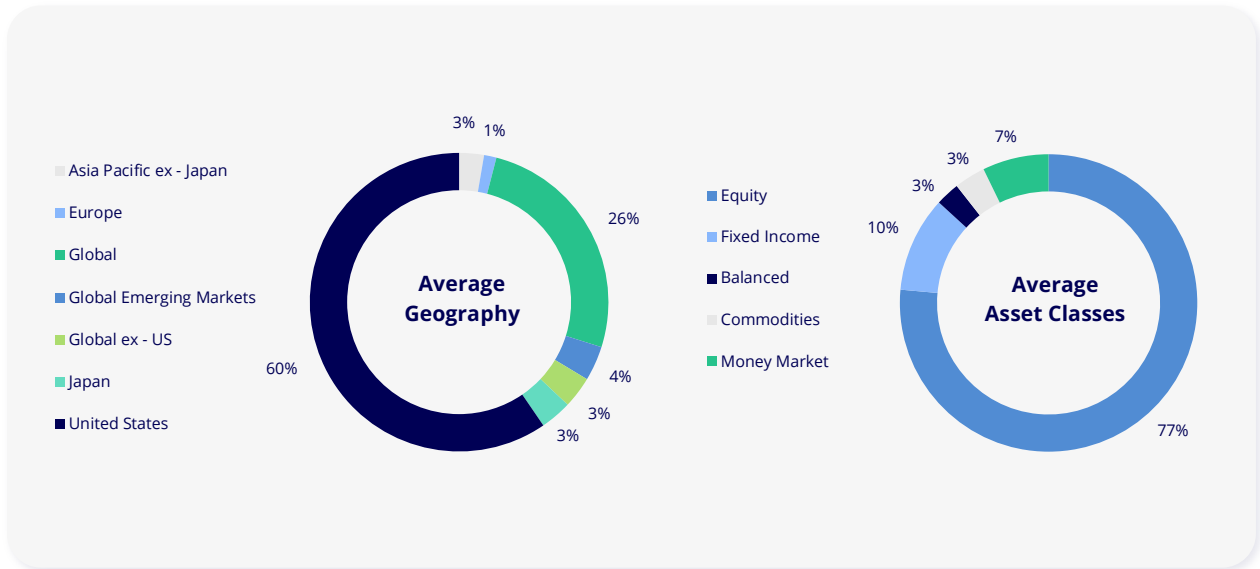
**-18% to -12%**

Peak to Trough Decline

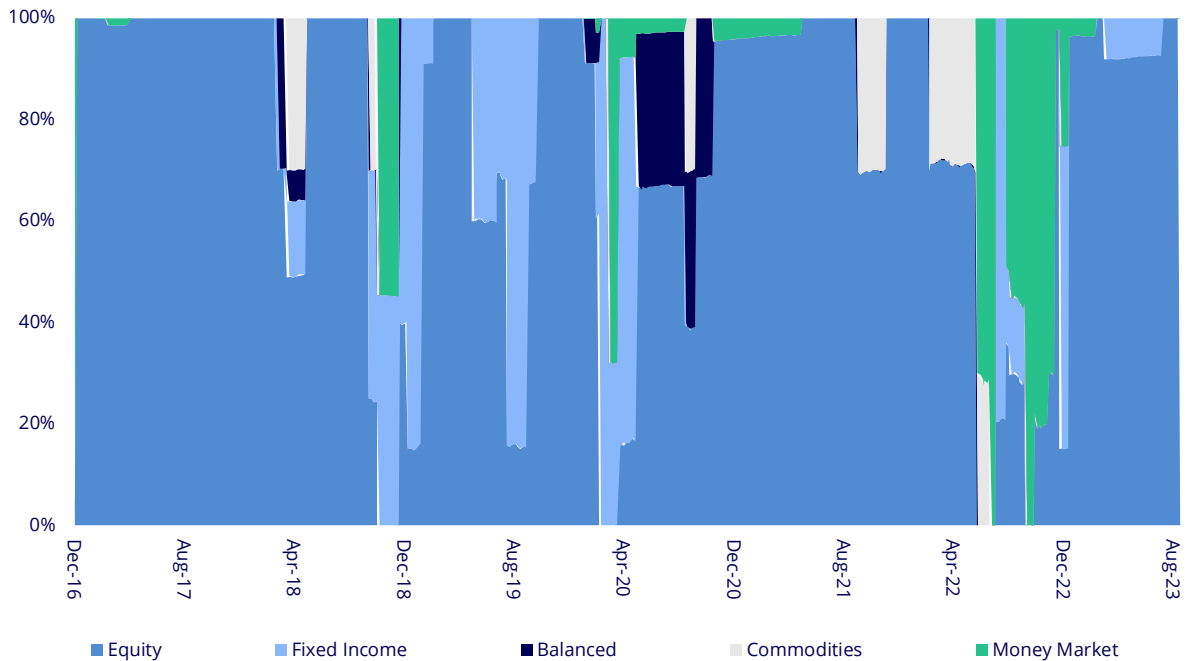
## Current Holdings – As of 9/30/23

Money Market	Size (%)
T Rowe Price Government Money Fund A Dis	0.08%
	<b>0.08%</b>
Equities	Size (%)
BlackRock Energy Opportunities Fund Dis	15.34%
Cohen & Steers MLP & Energy Opportunity Fund Dis	15.13%
Janus Henderson GI Tch and Innov Fd Dis	16.98%
Victory Nasdaq-100 Index Fund Dis	17.41%
BNY Mellon Natural Resources Fund Dis	15.14%
T Rowe Price New Era Fund I Dis	14.99%
AB Large Cap Growth Fund Dis	4.92%
	<b>99.92%</b>

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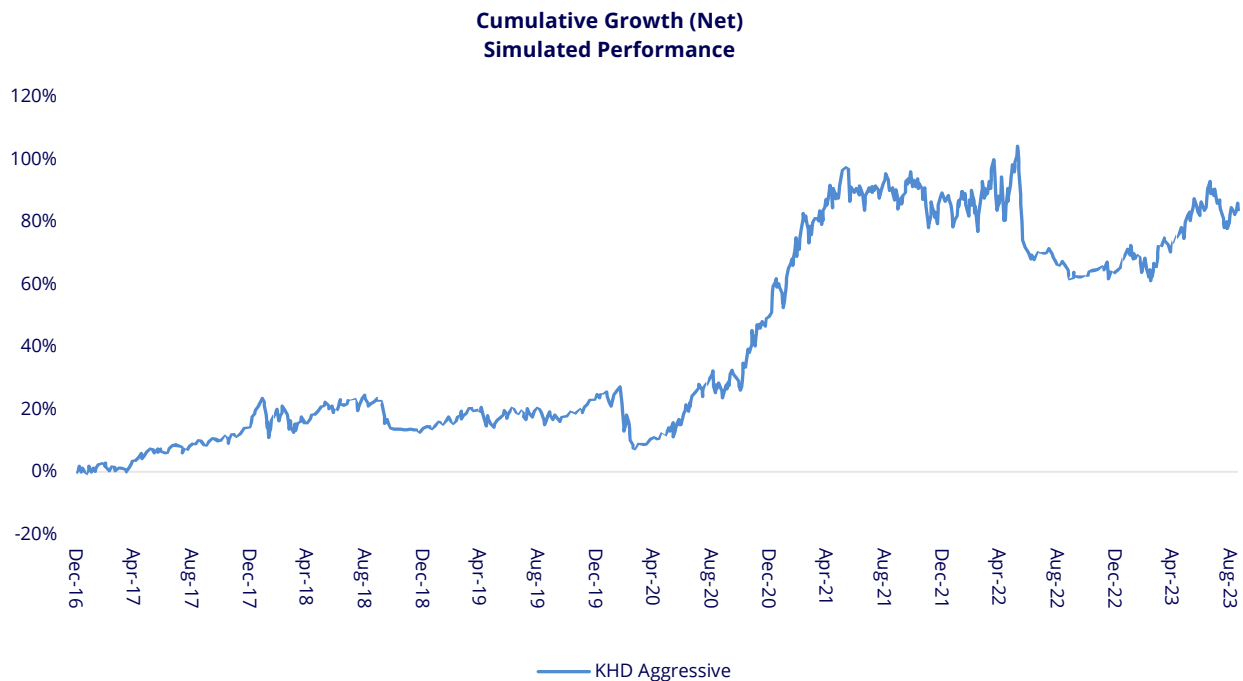


### Asset Classes Over Time



Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.

## Lumenai – Aggressive Managed Portfolio



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
<b>2017</b>	-0.30%	0.53%	-0.37%	2.44%	3.17%	-0.13%	3.14%	1.60%	-0.16%	3.84%	2.74%	1.73%	<b>19.66%</b>
<b>2018</b>	5.70%	-2.82%	-1.16%	0.06%	4.54%	0.46%	2.48%	-0.96%	0.33%	-7.58%	-0.05%	0.25%	<b>0.60%</b>
<b>2019</b>	2.43%	-0.59%	1.72%	0.97%	-3.29%	3.11%	-0.54%	4.38%	-2.55%	1.11%	0.44%	2.92%	<b>10.29%</b>
<b>2020</b>	-1.63%	-6.13%	-2.30%	2.09%	1.85%	-0.32%	3.64%	2.60%	-1.35%	-1.88%	7.72%	5.98%	<b>9.87%</b>
<b>2021</b>	0.14%	8.10%	4.05%	6.62%	3.21%	-4.04%	0.47%	0.82%	-3.54%	2.82%	-3.83%	4.23%	<b>19.77%</b>
<b>2022</b>	-3.95%	4.01%	0.25%	-3.30%	0.76%	-5.70%	-0.40%	-2.23%	-2.25%	0.76%	0.84%	-0.66%	<b>-11.59%</b>
<b>2023</b>	1.64%	-2.85%	0.56%	-0.05%	-0.71%	2.67%	1.91%	-2.58%	0.13%				<b>0.58%</b>

Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.

## Lumenai – Very Aggressive Managed Portfolio

**Objective:** Very long-term (15+ years): For this time horizon, the focus can be on growth-oriented investments. A portfolio with a small allocation to money markets, government bonds, and corporate credit, and the balance allocated to quality- and growth-oriented equity investments, such as global, large caps, mid caps, technology, healthcare, energy, and natural resources, would be appropriate. The risk target for this time horizon should be very high.

### Target Returns

**7% to 10%**

Annualized net

### Target Risk

**13% to 15%**

Annualized Volatility

### Target Max Drawdown

**-22% to -26%**

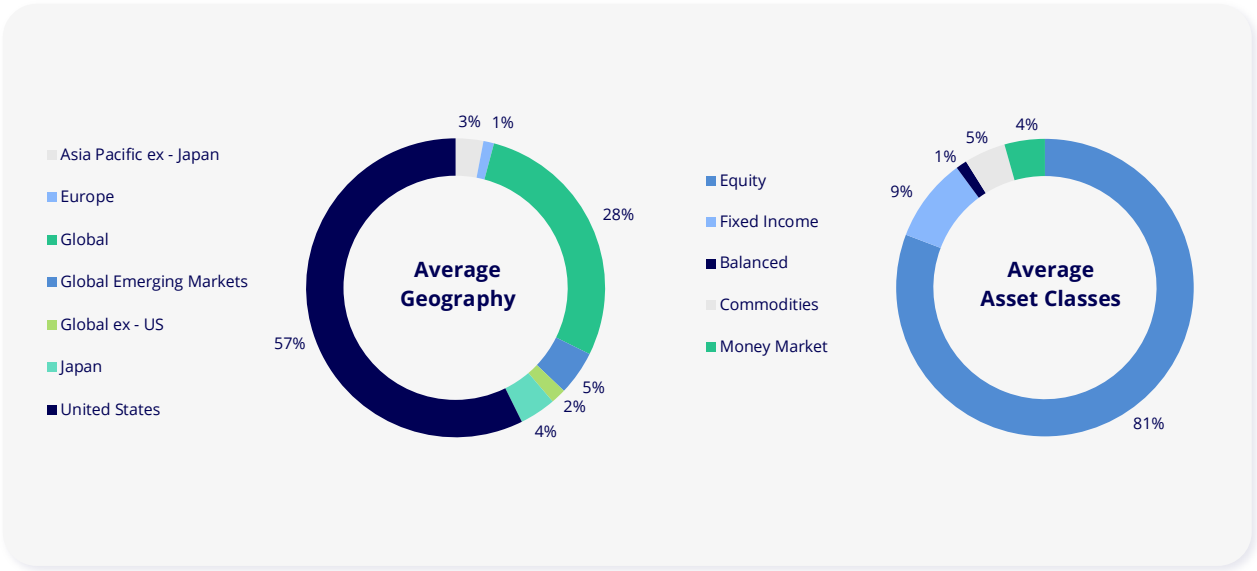
Peak to Trough Decline

## Current Holdings – As of 9/30/23

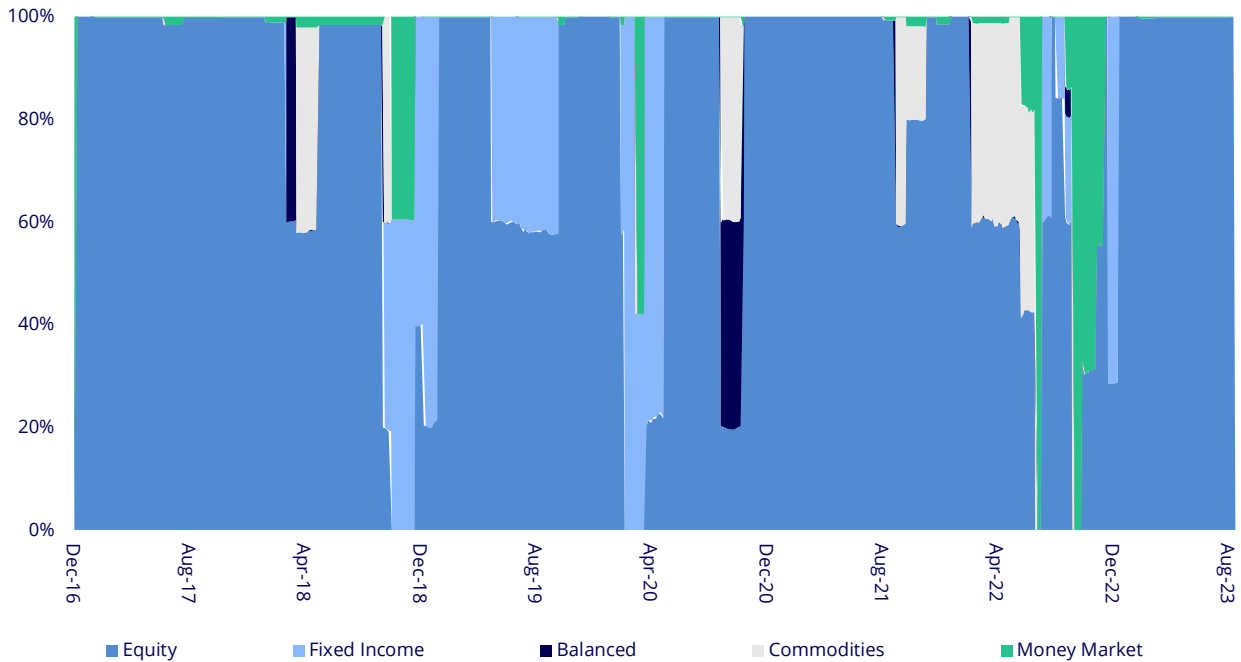
Money Market	Size (%)
T Rowe Price Government Money Fund A Dis	0.09%
	<b>0.09%</b>
Equities	Size (%)
BlackRock Energy Opportunities Fund Dis	14.45%
Janus Henderson GI Tch and Innov Fd Dis	22.27%
Victory Nasdaq-100 Index Fund Dis	22.94%
BNY Mellon Natural Resources Fund Dis	20.23%
T Rowe Price New Era Fund I Dis	20.02%
	<b>99.91%</b>

Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.



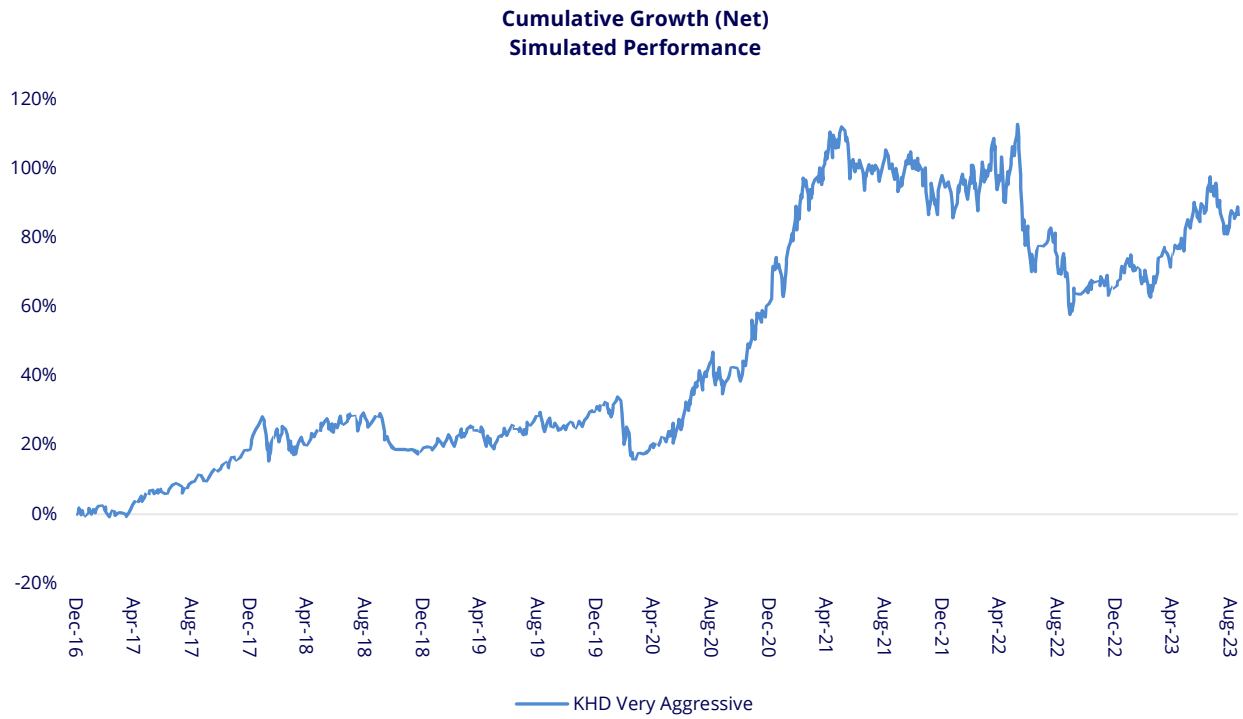


### Asset Classes Over Time



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## Lumenai – Very Aggressive Managed Portfolio



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
<b>2017</b>	0.25%	0.69%	-0.37%	2.44%	2.61%	0.33%	2.05%	1.50%	-0.28%	3.76%	2.83%	1.72%	<b>18.88%</b>
<b>2018</b>	5.63%	-2.88%	-2.02%	0.46%	4.41%	0.46%	2.48%	-0.96%	0.33%	-7.32%	-0.05%	0.25%	<b>0.16%</b>
<b>2019</b>	2.43%	-0.59%	1.52%	1.47%	-3.90%	3.11%	-0.54%	4.38%	-2.80%	0.47%	0.85%	2.92%	<b>9.37%</b>
<b>2020</b>	-1.63%	-6.13%	-2.30%	1.55%	2.67%	4.20%	8.10%	4.73%	-4.55%	0.41%	8.72%	7.36%	<b>24.13%</b>
<b>2021</b>	0.85%	11.80%	5.75%	5.19%	3.58%	-5.21%	0.47%	0.83%	-3.54%	2.82%	-5.50%	4.95%	<b>22.71%</b>
<b>2022</b>	-4.25%	3.95%	-0.27%	-0.44%	3.89%	-12.80%	-0.01%	-3.55%	-7.73%	4.33%	2.38%	-1.90%	<b>-16.53%</b>
<b>2023</b>	4.55%	-3.18%	3.87%	1.19%	3.42%	4.15%	3.14%	-4.56%	-0.19%				<b>12.59%</b>

Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets. Additionally, the performance quoted herein is based on simulations and not actual performance, please read about the limitations and risks of simulated performance in the Appendix that follows herein.

### Getting Started:

Initiating one's journey with Lumenai is a streamlined and intuitive process, designed with both corporations and their employees in mind.

### For Corporations:

Lumenai offers a holistic solution that not only simplifies the administrative side of retirement fund management but also adds value by ensuring optimal growth of these funds. By adopting Lumenai's AI-driven strategies, corporations can foster employee confidence, knowing that their 401(k) plans are being managed with precision and expertise. Moreover, the platform's integrated tools and analytics offer real-time insights, allowing for timely and informed decision-making. The result? A seamless, efficient, and value-driven retirement planning system that aligns with the company's objectives and enhances its benefits offering.

### For Employees:

The onboarding process is straightforward. With a user-friendly interface, employees can easily set up and manage their retirement accounts. Lumenai's platform provides educational resources, insights, and personalized recommendations, ensuring that employees, regardless of their financial literacy, can make informed decisions about their retirement investments. By choosing from the four tailored portfolio options, they can align their investments with their risk tolerance and retirement goals. Plus, with regular updates and transparent reporting, employees can stay engaged and proactive in managing their retirement funds.

## How To Select and Sign Up For Your AI Managed Portfolio



Please note there is no guarantee that Lumenai will be successful in achieving the performance targets shown above. Actual returns may be lower and maximum declines may be larger than the targets



In essence, Lumenai not only simplifies the investment journey but also empowers corporations and their employees to take control of their retirement futures with confidence and clarity.

### **Conclusion:**

Lumenai, by synergizing artificial intelligence with time-tested investment strategies, presents a paradigm shift in the realm of 401(k) Plan management. Such an integration not only provides corporations and their employees with a sophisticated and efficient investment solution but also establishes a new benchmark for the future of investment management. We invite stakeholders to consider this robust approach, ensuring a secure and prosperous retirement journey.

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For more information on any mention of awards, please contact the Chief Compliance Officer as Lumenai maintains strict criteria for any industry award nominations that they may garner. Lumenai does not pay anyone for award nominations.

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