



ETF Category Report

Equity: Thematic - Industrial Revolution

Flows & Product Growth | Structure | Performance
As of 5/28/2024

Risk | Composition | Fundamentals

The ETF Action Category Reports present category averages, category breakdown, and ETF level data using the ETF Action Classification System. For more information, please reach out to team@etfaction.com.

ETF Action Category List

Alternative: Absolute Return - Event Driven	Equity: Global Ex-U.S. Large Cap - Value	Equity: U.S. Mid Cap - Growth
Alternative: Absolute Return - Managed Futures	Equity: Global Ex-U.S. Small Mid Cap	Equity: U.S. Mid Cap - Value
Alternative: Absolute Return - Multi-Strategy	Equity: Global Large Cap	Equity: U.S. Small Cap - Blend
Alternative: Specialty - Volatility	Equity: Global Large Cap - Blend	Equity: U.S. Small Cap - Growth
Asset Allocation: Specialty - Miscellaneous	Equity: Global Large Cap - Growth	Equity: U.S. Small Cap - Value
Asset Allocation: Target Date - 2015	Equity: Global Large Cap - Value	Fixed Income: Municipal - Defined Maturity
Asset Allocation: Target Date - 2020	Equity: Global Small Mid Cap	Fixed Income: Municipal - High Yield
Asset Allocation: Target Date - 2025	Equity: Region - Africa-Middle East	Fixed Income: Municipal - Intermediate
Asset Allocation: Target Date - 2030	Equity: Region - Asia-Pacific	Fixed Income: Municipal - Long
Asset Allocation: Target Date - 2035	Equity: Region - Asia-Pacific Ex-Japan	Fixed Income: Municipal - Short
Asset Allocation: Target Date - 2040	Equity: Region - Country Specific	Fixed Income: Municipal - Single State
Asset Allocation: Target Date - 2045	Equity: Region - Eurozone	Fixed Income: Taxable - Bank Loans
Asset Allocation: Target Date - 2050	Equity: Region - Latin America	Fixed Income: Taxable - Convertible
Asset Allocation: Target Date - 2055	Equity: Sector - Communication Services	Fixed Income: Taxable - Core
Asset Allocation: Target Date - 2060	Equity: Sector - Consumer Discretionary	Fixed Income: Taxable - Core Enhanced
Asset Allocation: Target Date - 2065+	Equity: Sector - Consumer Staples	Fixed Income: Taxable - Corporate
Asset Allocation: Target Date - Retirement	Equity: Sector - Energy	Fixed Income: Taxable - Defined Maturity
Asset Allocation: Target Risk - Aggressive	Equity: Sector - Financials	Fixed Income: Taxable - Emerging
Asset Allocation: Target Risk - Conservative	Equity: Sector - Health Care	Fixed Income: Taxable - Emerging USD
Asset Allocation: Target Risk - Global Macro	Equity: Sector - Industrial	Fixed Income: Taxable - Government Intermediate
Asset Allocation: Target Risk - Growth	Equity: Sector - Materials	Fixed Income: Taxable - Government Long
Asset Allocation: Target Risk - Moderate	Equity: Sector - Real Estate	Fixed Income: Taxable - Government Short
Asset Allocation: Target Risk - Tactical	Equity: Sector - Technology	Fixed Income: Taxable - High Yield
Commodity: Focused - Agriculture	Equity: Sector - Utilities	Fixed Income: Taxable - Inflation Protected
Commodity: Focused - Energy	Equity: Thematic - Disruptive Tech	Fixed Income: Taxable - International
Commodity: Focused - Industrial Metals	Equity: Thematic - Evolving Consumer	Fixed Income: Taxable - International USD
Commodity: Focused - Precious Metals	Equity: Thematic - FinTech	Fixed Income: Taxable - Long-Term
Commodity: Multi-Sector - Broad Market	Equity: Thematic - Health Innovation	Fixed Income: Taxable - Multisector
Commodity: Specialty - Carbon Credits	Equity: Thematic - Industrial Revolution	Fixed Income: Taxable - Preferred Stock
Commodity: Specialty - Shipping Freight	Equity: Thematic - Infrastructure	Fixed Income: Taxable - Securitized
Cryptocurrency	Equity: Thematic - Midstream & MLPs	Fixed Income: Taxable - Short-Term
Currency	Equity: Thematic - Miscellaneous	Fixed Income: Taxable - Ultrashort
Equity: Dev Ex-U.S. Large Cap - Blend	Equity: Thematic - Multi-Sector	Non-Traditional: Buffer
Equity: Dev Ex-U.S. Large Cap - Growth	Equity: Thematic - Natural Resources	Non-Traditional: Interest Rate Volatility
Equity: Dev Ex-U.S. Large Cap - Value	Equity: Thematic - Precious Metals	Non-Traditional: Leverage Inverse
Equity: Dev Ex-U.S. Small Mid Cap	Equity: Thematic - Sustainability	Non-Traditional: Long Short
Equity: Emerging Large Cap	Equity: U.S. Large Cap - Blend	Non-Traditional: Option Overlay
Equity: Emerging Small Mid Cap	Equity: U.S. Large Cap - Growth	Non-Traditional: Synthetic Income
Equity: Global Ex-U.S. Large Cap - Blend	Equity: U.S. Large Cap - Value	
Equity: Global Ex-U.S. Large Cap - Growth	Equity: U.S. Mid Cap - Blend	

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Overview & Structure

Category: Equity: Thematic - Industrial Revolution

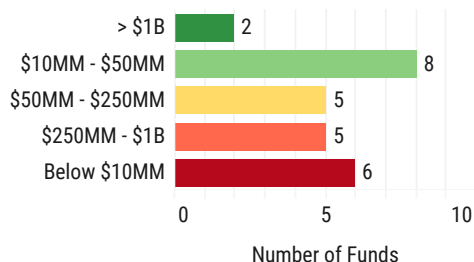


As of 3/31/2024

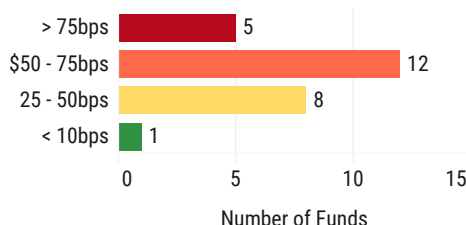
Fund Count	Assets Under Management	Average Expense Ratio	Average Lifespan	Average TTM Yield	Average Spread (%)	Average ADV (\$)
26	\$8.1B	0.59%	5.23 Years	0.76%	0.29%	\$2.61M

Breakdown of Category Universe Ratings

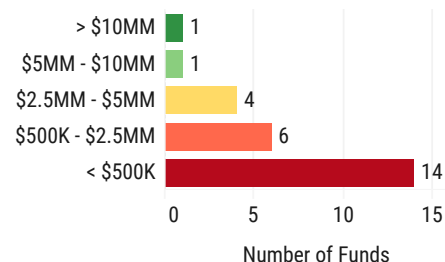
Assets Under Management



Expense Ratio



Liquidity (\$ ADV)



Top 10 Funds by Market Share

Ticker	Name	Inception	AUM	Expense Ratio	Distribution Yield (TTM)	Average Spread	ADV
BOTZ	Global X Robotics & Artificial Intelligence ETF	9/12/2016	\$2,864.73M	0.69%	0.18%	0.03%	\$37.49M
ROBO	ROBO Global Robotics & Automation Index ETF	10/22/2013	\$1,353.41M	0.95%	0.05%	0.19%	\$4.33M
ARKQ	ARK Autonomous Technology & Robotics ETF	9/30/2014	\$882.48M	0.75%	1.52%	0.05%	\$6.90M
IRBO	iShares Robotics and Artificial Intelligence Multisector ETF	6/26/2018	\$673.54M	0.47%	0.88%	0.15%	\$4.94M
DRIV	Global X Autonomous & Electric Vehicles ETF	4/13/2018	\$604.01M	0.68%	1.63%	0.16%	\$3.14M
ROBT	First Trust Nasdaq Artificial Intelligence & Robotics ETF	2/21/2018	\$557.18M	0.65%	0.17%	0.09%	\$4.06M
IDRV	iShares Self-driving EV & Tech ETF	4/16/2019	\$260.06M	0.47%	2.43%	0.23%	\$1.97M
ARKX	ARK Space Exploration & Innovation ETF	3/30/2021	\$248.17M	0.75%	0.00%	0.13%	\$0.86M
PRNT	3D Printing ETF	7/19/2016	\$133.72M	0.66%	0.00%	0.68%	\$0.41M
FBOT	Fidelity Disruptive Automation ETF	6/12/2023	\$109.10M	0.50%	0.00%	0.20%	\$0.53M

Top 10 Funds by Greatest Average Daily Traded Value (ADV)

Ticker	Name	Inception	AUM	Expense Ratio	Distribution Yield (TTM)	Average Spread	ADV
BOTZ	Global X Robotics & Artificial Intelligence ETF	9/12/2016	\$2,864.73M	0.69%	0.18%	0.03%	\$37.49M
ARKQ	ARK Autonomous Technology & Robotics ETF	9/30/2014	\$882.48M	0.75%	1.52%	0.05%	\$6.90M
IRBO	iShares Robotics and Artificial Intelligence Multisector ETF	6/26/2018	\$673.54M	0.47%	0.88%	0.15%	\$4.94M
ROBO	ROBO Global Robotics & Automation Index ETF	10/22/2013	\$1,353.41M	0.95%	0.05%	0.19%	\$4.33M
ROBT	First Trust Nasdaq Artificial Intelligence & Robotics ETF	2/21/2018	\$557.18M	0.65%	0.17%	0.09%	\$4.06M
DRIV	Global X Autonomous & Electric Vehicles ETF	4/13/2018	\$604.01M	0.68%	1.63%	0.16%	\$3.14M
IDRV	iShares Self-driving EV & Tech ETF	4/16/2019	\$260.06M	0.47%	2.43%	0.23%	\$1.97M
KARS	KraneShares Electric Vehicles & Future Mobility Index ETF	1/18/2018	\$105.30M	0.72%	0.97%	0.62%	\$0.91M
ARKX	ARK Space Exploration & Innovation ETF	3/30/2021	\$248.17M	0.75%	0.00%	0.13%	\$0.86M
SHLD	Global X Defense Tech ETF	9/11/2023	\$39.13M	0.50%	0.00%	0.32%	\$0.77M

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Flows & Category Growth

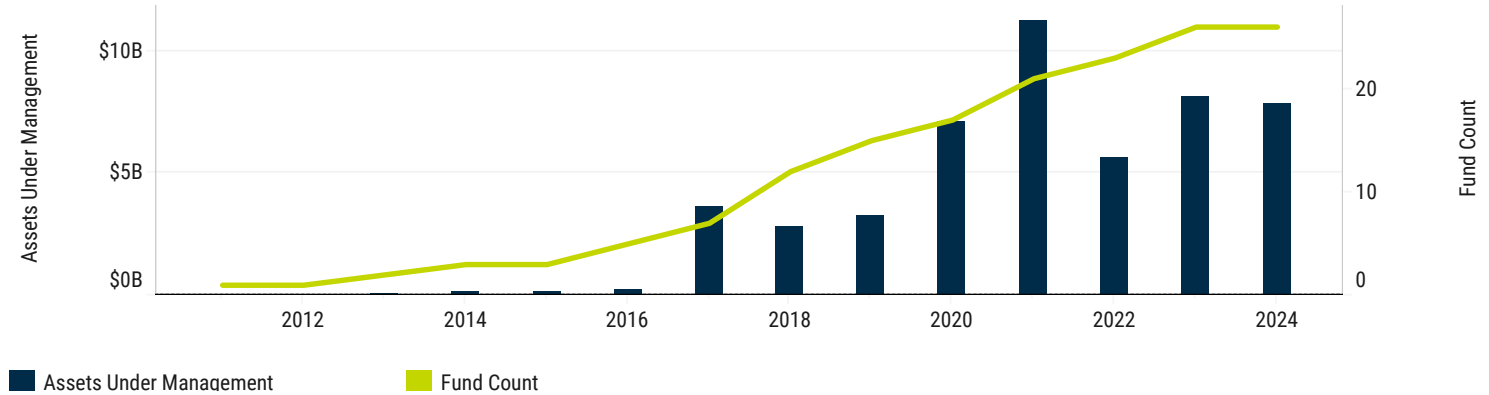


Category: Equity: Thematic - Industrial Revolution

As of 3/31/2024

Fund Count	Assets Under Management	1 Month Flows	3 Month Flows	Year To Date Flows	1 Year Flows	3 Year Flows	5 Year Flows
26	\$8.1B	\$0.09B	(\$0.10B)	(\$0.11B)	\$0.62B	(\$0.54B)	\$4.80B

Category Growth



Top 10 Funds by 1 Month Flows

Ticker	Name	Inception	AUM	1 Month	3 Month	Year To Date	1 Year	3 Year	5 Year
BOTZ	Global X Robotics & Artificial Intelligence ETF	9/12/2016	\$2,864.73M	\$149.5M	\$107.2M	\$107.7M	\$645.0M	\$491.7M	\$573.0M
IRBO	iShares Robotics and Artificial Intelligence Multi..	6/26/2018	\$673.54M	\$41.2M	\$81.2M	\$74.2M	\$320.2M	\$338.8M	\$628.4M
ROBT	First Trust Nasdaq Artificial Intelligence & Robot..	2/21/2018	\$557.18M	\$28.2M	\$70.6M	\$70.6M	\$297.7M	\$367.6M	\$496.1M
SHLD	Global X Defense Tech ETF	9/11/2023	\$39.13M	\$17.9M	\$31.1M	\$31.1M	\$35.4M	\$35.4M	\$35.4M
FITE	SPDR S&P Kensho Future Security ETF	12/26/2017	\$56.48M	\$10.8M	\$14.7M	\$14.7M	\$19.0M	\$28.5M	\$31.6M
IBOT	Vaneck Robotics ETF	4/5/2023	\$9.87M	\$3.2M	\$5.2M	\$5.2M	\$8.8M	\$8.8M	\$8.8M
MAKX	ProShares S&P Kensho Smart Factories ETF	9/29/2021	\$0.93M	\$0.0M	\$0.0M	\$0.0M	\$0.0M	(\$2.4M)	(\$2.4M)
BULD	Pacer BlueStar Engineering the Future ETF	5/4/2022	\$0.95M	\$0.0M	\$0.0M	\$0.0M	(\$0.8M)	\$0.8M	\$0.8M
CARZ	First Trust NASDAQ Global Auto Index Fund	5/9/2011	\$38.40M	\$0.0M	(\$5.4M)	(\$5.4M)	(\$7.7M)	(\$27.0M)	\$5.1M
CLNR	IQ Cleaner Transport ETF	10/21/2021	\$5.82M	\$0.0M	\$0.0M	\$0.0M	\$0.0M	\$1.5M	\$1.5M

Bottom 10 Funds by 1 Month Flows

Ticker	Name	Inception	AUM	1 Month	3 Month	Year To Date	1 Year	3 Year	5 Year
DRIV	Global X Autonomous & Electric Vehicles ETF	4/13/2018	\$604.01M	(\$39.6M)	(\$103.5M)	(\$103.6M)	(\$291.9M)	(\$78.6M)	\$700.2M
ARKQ	ARK Autonomous Technology & Robotics ETF	9/30/2014	\$882.48M	(\$35.5M)	(\$113.9M)	(\$113.9M)	(\$145.0M)	(\$1,619.0M)	\$1,119.8M
ROBO	ROBO Global Robotics & Automation Index ETF	10/22/2013	\$1,353.41M	(\$27.7M)	(\$69.9M)	(\$70.1M)	(\$106.4M)	(\$341.6M)	(\$461.3M)
IDRV	iShares Self-driving EV & Tech ETF	4/16/2019	\$260.06M	(\$25.3M)	(\$54.1M)	(\$54.1M)	(\$93.5M)	\$135.0M	\$410.7M
ARKX	ARK Space Exploration & Innovation ETF	3/30/2021	\$248.17M	(\$9.5M)	(\$16.1M)	(\$16.1M)	(\$49.1M)	\$397.2M	\$397.2M
HAIL	SPDR S&P Kensho Smart Mobility ETF	12/26/2017	\$38.56M	(\$9.2M)	(\$3.1M)	(\$3.1M)	(\$15.1M)	(\$100.6M)	\$97.3M
PRNT	3D Printing ETF	7/19/2016	\$133.72M	(\$7.8M)	(\$17.7M)	(\$16.5M)	(\$42.5M)	(\$239.9M)	\$294.8M
KARS	KraneShares Electric Vehicles & Future Mobility ..	1/18/2018	\$105.30M	(\$3.3M)	(\$18.2M)	(\$18.2M)	(\$32.7M)	\$65.4M	\$205.1M
FDRV	Fidelity Electric Vehicles and Future Transportat..	10/5/2021	\$37.85M	(\$0.7M)	(\$2.2M)	(\$2.2M)	(\$2.9M)	\$62.2M	\$62.2M
ROKT	SPDR S&P Kensho Final Frontiers ETF	10/22/2018	\$16.56M	(\$0.4M)	(\$0.9M)	(\$0.9M)	(\$2.5M)	(\$9.2M)	\$10.0M

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Category Performance

Category: Equity: Thematic - Industrial Revolution



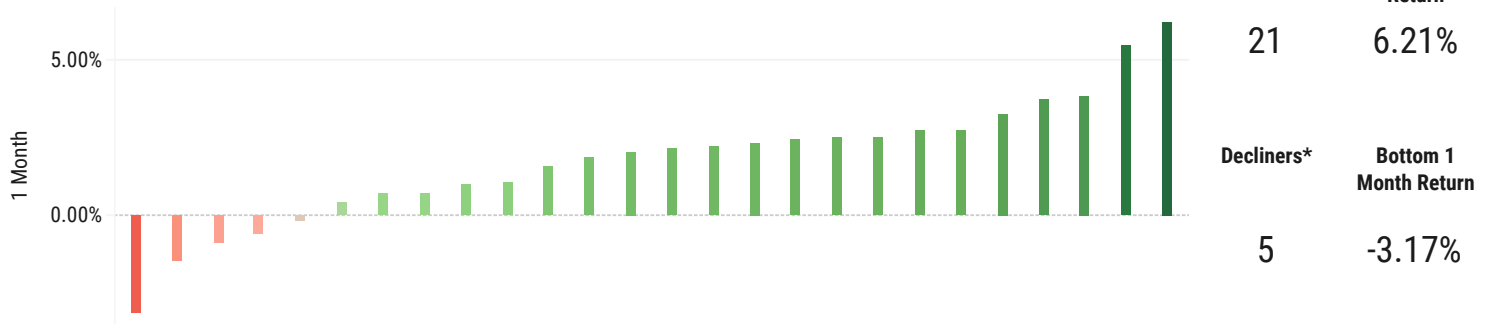
As of 3/31/2024

Fund Count	Average 1 Month Return	Average 3 Month Return	Average YTD Return	Average 1 Year Return	Average 3 Year Return**	Average 5 Year Return**	Average 10 Year Return**
26	1.72%	1.56%	1.56%	9.38%	-2.72%	3.91%	0.55%

Breakdown of Category Performance

**Annualized

1 Month Returns



Top 10 Performers: 1 Month

Ticker	Name	Inception	AUM	1 Month	3 Month	YTD	1 Year	3 Year*	5 Year*
SHLD	Global X Defense Tech ETF	9/11/2023	\$39.13M	6.21%	19.17%	19.17%			
GAST	Gabelli Automation ETF	1/5/2022	\$5.00M	5.48%	8.02%	8.02%	22.93%		
PRNT	3D Printing ETF	7/19/2016	\$133.72M	3.81%	-2.36%	-2.36%	2.73%	-15.27%	0.49%
MOTO	SmartETFs Smart Transportation & Technology ETF	11/15/2019	\$10.97M	3.69%	4.60%	4.60%	14.46%	2.63%	
ARKX	ARK Space Exploration & Innovation ETF	3/30/2021	\$248.17M	3.25%	-3.05%	-3.05%	9.13%	0.00%	
FBOT	Fidelity Disruptive Automation ETF	6/12/2023	\$109.10M	2.72%	5.95%	5.95%			
CLNR	IQ Cleaner Transport ETF	10/21/2021	\$5.82M	2.69%	2.83%	2.83%	15.92%		
IQM	Franklin Intelligent Machines Fund Franklin Intelligent ..	2/25/2020	\$20.46M	2.51%	14.47%	14.47%	35.92%	11.76%	
IBOT	Vaneck Robotics ETF	4/5/2023	\$9.87M	2.49%	10.78%	10.78%			
HAIL	SPDR S&P Kensho Smart Mobility ETF	12/26/2017	\$38.56M	2.45%	-4.38%	-4.38%	-0.80%	-18.53%	3.53%

Bottom 10 Performers: 1 Month

Ticker	Name	Inception	AUM	1 Month	3 Month	YTD	1 Year	3 Year*	5 Year*
IDRV	iShares Self-driving EV & Tech ETF	4/16/2019	\$260.06M	-3.17%	-12.03%	-12.03%	-14.47%	-9.87%	
FDRV	Fidelity Electric Vehicles and Future Transportation ETF	10/5/2021	\$37.85M	-1.50%	-15.09%	-15.09%	-20.19%		
ROBT	First Trust Nasdaq Artificial Intelligence & Robotics ETF	2/21/2018	\$557.18M	-0.92%	-0.64%	-0.64%	10.20%	-3.92%	7.52%
KARS	KraneShares Electric Vehicles & Future Mobility Index E..	1/18/2018	\$105.30M	-0.62%	-12.61%	-12.61%	-24.69%	-15.69%	3.75%
VCAR	Simplify Volt RoboCar Disruption and Tech ETF	12/28/2020	\$5.23M	-0.19%	9.67%	9.67%	35.98%	-1.58%	
FITE	SPDR S&P Kensho Future Security ETF	12/26/2017	\$56.48M	0.40%	4.00%	4.00%	27.32%	6.60%	10.96%
ARKQ	ARK Autonomous Technology & Robotics ETF	9/30/2014	\$882.48M	0.66%	-5.18%	-5.18%	12.27%	-11.85%	10.32%
BULD	Pacer BlueStar Engineering the Future ETF	5/4/2022	\$0.95M	0.68%	6.87%	6.87%	19.37%		
IRBO	iShares Robotics and Artificial Intelligence Multisector ..	6/26/2018	\$673.54M	0.97%	-0.43%	-0.43%	14.19%	-5.53%	8.09%
UFO	Procore Space ETF	4/11/2019	\$35.15M	1.01%	-8.79%	-8.79%	-7.30%	-13.94%	

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3 Year Risk Metrics

Category: Equity: Thematic - Industrial Revolution



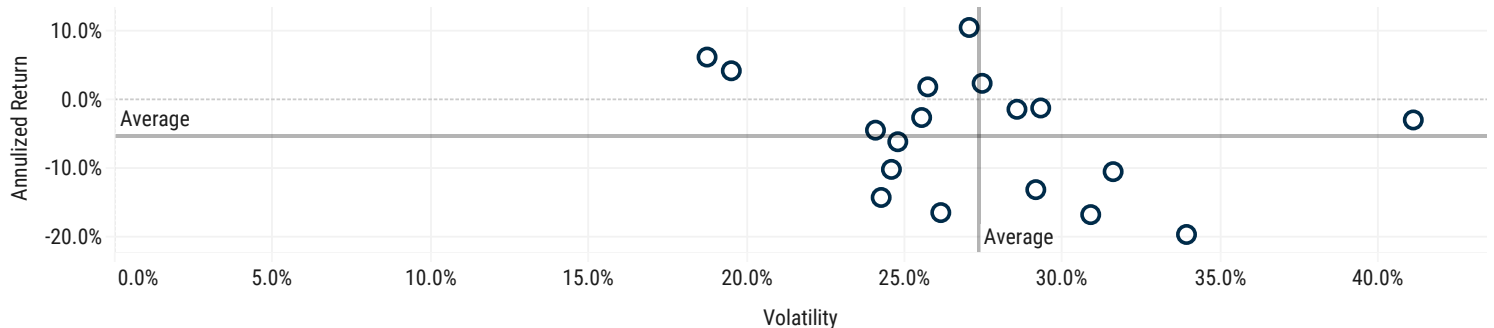
As of 3/31/2024

Fund Count	Average Return	Average Volatility	Average Correlation	Average Sharpe Ratio	Average Sortino Ratio	Average Beta	Average Alpha	Average Up Capture	Average Down Capture
26	-5.20%	27.33%	0.80	-0.19	-0.32	1.23	-17.09%	84.21%	152.98%

Breakdown of Category Risk

Risk Benchmark: ACWI - iShares MSCI ACWI ETF

3 Year Risk-Return Scatterplot



Top 10 Funds by Sharpe Ratio (3 Year)

Risk Benchmark: ACWI - iShares MSCI ACWI ETF

Ticker	Name	AUM	Annualized Return	Volatility	Correlation (SPY)	Sharpe Ratio	Beta	Alpha	Up Capture	Down Capture
IQM	Franklin Intelligent Machines Fund Frankli..	\$20.5M	10.6%	27.0%	89.2%	0.37	1.37	-3.1%	127.4%	142.3%
FITE	SPDR S&P Kensho Future Security ETF	\$56.5M	6.3%	18.7%	80.3%	0.33	0.85	-2.7%	74.3%	84.2%
ROKT	SPDR S&P Kensho Final Frontiers ETF	\$16.6M	4.3%	19.5%	81.0%	0.21	0.90	-5.0%	69.1%	85.5%
CARZ	First Trust NASDAQ Global Auto Index Fu..	\$38.4M	2.4%	27.4%	80.4%	0.09	1.25	-9.3%	106.4%	147.6%
MOTO	SmartETFs Smart Transportation & Techn..	\$11.0M	1.9%	25.7%	89.0%	0.07	1.30	-10.9%	106.7%	150.3%
BOTZ	Global X Robotics & Artificial Intelligence ..	\$2,864.7M	-1.2%	29.3%	85.4%	-0.04	1.42	-14.4%	113.5%	173.9%
DRIV	Global X Autonomous & Electric Vehicles ..	\$604.0M	-1.4%	28.5%	85.6%	-0.05	1.39	-14.4%	105.9%	164.0%
VCAR	Simplify Volt RoboCar Disruption and Tec..	\$5.2M	-2.9%	41.1%	57.3%	-0.07	1.34	-11.4%	95.5%	156.6%
ROBO	ROBO Global Robotics & Automation Inde..	\$1,353.4M	-2.6%	25.5%	91.1%	-0.10	1.32	-15.6%	96.4%	156.2%
ROBT	First Trust Nasdaq Artificial Intelligence &..	\$557.2M	-4.4%	24.1%	86.6%	-0.19	1.18	-16.2%	85.3%	149.2%

Top 10 Funds by Greatest Alpha (3 Year)

Risk Benchmark: ACWI - iShares MSCI ACWI ETF

Ticker	Name	AUM	Annualized Return	Volatility	Correlation (SPY)	Sharpe Ratio	Beta	Alpha	Up Capture	Down Capture
FITE	SPDR S&P Kensho Future Security ETF	\$56.5M	6.3%	18.7%	80.3%	0.33	0.85	-2.7%	74.3%	84.2%
IQM	Franklin Intelligent Machines Fund Frankli..	\$20.5M	10.6%	27.0%	89.2%	0.37	1.37	-3.1%	127.4%	142.3%
ROKT	SPDR S&P Kensho Final Frontiers ETF	\$16.6M	4.3%	19.5%	81.0%	0.21	0.90	-5.0%	69.1%	85.5%
CARZ	First Trust NASDAQ Global Auto Index Fund	\$38.4M	2.4%	27.4%	80.4%	0.09	1.25	-9.3%	106.4%	147.6%
MOTO	SmartETFs Smart Transportation & Techno..	\$11.0M	1.9%	25.7%	89.0%	0.07	1.30	-10.9%	106.7%	150.3%
VCAR	Simplify Volt RoboCar Disruption and Tech..	\$5.2M	-2.9%	41.1%	57.3%	-0.07	1.34	-11.4%	95.5%	156.6%
BOTZ	Global X Robotics & Artificial Intelligence E..	\$2,864.7M	-1.2%	29.3%	85.4%	-0.04	1.42	-14.4%	113.5%	173.9%
DRIV	Global X Autonomous & Electric Vehicles E..	\$604.0M	-1.4%	28.5%	85.6%	-0.05	1.39	-14.4%	105.9%	164.0%
ROBO	ROBO Global Robotics & Automation Index ..	\$1,353.4M	-2.6%	25.5%	91.1%	-0.10	1.32	-15.6%	96.4%	156.2%
ROBT	First Trust Nasdaq Artificial Intelligence & ..	\$557.2M	-4.4%	24.1%	86.6%	-0.19	1.18	-16.2%	85.3%	149.2%

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Equity Composition

Category: Equity: Thematic - Industrial Revolution



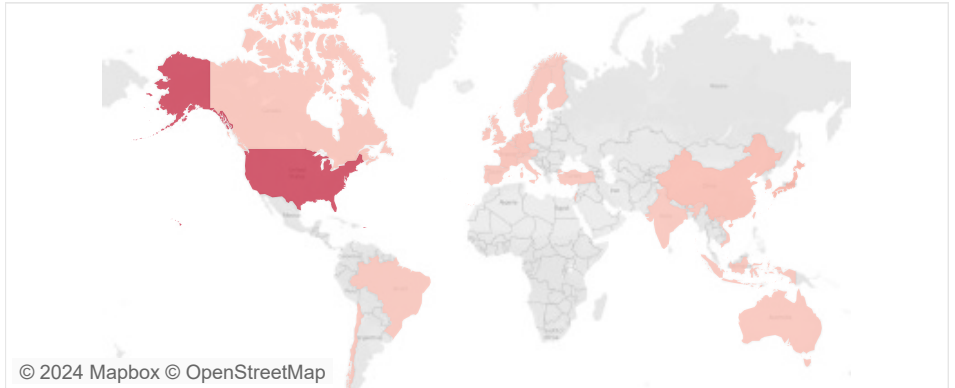
As of 3/31/2024

Fund Count*	Assets Under Management	Average Top 10 Holdings Weight	Average Weighted Avg Market Cap	Average Sector Concentration	Average Stock Concentration
26	\$8.1B	42.97%	\$203,582M	High	Average

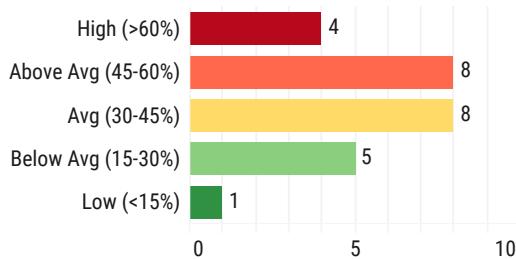
Average Size & Style Exposure

	Growth	Core	Value
Large-cap	26.15%	12.91%	7.36%
Mid-cap	10.58%	8.29%	6.36%
Small-cap	11.11%	7.31%	9.44%

Average Geographic Exposure



Category Breakdown: Stock Concentration



Stock Concentration measured by weighting in top 10 portfolio holdings.

Average Market Development

U.S.	59.87%
Developed ex-U.S.	33.10%
Emerging	7.01%
Frontier	0.01%
Rest of World	0.00%
Unassigned	0.00%

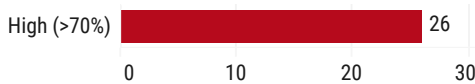
Average Regional Exposure

North America	61.36%
Europe	17.29%
Asia Pacific	19.23%
Latin America	0.26%
Africa	1.85%
Unassigned	0.00%

Average Top 10 Country Exposure

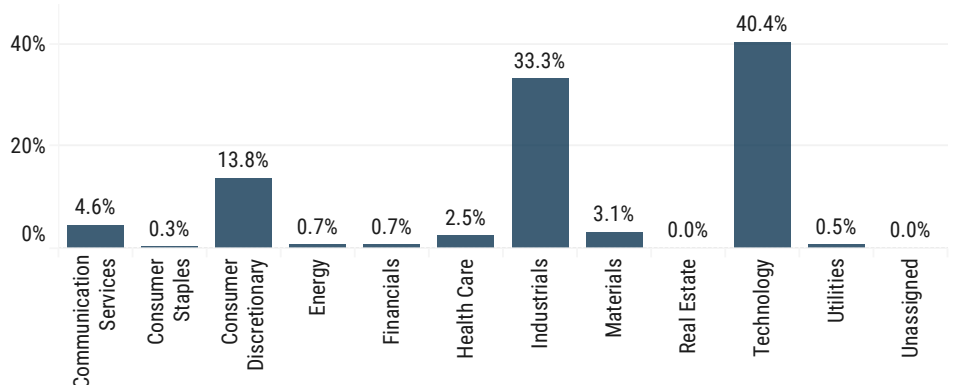
United States	59.87%
Japan	8.46%
China	4.52%
Germany	3.86%
South Korea	3.12%
France	2.63%
Switzerland	2.48%
Netherlands	2.40%
Taiwan	2.07%
Israel	1.85%

Category Breakdown: Sector Concentration



Sector Concentration measured by greatest weight within one sector of the portfolio

Average Sector Exposure



*Fund count for composition and fundamentals excludes funds with no recent holdings date (ie: ETNs)

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Equity Fundamentals

Category: Equity: Thematic - Industrial Revolution

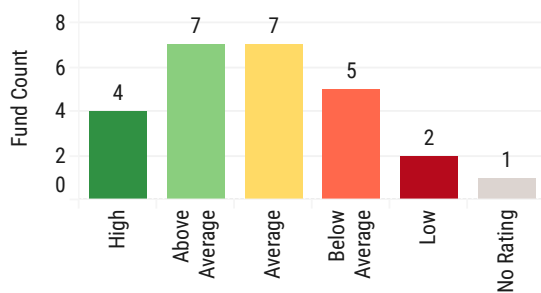


As of 3/31/2024

Valuation

Fund Count*	Avg Price / Earnings (TTM)	Avg Price / Earnings (NTM)	Avg Price / Sales (TTM)	Avg Price / Sales (NTM)	Avg Price / Cash Flow (TTM)	Avg Price / Free Cash Flow (TTM)	Avg Price / Book (TTM)
26	24.21	22.04	2.21	2.26	14.84	27.60	2.78

Category Breakdown: Value Rating



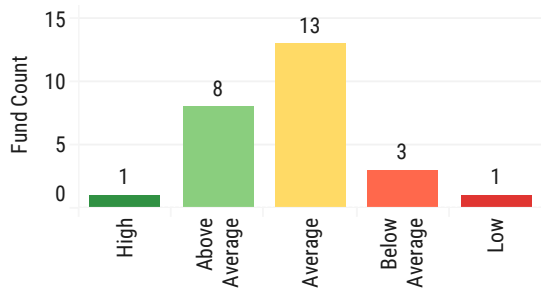
Top 10 Funds by Value Score

Ticker	Name	AUM	Value Rating (0-5)
IDRV	iShares Self-driving EV & Tech ETF	\$260.06M	4.87
DRIV	Global X Autonomous & Electric Vehicles ETF	\$604.01M	4.40
CLNR	IQ Cleaner Transport ETF	\$5.82M	4.02
HAIL	SPDR S&P Kensho Smart Mobility ETF	\$38.56M	4.01
MOTO	SmartETFs Smart Transportation & Technology ETF	\$10.97M	3.86
KARS	KraneShares Electric Vehicles & Future Mobility Index ETF	\$105.30M	3.78
FDRV	Fidelity Electric Vehicles and Future Transportation ETF	\$37.85M	3.55
UFO	Procore Space ETF	\$35.15M	3.54
GAST	Gabelli Automation ETF	\$5.00M	3.29
ROKT	SPDR S&P Kensho Final Frontiers ETF	\$16.56M	3.10

Quality

Fund Count*	Avg Return On Equity	Avg Return On Assets	Avg Return On Invested Capital	Avg Long Term Debt / Equity	Avg Interest Coverage
26	11.7%	5.8%	8.1%	49.8%	24.3%

Category Breakdown: Quality Rating



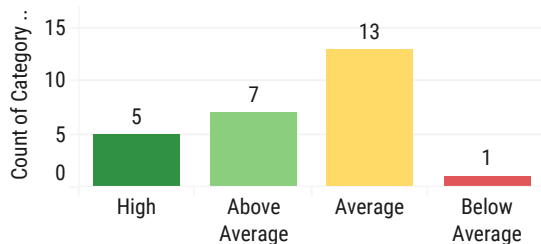
Top 10 Funds by Quality Score

Ticker	Name	AUM	Quality Rating (0-5)
IQM	Franklin Intelligent Machines Fund Franklin Intelligent Mac..	\$20.46M	4.16
FBOT	Fidelity Disruptive Automation ETF	\$109.10M	3.98
VCAR	Simplify Volt RoboCar Disruption and Tech ETF	\$5.23M	3.75
IBOT	Vaneck Robotics ETF	\$9.87M	3.72
BULD	Pacer BlueStar Engineering the Future ETF	\$0.95M	3.47
ROBO	ROBO Global Robotics & Automation Index ETF	\$1,353.41M	3.44
BOTZ	Global X Robotics & Artificial Intelligence ETF	\$2,864.73M	3.42
MOTO	SmartETFs Smart Transportation & Technology ETF	\$10.97M	3.36
CARZ	First Trust NASDAQ Global Auto Index Fund	\$38.40M	3.31
MAKX	ProShares S&P Kensho Smart Factories ETF	\$0.93M	2.97

Growth

Fund Count*	Avg LT Earnings	Avg Earnings Growth (TTM)	Avg Earnings Growth (NTM)	Avg Sales Growth (TTM)	Avg Sales Growth (NTM)	Avg Cash Flow Growth (TTM)	Avg Book Growth (TTM)	Avg Dividend Growth (TTM)
26	12.4%	12.7%	35.1%	8.0%	6.3%	18.4%	10.0%	7.9%

Category Breakdown: Growth Rating



Top 10 Funds by Growth Score

Ticker	Name	AUM	Growth Rating (0-5)
MAKX	ProShares S&P Kensho Smart Factories ETF	\$0.93M	4.22
SHLD	Global X Defense Tech ETF	\$39.13M	4.21
ARKX	ARK Space Exploration & Innovation ETF	\$248.17M	4.17
ROBT	First Trust Nasdaq Artificial Intelligence & Robotics ETF	\$557.18M	4.06
IRBO	iShares Robotics and Artificial Intelligence Multisector E..	\$673.54M	4.04
FITE	SPDR S&P Kensho Future Security ETF	\$56.48M	3.91
VCAR	Simplify Volt RoboCar Disruption and Tech ETF	\$5.23M	3.81
PRNT	3D Printing ETF	\$133.72M	3.73
UFO	Procore Space ETF	\$35.15M	3.54
IQM	Franklin Intelligent Machines Fund Franklin Intelligent M..	\$20.46M	3.38

*Fund count for composition and fundamentals excludes funds with no recent holdings date (ie: ETNs)

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Appendix: Category Funds



As of 3/31/2024

Appendix: Top Category Funds 1-50 By AUM

Ticker	Name	Inception	AUM	1 Month	3 Month	YTD	1 Year	3 Year*	5 Year*
BOTZ	Global X Robotics & Artificial Intelligence ETF	9/12/2016	\$2,865M	2.02%	11.61%	11.61%	28.37%	-0.77%	10.01%
ROBO	ROBO Global Robotics & Automation Index ETF	10/22/2013	\$1,353M	2.14%	2.34%	2.34%	9.99%	-2.04%	8.82%
ARKQ	ARK Autonomous Technology & Robotics ETF	9/30/2014	\$882M	0.66%	-5.18%	-5.18%	12.27%	-11.85%	10.32%
IRBO	iShares Robotics and Artificial Intelligence Multisector ETF	6/26/2018	\$674M	0.97%	-0.43%	-0.43%	14.19%	-5.53%	8.09%
DRIV	Global X Autonomous & Electric Vehicles ETF	4/13/2018	\$604M	2.28%	0.12%	0.12%	8.07%	-0.60%	14.41%
ROBT	First Trust Nasdaq Artificial Intelligence & Robotics ETF	2/21/2018	\$557M	-0.92%	-0.64%	-0.64%	10.20%	-3.92%	7.52%
IDRV	iShares Self-driving EV & Tech ETF	4/16/2019	\$260M	-3.17%	-12.03%	-12.03%	-14.47%	-9.87%	
ARKX	ARK Space Exploration & Innovation ETF	3/30/2021	\$248M	3.25%	-3.05%	-3.05%	9.13%	0.00%	
PRNT	3D Printing ETF	7/19/2016	\$134M	3.81%	-2.36%	-2.36%	2.73%	-15.27%	0.49%
FBOT	Fidelity Disruptive Automation ETF	6/12/2023	\$109M	2.72%	5.95%	5.95%			
KARS	KraneShares Electric Vehicles & Future Mobility Index ETF	1/18/2018	\$105M	-0.62%	-12.61%	-12.61%	-24.69%	-15.69%	3.75%
FITE	SPDR S&P Kensho Future Security ETF	12/26/2017	\$56M	0.40%	4.00%	4.00%	27.32%	6.60%	10.96%
SHLD	Global X Defense Tech ETF	9/11/2023	\$39M	6.21%	19.17%	19.17%			
HAIL	SPDR S&P Kensho Smart Mobility ETF	12/26/2017	\$39M	2.45%	-4.38%	-4.38%	-0.80%	-18.53%	3.53%
CARZ	First Trust NASDAQ Global Auto Index Fund	5/9/2011	\$38M	1.82%	3.46%	3.46%	19.98%	3.31%	14.44%
FDRV	Fidelity Electric Vehicles and Future Transportation ETF	10/5/2021	\$38M	-1.50%	-15.09%	-15.09%	-20.19%		
UFO	Procore Space ETF	4/11/2019	\$35M	1.01%	-8.79%	-8.79%	-7.30%	-13.94%	
IQM	Franklin Intelligent Machines Fund Franklin Intelligent Machines Fund	2/25/2020	\$20M	2.51%	14.47%	14.47%	35.92%	11.76%	
ROKT	SPDR S&P Kensho Final Frontiers ETF	10/22/2018	\$17M	2.19%	0.45%	0.45%	12.36%	4.55%	9.20%
MOTO	SmartETFs Smart Transportation & Technology ETF	11/15/2019	\$11M	3.69%	4.60%	4.60%	14.46%	2.63%	
IBOT	Vaneck Robotics ETF	4/5/2023	\$10M	2.49%	10.78%	10.78%			
CLNR	IQ Cleaner Transport ETF	10/21/2021	\$6M	2.69%	2.83%	2.83%	15.92%		
VCAR	Simplify Volt RoboCar Disruption and Tech ETF	12/28/2020	\$5M	-0.19%	9.67%	9.67%	35.98%	-1.58%	
GAST	Gabelli Automation ETF	1/5/2022	\$5M	5.48%	8.02%	8.02%	22.93%		
BULD	Pacer BlueStar Engineering the Future ETF	5/4/2022	\$1M	0.68%	6.87%	6.87%	19.37%		
MAKX	ProShares S&P Kensho Smart Factories ETF	9/29/2021	\$1M	1.56%	0.90%	0.90%	12.13%		

*Annualized performance. Returns based on market price.

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ETF Action's model portfolio tools and any reports generated by these tools may illustrate or compare the hypothetical historical performance of a current and/or proposed model portfolio, blended model portfolio or both. While the specific securities/investments held in the model portfolios have actual performance, the combination of these investments in a model portfolio based on the model sponsor and/or your input is new and, therefore, that combination may not have an actual performance record.

The historical returns presented include all items of dividends and interest net of fees unless otherwise stated. Model portfolio and blended model portfolio analysis utilizes position data provided by the model sponsor and/or the user back to the initial asset allocation date provided. There is no guarantee that these hypothetical returns could or would have been achieved had this asset allocation or model portfolio been used during the years presented. Results shown are provided for illustrative purposes only. Past performance is not indicative of future results.

Performance data are based on actual returns of the investment strategies and securities in the portfolio and are provided for illustrative purposes only. Data and performance may be limited due to lack of published performance data either by the issuer or investment manager, or the availability of such data sources to FactSet. Aggregated data and average performance figures are calculated as simple averages of all funds that existed at that point in time for a specific category. All funds currently classified within a category will contribute to average historical performance figures such that a survivorship bias may be present for average category performance figures.

Past performance is not an indicator of future performance. The model portfolio and blended model portfolio returns presented are calculated based on historical investment position data provided by the model sponsor and/or user. The returns do not reflect the actual trading of any account or group of accounts and are thereby hypothetical in nature. Model position changes are implemented using closing prices on position date provided unless otherwise stated and the returns reflect the reinvestment of dividends and interest. The impact of fund fees held in the model portfolios is reflected in the returns for all periods presented. Model portfolio returns shown are net of fees provided by model sponsor and/or user and are prominently displayed in each model portfolio.

ASSET CLASS DEFINITIONS & RISK DISCLOSURES:

US Equities include stocks listed in the United States, including small-cap and mid-cap equities, Master Limited Partnerships (MLPs), Real Estate Investment Trusts (REITs), and alternative equity securities, including covered call ETFs and hedged ETFs or ETFs that make use of derivatives. Stocks represent partial ownership of a corporation. If the corporation does well, its value can increase, and investors can share in the appreciation. However, if it goes bankrupt, or performs poorly, investors can lose their entire initial investment (i.e., the stock price can go to zero). MLP investing includes risks such as equity- and commodity-like volatility. Also, distribution payouts sometimes include the return of principal and, in these instances, references to these payouts as "dividends" or "yields" may be inaccurate and may overstate the profitability/success of the MLP. There are potentially complex and adverse tax consequences associated with investing in MLPs. There are special risks associated with an investment in real estate and REITs, including credit risk, interest rate fluctuations and the impact of varied economic conditions. A covered call option involves holding a long position in a particular asset, in this case US common equities, and writing a call option on that same asset with the goal of realizing additional income from the option premium. Certain ETFs use a covered call strategy. By selling covered call options, the fund limits its opportunity to profit from an increase in the price of the underlying index above the exercise price but continues to bear the risk of a decline in the index. Using a hedge or a hedged product does not insulate the portfolio against losses.

Global equities are equities that span across both developed countries and emerging markets. Investments in international and emerging markets securities include exposure to risks such as currency fluctuations, foreign taxes and regulations, and the potential for illiquid markets and political instability.

International Equities are equities that span across both developed countries and emerging markets, excluding U.S. equities. Investments in international and emerging markets securities include exposure to risks such as currency fluctuations, foreign taxes and regulations, and the potential for illiquid markets and political instability.

Developed international equities are large cap and mid cap equities in developed countries excluding the U.S. and Canada. International investments involve greater risks than U.S. investments, and can decline significantly in response to adverse issuer, political, regulatory, market, and economic risks.

Emerging market equities are large cap and mid cap equities in emerging market countries. Emerging market countries are countries with economies that are considered rapidly expanding and engaging aggressively in global markets. In addition to the risks associated with all international investing, inflation and rapid fluctuations in inflation rates have had, and may continue to have, negative effects on the economies and securities markets of certain emerging market countries.

Investment grade fixed income securities include broad fixed income, corporate securities, municipal bonds, treasuries, and mortgage backed securities (MBS). Investment grade securities are believed to be at less risk of default and rated higher by the credit rating agencies. In general, the bond market is volatile, and fixed income securities carry interest rate risk. (As interest rates rise, bond prices usually fall, and vice versa). This effect is usually more pronounced for longer-term securities.

Fixed income securities also carry inflation risk, liquidity risk, call risk and credit and default risks for both issuers and counterparties. The municipal market can be affected by adverse tax, legislative, or political changes, and by the financial condition of the issuers of municipal securities. MBS are subject to prepayment and extension risk; as such, they react differently to changes in interest rates than other bonds. Small movements in interest rates may quickly and significantly reduce the value of certain MBS.

Alternative fixed income asset class includes high yield, preferreds, bank loans, currency funds, developed non-US debt, emerging market debt, TIPS, and floaters. Lower-quality fixed income securities found in this category involve greater risk of default or price changes due to potential changes in the credit quality of the issuer. Any fixed-income security sold or redeemed prior to maturity may be subject to loss. Additionally, non-US/emerging market debt assumes the same risks as international investing.

Cash & Equivalents include direct cash positions and underlying cash positions within fund positions within a model. This also includes money market funds that may be held by the model or underlying positions.

Unassigned designations are used for positions that include options, commodities contracts, or other derivatives, and may not have composition data available.

Commodities include securities that tract bulk goods and raw materials, such as grains, metals, livestock, oil, cotton, coffee, sugar, and cocoa, that are used to produce consumer products. Buying commodities allows for a source of diversification for those sophisticated persons who wish to add this asset class to their portfolios and who are prepared to assume the risks inherent in the commodities market. Any commodity purchase represents a transaction in a non-income-producing asset and is highly speculative. Therefore, commodities should not represent a significant portion of an individual's portfolio.

Alternatives are securities that are typically less or inversely correlated with Equities and Fixed Income such as Index Volatility ETFs. Alternative investments are often non income producing and highly speculative. Therefore, alternative investments should not represent a significant portion of an individual's portfolio.

Dividends are not guaranteed and are subject to change or elimination.

ETFs are subject to substantially the same risks as those associated with the direct ownership of the underlying securities owned by the ETF. Additionally, the value of the investment will fluctuate in response to the performance of the underlying index or securities. ETFs typically charge therefore, investments in ETFs will result in the layering of expenses.

DEFINITIONS:

Acquired Fund Fees is the weighted average of the expense ratios of all model holdings.

Distribution yield refers to the percentage of income a portfolio has distributed to investors over the last 12 months. At the model level, this is calculated as a weighted average of TTM yield for all model holdings. This is based on fund and/or stock distributions, and is not a look-through calculation.

Geometric return is a measure of the compound rate of growth in a portfolio. This method eliminates the distorting effects created by inflows of new money. This is also called the 'geometric mean return,' as the reinvestment is captured by using the geometric total and mean, rather than the arithmetic total and mean. It is assumed that all cash distributions are reinvested in the portfolio and the exact same periods are used for comparisons. The difference between the two return measures is caused by volatility. The more volatile the asset class, the bigger the difference between its geometric and average annual returns. The geometric mean return is typically lower than the arithmetic mean return.

Pure gross returns are calculated before the deduction of advisory fees, trading expenses and other fees. Net of fees performance reflects the deduction of the advisory fees charged to the client, trading expenses, and other costs associated with investments made by the client. Returns do not include the reinvestment of dividends.

Standard deviation is a measure of the dispersion of a set of data from its mean. The more spread apart the data is, the higher the deviation. Calculated using monthly returns.

Alpha refers to the performance differential between a specific investment and that of the investment's beta multiplied by its benchmark. It isolates the portion of total return not accredited to movement in the broader market. Calculated using monthly returns.

Beta is a measure of the volatility—or systematic risk—of a security or portfolio compared to its relative benchmark. Securities with betas higher than 1.0 can be interpreted as more volatile relative to movements in the market benchmark while securities with a beta less than 1.0 can be interpreted as less volatile relative to movements in the market benchmark. Calculated using monthly returns.

The Sharpe ratio is the average return earned in excess of the risk-free rate per unit of volatility or total risk. Volatility is a measure of the price fluctuations of an asset or portfolio. Calculated using monthly returns.

The correlation coefficient is a statistical measure of the strength of the relationship between the relative movements of two variables. The values range between -1.0 and 1.0. A calculated number greater than 1.0 or less than -1.0 means that there was an error in the correlation measurement. A correlation of -1.0 shows a perfect negative correlation, while a correlation of 1.0 shows a perfect positive correlation. A correlation of 0.0 shows no linear relationship between the movement of the two variables. Calculated using monthly returns.

R-squared (R2) is a statistical measure that represents the proportion of the variance for a dependent variable that's explained by an independent variable or variables in a regression model. Calculated using monthly returns.

Tracking error is the divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark. This is often in the context of a hedge fund, mutual fund, or exchange-traded fund (ETF) that did not work as effectively as intended, creating an unexpected profit or loss. Tracking error is reported as a standard deviation percentage difference, which reports the difference between the return an investor receives and that of the benchmark they were attempting to imitate. Calculated using monthly returns.

The upside capture ratio measures an investment manager's relative performance during bull markets. The ratio is calculated by comparing the manager's returns in up-markets with that of a benchmark. Calculated using monthly returns.

The down-market capture ratio is a statistical measure of an investment manager's overall performance in down-markets. It is used to evaluate how well an investment manager performed relative to an index during periods when that index has dropped. The ratio is calculated by dividing the manager's returns by the returns of the index during the down-market and multiplying that factor by 100. Calculated using monthly returns.

A drawdown refers to how much an investment or trading account is down from the peak before it recovers back to the peak. Drawdowns are typically quoted as a percentage, but dollar terms may also be used if applicable for a specific trader. Drawdowns are a measure of downside volatility. Calculated using monthly returns.

Market capitalization is the sum of the total value of a company's outstanding shares multiplied by the price of one share. With a weighted average market capitalization, components that have a higher market cap have more influence because they constitute a higher percentage in the index; those with smaller caps have less influence.

The Price/Earnings Ratio or P/E Ratio is a valuation metric that assesses how many dollars investors are willing to pay for one dollar of a company's earnings. It's calculated by dividing a stock's price by the company's trailing 12-month earnings per share from continuous operations. Negative P/E ratios are excluded. Calculated using weighted harmonic average.

The forward (or leading) P/E uses future earnings guidance rather than trailing figures. Negative P/E ratios are excluded. Calculated using weighted harmonic average.

The Price/Sale (P/S) ratio is a stock's current price divided by the company's trailing 12-month sales per share. This represents the weighted average of the price/sales ratios of the stocks in a fund's portfolio. Price/sales represents the amount an investor is willing to pay for a dollar generated from a particular company's operations. Calculated using weighted harmonic average.

The forward (or leading) P/S uses future sales estimates rather than trailing figures. Calculated using weighted harmonic average.

The price/book (P/B) ratio of a fund is the weighted average of the price/book ratios of all the stocks in a fund's portfolio. Book value is the total assets of a company, less total liabilities (sometimes referred to as carrying value). A company's book value is calculated by dividing the market price of its outstanding stock by the company's book value, and then adjusting for the number of shares outstanding (Stocks with negative book values are excluded from this calculation.). Calculated using weighted harmonic average.

The price-to-cash flow (P/CF) ratio is a stock valuation indicator or multiple that measures the value of a stock's price relative to its operating cash flow per share over the trailing twelve months. The ratio uses operating cash flow (OCF), which adds back non-cash expenses such as depreciation and amortization to net income. Calculated using weighted harmonic average.

Price to free cash flow is an equity valuation metric used to compare a company's per-share market price to its per-share amount of free cash flow (FCF) over the trailing twelve months. This metric is very similar to the valuation metric of price to cash flow but is considered a more exact measure, owing to the fact that it uses free cash flow, which subtracts capital expenditures (CAPEX) from a company's total operating cash flow, thereby reflecting the actual cash flow available to fund non-asset-related growth. Negative P/E ratios are excluded. Calculated using weighted harmonic average.

The price/earnings to growth ratio (PEG ratio) is a stock's price-to-earnings (P/E) ratio divided by the growth rate of its earnings for a specified time period (NTM - next twelve months). The PEG ratio is used to determine a stock's value while also factoring in the company's expected earnings growth, and it is thought to provide a more complete picture than the more standard P/E ratio. Calculated using weighted harmonic average.

The dividend yield, expressed as a percentage, is a financial ratio (dividend/price) that shows how much a company pays out in dividends each year relative to its stock price. Unless otherwise stated, dividend yield takes the distributions over the trailing 12 months divided by the price on the as of date. Note that the dividend yield is a look through of all funds and securities to underlying holdings, and may not reflect what the fund or model actually distributes. Calculated using weighted harmonic average.

Gross margin is a ratio that equates to net sales minus the cost of goods sold divided by net sales. The gross margin shows the ratio of profit made before deducting selling, general, and administrative (SG&A) costs. Calculated using weighted average.

The net margin is a measure of profitability. It is equal to annual net income divided by revenues over the trailing 12 months. The resulting figure is then multiplied by 100. Calculated using weighted average.

Return on equity (ROE) is the percentage a company earns on its total equity in a given year. ROE shows how much profit a company generates on the money shareholders have invested in the firm. Calculated using weighted average.

Return on assets (ROA) is the percentage a company earns on its assets in a given year (Year 1, 2, etc.). The calculation is net income divided by end-of-year total assets. The resulting figure is then multiplied by 100. For a mutual fund, ROA represents a weighted median figure such that approximately 50% of the domestic stocks in the portfolio will have a greater ROA and roughly 50% of these domestic stocks will have a lower ROA than the weighted median. Calculated using weighted average.

Return on invested capital (ROIC) is the percentage of money a company earns that is above the average cost it pays for its debt and equity capital. Calculated using weighted average.

The interest coverage ratio is a debt and profitability ratio used to determine how easily a company can pay interest on its outstanding debt. The interest coverage ratio is calculated by dividing a company's earnings before interest and taxes (EBIT) by its interest expense during a given period. Calculated using weighted average.

The debt-to-equity (D/E) ratio is used to evaluate a company's financial leverage and is calculated by dividing a company's total liabilities by its shareholder equity. Calculated using weighted average.

The payout ratio, also known as the dividend payout ratio, shows the percentage of a company's earnings paid out as dividends to shareholders over the trailing twelve months. Calculated using weighted average.

Per share growth metrics calculate the growth metrics over the trailing twelve months (TTM) or estimated growth metrics over the next twelve months (NTM) for Earnings, Sales, Cash Flow, Free Cash Flow, Book Value, and Dividends. Calculated using weighted median.

Long-Term earnings (LT Earnings) calculates the growth in earnings per share over longer time horizons (5 years). Calculated using weighted median.

The coupon rate is calculated by weighting each bond's coupon by its relative size in the portfolio. It indicates whether the underlying fund owns more high- or low-coupon bonds. There can be advantages to holding higher coupon bonds, but many funds buy them simply to tempt investors with a high payout. This can be damaging to investors for two reasons. The first is that higher-coupon bonds often carry greater risk than lower-coupon issues. The second is that when these bonds don't carry extra risk, they are old issues that the fund has paid up for and if the offering doesn't amortize the extra yield, investors are likely to find that their principal erodes over time. Calculated using weighted average.

Effective duration is a measure of a fund's interest-rate sensitivity; the longer a fund's duration, the more sensitive the fund is to shifts in interest rates. Duration is determined by a formula that includes coupon rates and bond maturities. Small coupons tend to increase duration, while shorter maturities and higher coupons shorten duration. The relationship between funds with different durations is straightforward: A fund with a duration of 10 years is twice as volatile as a fund with a five-year duration. Calculated using weighted average.

Modified Duration expresses the measurable change in the value of a security in response to a change in interest rates. Calculated using weighted average.

Average effective maturity is a weighted average of all the maturities of the bonds in a portfolio, computed by weighting each bond's effective maturity by the market value of the security. Average effective maturity takes into consideration all mortgage prepayments, puts, and adjustable coupons. Longer-maturity funds are generally considered more interest-rate sensitive than their shorter counterparts. We list Average Effective Maturity for Taxable Fixed-Income and Hybrid funds and Average Nominal Maturity for Municipal Bond Funds. Since this is collected by survey, it is important to bear in mind that different fund companies may use different interest-rate assumptions in determining call likelihood and timing. Generally speaking, the longer the maturity, the greater the interest rate risk. When duration is unavailable, this is used in the calculation of the fixed income style box. Calculated using weighted average.

Yield to Maturity: is the holding weighted average yield of all applicable holdings within a portfolio. Yield is a measure of the expected rate of return. Calculation of yield to maturity of a security ignores the impact of options such as a call or put feature. Calculated using weighted average.

Yield to worst is calculated on all possible call dates. It is assumed that prepayment occurs if the bond has call or put provisions and the issuer can offer a lower coupon rate based on current market rates. If market rates are higher than the current yield of a bond, the yield to worst calculation will assume no prepayments are made, and yield to worst will equal the yield to maturity.

The assumption is made that prevailing rates are static when making the calculation. The yield to worst will be the lowest of yield to maturity or yield to call (if the bond has prepayment provisions); yield to worst may be the same as yield to maturity but never higher. Calculated using weighted average.

Convexity demonstrates how the duration of a bond changes as the interest rate changes. If a bond's duration increases as yields increase, the bond is said to have negative convexity. If a bond's duration rises and yields fall, the bond is said to have positive convexity. Calculated using weighted average.

Key rate duration measures how the value of a debt security or a debt instrument portfolio, generally bonds, changes at a specific maturity point along the entirety of the yield curve. When keeping other maturities constant, the key rate duration is used to measure the sensitivity in a debt security's price to a 1% change in yield for a specific maturity.

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