Quant

Aurum

Quant deep dive

12-month review to August 2022

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In summary

- Quant funds generated an average return of 12.8% in the 12 months to August 2022.
- Strategy AUM has grown by \$42.8bn, net profits contributed \$47.8bn of this growth and net outflows were \$5.0bn.
- Quant macro was the strongest performing quant sub-strategy, generating an average return of 20.6%.
- Statistical arbitrage had the lowest standard deviation amongst the quant sub-strategies and suffered only one negative month in the period.

All figures and charts use asset weighted net returns unless otherwise stated. All Hedge Fund data is sourced from Aurum Hedge Fund Data Engine. For definitions on how the Strategies and Sub-Strategies are defined please refer to <u>https://www.aurum.com/hedge-fund-strategy-definitions/</u>, and for information on index methodology, weighting and composition please refer to <u>https://www.aurum.com/aurum-strategy-engine/</u>

MASTER STRATEGY vs INDICES NET RETURN



SUB-STRATEGY NET RETURN (1 YR)



STANDARD DEVIATION (1 YR)









^{*}HF Composite = Aurum Hedge Fund Data Engine Asset Weighted Composite Index. **Bonds = S&P Global Developed Aggregate Ex Collateralized Bond (USD). ***Equities = S&P Global BMI.

Performance

Quant has exhibited exceptional positive performance over the 12 months to August 2022, delivering an average return of 12.8%. The strategy was positive for 9 of those 12 months, with the worst monthly drawdown in July 2022 when the master strategy was down 2.1%. The best monthly return for the period was 3.9% followed closely by 3.7% in March 2022 and April 2022 respectively.

The second largest strategy monitored by Aurum's Hedge Fund Data Engine by AUM is quant, accounting for \$445bn out of \$3,143bn combined AUM monitored as at August 2022. The quant master strategy AUM over the period grew by \$42.8bn; the growth was primarily due to net profits of \$47.8bn with net outflows of \$5.0bn, while the total number of quant funds monitored decreased by seven funds from 483 funds to 476 funds. At a sub-strategy level, the variance in observable funds were -6 funds across CTA, -5 in risk premia, -3 in quant equity market neutral and +7 in statistical arbitrage.

In terms of performance, quant was the best performer of all the hedge fund strategies observed in the 12 months to August 2022. All sub-strategies apart from risk premia had positive performance over the review period. It should be noted that there was a high level of performance dispersion between the top and bottom performing sub-strategies, ranging from -3.7% for risk premia to +20.6% for quant macro.

At the sub-strategy level, quant macro, CTA and statistical arbitrage outperformed, while risk premia and quant equity market neutral were more challenged. Both quant macro and CTA were well positioned for rising inflationary pressures through long positions in commodities, US dollar, and short fixed income. Statistical arbitrage benefited from elevated intra-month stock volatility and increased cross-sectional dispersion.

Net Performance	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	YTD	1 YR
Quant	0.1%	1.2%	-1.2%	2.6%	0.9%	0.7%	3. 9 %	3.7%	-0.4%	1.3%	-2.1%	1.5%	9 <mark>.9</mark> %	12.8%
Quant Macro	1.7%	0.4%	-1.4%	2.8%	2.8%	0.5%	4.0%	6.2%	-0.6%	3.4%	-3.9%	3.4%	1 <mark>6.5%</mark>	2 <mark>0</mark> .6%
СТА	-0.1%	2.6%	-3.2%	0.9%	0.7%	2.3%	6.6%	4.5%	-0.2%	1.3%	-3.0%	2.7%	1 <mark>5.6%</mark>	1 <mark>5.9%</mark>
Stat Arb	1.7%	0.1%	1.1%	1.2%	1.5%	0.3%	2.1%	1.8%	-0.5%	1.2%	1.1%	1.4%	9.0%	1 <mark>3.5</mark> %
Quant EMN	-2.3%	1.1%	0.3%	6.1%	-1.3%	-1.0%	2.5%	1.9%	-1.3%	1.4%	-1.6%	-3.1%	-2.6%	2.4%
Risk Premia	-2.0%	0.6%	0.2%	3.3%	-0.4%	-0.1%	0.0%	-1.1%	1.0%	-4.9%	2.5%	-2.7%	-5.6%	-3.7%
HF Composite*	-0.1%	1.1%	-1.2%	1.0%	-1.6%	-0.4%	0.9%	-0.6%	-1.0%	-1.7%	1.1%	0.6%	- <mark>2</mark> .7%	-1.9%
Bonds**	-1.9%	-0.3%	-0.5%	-0.2%	-2.3%	-1.3%	-2.9%	-5.6%	0.2%	-3.3%	1.9%	-3.9%	<mark>-16</mark> .1%	<mark>-18</mark> .6%
Equities***	-4.1%	4.6%	-2.9%	3.8%	-5.3%	-2.4%	1.7%	-8.1%	-0.2%	-8.7%	6.9%	-3.6%	<mark>-19</mark> .0%	<mark>-18</mark> .0%

NET RETURN OF MASTER AND SUB STRATEGIES (1 YR)

Sub-strategy performance

Quant macro was the strongest performing quant sub-strategy generating an asset weighted average net return of 20.6%. The strategy recovered from their worst 12-month rolling performance over five years of -7.5% in July 2020. Quant macro has benefited from global inflationary pressures that have driven the Fed and other central banks to end their accommodative monetary policy. The sub-strategy has profited from long positions in energy, US dollar and short fixed income. CTA is the second best performing quant sub-strategy, benefitting from very similar positioning to quant macro as reflected by having very similar monthly return distributions over the trailing 12 months.

Risk premia – the worst performing quant sub-strategy – generated a return of -3.7%. These losses, even though they are relatively modest when compared with equity markets, are harmful for a sub-strategy that has struggled to deliver meaningful returns over 10 years. Most of the recent losses can be attributable to bond carry trades, which tend to exhibit a net long duration risk. Long positioning in fixed income underperformed as prices fell and yields rose resulting from a tightening monetary policy from central banks, elevated inflation levels and declining appetite for fixed income.

Statistical arbitrage was the most consistent strategy with a 12 month standard deviation of only 2.7% with 11 out of 12 months delivering positive returns and the only down month detracting 0.5%. When viewing statistical arbitrage on a risk adjusted basis, it has delivered a Sharpe ratio of 2.17 over 3 years, significantly outperforming the quant master strategy that has a Sharpe ratio of 0.63.



Longer term performance

Analysing the sub-strategies' performance over several time horizons provides a comprehensive overview of performance across business cycles. When extending the look back period to three years, five years and ten years, statistical arbitrage consistently outperforms the other sub-strategies (page 11). While quant macro has outperformed the broader hedge fund universe more recently, its performance over ten years was less impressive. The long-term underperformance of risk premia reflects on its low level of excess returns from specific risk across the quant universe.

Alpha extraction

The standout performing sub-strategy when evaluating the alpha/beta decomposition for each of the sub-strategies relative to global equities is statistical arbitrage. Since January 2013, only 2% of the cumulative dollars generated within the statistical arbitrage strategy are attributable to beta. On the other hand, most of the gains are attributable to alpha (page 10). The high proportion of alpha gains is understandable given the strategy's low net equity exposure and trading style.

Risk premia has the lowest alpha contribution across the sub-strategies within quant, and predictably has a high level of negative alpha since January 2013 (page 10). The sub-strategy experienced a material drawdown in March 2020 resulting in negative PnL attributable from both alpha and beta and since then it has not been able to recover.

Performance dispersion

The rolling 12 month net interdecile performance spread across the quant strategy has expanded to the highest level it has been since December 2014 at 40%, up from a low of 18% in July 2018. The increased dispersion is a reflection on the increased market volatility, strategy divergence and intra-sub-strategy dispersion.

The sub-strategy with the largest dispersion over the last 12 months has been risk premia, which has also underperformed relative to the quant strategy and broader hedge fund universe. Quant equity market neutral has the tightest dispersion at 24% and historically this has ranged from 14% to 35%. Given the high level of intra-strategy dispersion within quant, the potential rewards from picking high quality managers within quant is extremely compelling.

Assets and flows

Quant, the second largest strategy tracked by Aurum managed \$445 billion at the end of August 2022 (<u>page 17</u>), representing 14% of the

10th – 90th PERCENTILE 12M ROLLING NET PERFORMANCE SPREAD



assets managed by the broader hedge fund universe tracked by Aurum. The largest sub-strategy by number of funds and assets under management was CTA, representing 34% of quant assets and 51% of quant managers. The average assets managed by a fund ranged from \$620 million in CTA to \$2.1 billion in Quant Macro.

Net assets increased in quant by \$42.8bn over the prevailing 12 months, with net increases coming from quant macro, CTA and statistical arbitrage. The vast majority of the rise in quant strategy assets came from performance as expected given the strategy gained 12.8% during the last 12 months. Risk premia and quant EMN saw significant investor outflows, while CTAs and quant macro saw material inflows relative to recent years.

Terms

On average, quant offers the best liquidity terms, with the median liquidity terms being monthly with five days' notice. Unsurprisingly the weighted average redemption days is 52, implying that funds with greater assets have more onerous liquidity terms than smaller funds. The most illiquid terms, based on the weighted average comes from statistical arbitrage, not surprising given the stronger long-term performance of the strategy.

The weighted average management fee for quant is 1.6%, ranging from a low of 0.7% for risk premia to a high of 2.5% for statistical arbitrage. It is not surprising that the average management fee is materially lower for risk premia than it is for other quant sub-strategies. The weighted average performance fee for quant is 17.6%, with sub-strategy fees ranging from a low of 6.3% for risk premia to a high of 24.1% for statistical arbitrage (<u>page 19</u>).

NET MONTHLY RETURN (5 YR)





NET RETURN (ANNUALISED)



VOLATILITY (ANNUALISED)



MASTER STRATEGY NET ANNUALISED RETURNS



MULTIPLE PERIOD - HIERARCHICAL ANNUALISED NET RETURN

1 YEAR	3 YEAR	5 YEAR	10 YEAR
Quant	Multi-Strategy	Multi-Strategy	Multi-Strategy
12.8%	12.0%	9.2%	8.3%
Multi-Strategy	Event	Event	Event
10.9%	7.5%	6.2%	6.2%
Arbitrage	Arbitrage	HF Composite*	Equity L/S
4.2%	6.5%	4.7%	5.5%
Macro	HF Composite*	Arbitrage	HF Composite*
2.2%	5.5%	4.6%	4.8%
HF Composite*	Macro	Equity L/S	Credit
-1.9%	5.1%	4.3%	4.5%
Credit	Equity L/S	Long biased	Long biased
-2.2%	4.9%	4.1%	4.4%
Event	Long biased	Macro	Macro
-3.2%	4.5%	3.9%	3.4%
Equity L/S	Quant	Quant	Quant
-11.7%	4.4%	3.8%	3.3%
Long biased	Credit	Credit	Arbitrage
-12.8%	3.3%	3.5%	2.3%

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STRATEGY NET TOTAL RETURN VS ANNUALISED VOL (3 YR)



SHARPE RATIO BY HEDGE FUND STRATEGY (3 YR)*



<u>Aurum</u>

Source: Aurum Hedge Fund Data Engine, Bloomberg. *Risk Free Rate = period average of 3-month US Libor 1.12% 6 *HF Composite = Aurum Hedge Fund Data Engine Asset Weighted Composite Index. Equities = S&P Global BMI. Bonds = S&P Global Developed Aggregate Ex Collateralized Bond (USD).

STRATEGY BETA TO BONDS AND EQUITIES (3 YR)



MASTER STRATEGY - DECOMPOSING DOLLAR PERF. INTO ALPHA, BETA AND RISK FREE (RF) COMPONENTS



These charts decompose the Hedge Fund Composite dollar returns into beta, alpha and risk free ("Rf") components, as follows: alpha = actual return – Rf – beta * (market return – Rf).

Where Rf is the risk free rate as defined by a rolling 3m USD Libor, where market return is that of S&P Global BMI ('the market index') and where beta has been calculated with respect to each underlying fund observed on a 24m rolling basis to the market index. The monthly alpha, beta and Rf components are then applied to each underlying fund's dollar performance for a particular month, and then at a master strategy or industry level the individual fund dollar contributions are aggregated up.

For note, beta can be negative in certain cases, creating negative dollar attributions. These are offset by corresponding positive alpha contributions.



HF COMPOSITE* - DECOMPOSING DOLLAR PERF. INTO ALPHA, BETA AND RISK FREE (RF) COMPONENTS



SUB-STRATEGY - DECOMPOSING DOLLAR PERF. INTO ALPHA, BETA AND RISK FREE (RF) COMPONENTS



Quant Macro



Quant EMN



Stat Arb



Risk Premia



ROLLING 12 MONTH NET RETURN (5 YR)





CUMULATIVE NET RETURN (5 YR)



COMPOUND RETURN (ANNUALISED)

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Source: Aurum Hedge Fund Data Engine. The Hedge Fund Data Engine is a proprietary database maintained by Aurum Research Limited ("ARL") containing data on around 3,000 active hedge funds representing around \$3.1 trillion of assets as at June 2022. *HF Composite = Aurum Hedge Fund Data Engine Asset Weighted Composite Index. **Bonds = S&P Global Developed Aggregate Ex Collateralized Bond (USD). ***Equities = S&P Global BMI.

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CC-2 404.21 Dec.21 Jan-22





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tep.jj Waty May 22

" WI-22

AUS-22



Marizz APT-22 Way-22

SUB-STRATEGIES NET MONTHLY RETURN DISTRIBUTION

CTA

1417-22

141-22 AU0522

6%

4%

2% 0%

Jan 22

104.21 Dec.2

OCT-2 Sep. 2



SUB-STRATEGY NET RETURN (1 YR)





9%

6%

3%

0%

-3%

-6%

10%

5%

0%







SUB-STRATEGIES NET MONTHLY RETURN DISTRIBUTION





10th – 90th PERCENTILE 12M ROLLING PERFORMANCE SPREAD - SUB STRATEGY VS MASTER STRATEGY



10th – 90th PERCENTILE 12M ROLLING PERFORMANCE SPREAD



Quant Quant Macro

Quant EMN 45% 40% 35% 30% 25% 20% 15% Marins Marini Marill Marits Serits Marilo Septi Mar-18 Serie Mar-19 500,19 500,22 Series Sep. 14 500,00 Mar 20 500,20 Marizi Sep.2 Wat. 2 AUS 2

Quant Quant EMN

Aurum



Quant Stat Arb

Risk Premia



Assets, flows and fees

NUMBER OF FUNDS AND AUM BY SUB-STRATEGY



AUM OF MASTER STRATEGY - AUG 2022 (\$ BN)



SUB-STRATEGY FUND CONCENTRATION (\$ BN)



ASSETS UNDER MANAGEMENT BY LOCATION



MASTER STRATEGY ASSETS (5 YR)*





Risk Premia Quant EMN Stat Arb Quant Macro CTA \$-10 bn \$-5 bn \$0 bn \$5 bn \$10 bn \$15 bn \$20 bn \$25 bn \$30 bn P&L Net Flows 🔶 Net

12-MONTH CHANGE IN AUM BY SUB-STRATEGY

TERMS AND CONDITIONS

	Median redemption notice (days)	Median redemption frequency	Weighted avg. redemption total (days)¹	Weighted avg. management fee	Weighted avg. performance fee
Quant	5	Monthly	52	1.62%	17.60%
СТА	3	Weekly	34	1.34%	15.71%
Quant EMN	30	Monthly	75	1.32%	14.58%
Quant Macro	7	Monthly	30	1.97%	19.52%
Risk Premia	3	Daily	28	0.68%	6.29%
Stat Arb	30	Monthly	111	2.49%	24.14%

*Weighted Avg. Redemption Total (Days) is the weighted average of both redemptions notice days and redemption frequency days.

Definitions

Quant

Systematic strategies: Funds trade securities based strictly on the buy/sell decisions of computer algorithms. Quant strategies primarily fall into the following categories: Quantitative Equity Market Neutral, Statistical Arbitrage, Quant macro/GAA (Global Asset Allocation), CTA, and risk-premia.

Quant – CTA

CTAs (Commodity Trading Advisors) take primarily directional positions in index level or macro instruments, such as futures or FX contracts, in a systematic fashion. Technically, a CTA is a trader of futures contracts as defined by the CFTC and historically, there were many CTAs who were not systematic; such traders are more likely to be classified as 'Global Macro'. CTAs are typically extremely systematised with straight through processing from signal generation to execution. Many, but by no means all, CTAs are trend following (using historical prices to determine predictable 'trending patterns') buying into markets where prices are rising and selling where markets are falling. When rising markets slow down/stop rising, trend-followers typically reduce its position and will eventually reverse its position into a short position, which it will hold until the market starts to rally again. The strategy is known for running with profits and cutting losses. Other models used in CTAs may include carry, seasonality, mean reverting or pattern recognition systems, models driven by fundamental data or non-traditional data sources. Some CTAs can also trade very short-term signals driven by market microstructure anomalies and patterns.

Quant – Macro / GAA

GAA (Global Asset Allocation) is a systematic approach to Global Macro, with managers taking positions in global markets based on quantitative analysis, taking in information based primarily on economic data, but also incorporating price related information. The strategy is highly data and technology intensive. The positions tend to be relative value based, but they may also take directional positions in instruments such as futures, FX and baskets of equities, ETFs, swaps and other instruments. Signals may be arranged into relative value asset class models, cross asset class models / directional trades. Signals are also often classified under a number of factor headings: value, carry, momentum etc.

Quant – Statistical arbitrage

Statistical arbitrage funds typically take price data and its derivatives, such as correlation, volatility and other forms of market data, such as volume and order-book information to determine the existence of patterns. These patterns can help the manager forecast the future return of a stock, often over a relatively short timeframe. Typical signal types are: mean-reversion, momentum and event-driven. Mean-reversion looks to take advantage of the phenomenon of short-term price movements occurring due to supply/demand imbalances then moving back to an equilibrium level. Momentum models look for patterns in price data that suggest that price movements will be more persistent (i.e. trend). Other statistical arbitrage funds will look to incorporate more discrete information into their process from events (e.g. publishing of analyst earnings estimates, news flow, etc.). Whilst statistical arbitrage funds tend to focus more on 'technical' models, some may also incorporate some longer-term models that are driven by fundamental data (e.g. stock value models, growth, etc.), however, if these models are the more dominant driver of risk, then the fund is likely to be classified as Quantitative Equity Market Neutral. Statistical arbitrage funds are typically run with a very low level of beta and are market neutral, however, this may not always be the case, with some funds able to take significant directional risk; however, given the higher frequency trading nature of such funds, they are not expected to have significant correlation to markets over time.

Quant - Quant equity market neutral

Traditional QEMN strategies take fundamental data, such as analyst earnings estimates, balance sheet information and cash flow statement statistics, and systematically rank/score stocks against these metrics in varying proportions. The weights of the scores of the different fundamental data sources may be fixed or dynamic. Managers may construct a portfolio using an optimisation process or by applying simpler rules combined with risk constraints so as to create a portfolio that is dollar and/or beta neutral, and typically with minimal sector exposure. Traditional QEMN portfolios consists of exposure to: Value (looking for stocks mispriced relative to their fundamental value, e.g. based on P/E, P/B, cash flow, etc.); Quality (looking at metrics such as levels of debt, stability of earnings growth, balance sheet strength); momentum (looking at past returns over a pre-set timeframe ranging from days to months); however, these are common factors that are relatively easy to exploit/replicate - hence the proliferation of risk-premia products that operate in this space.

Quant – Risk premia

Hedge fund risk premia products typically seek to capture the fundamental insights of a class of hedge fund strategies (hedge fund risk premia / Alternative Risk Premia) along with a meaningful proportion of the expected returns those strategies can earn - using a dynamic but clearly defined process. Funds typically have exposure to a well-diversified portfolio of hedge-fund premia. Premia can cover everything from equity premia (Equity market neutral - trading across value, quality, growth and momentum factors, as well as EM premia), macro premia (e.g. trend following, or EM premia), to arbitrage strategies (e.g. risk arbitrage - holding a portfolio of merger targets diversified by sector and deal type; convertible arbitrage, etc.). The strategies are typically very well understood, backed up by academic research and implemented systematically.

Bond and equity indices

The S&P Global BMI and S&P Global Developed Aggregate Ex Collateralized Bond (USD) Total Return Index (the "S&P Indices") are products of S&P Dow Jones Indices LLC, its affiliates and/or their licensors and has been licensed for use by Aurum Research Limited. Copyright © 2021 S&P Dow Jones Indices LLC, its affiliates and/or their licensors. All rights reserved. Redistribution or reproduction in whole or in part are prohibited without written permission of S&P Dow Jones Indices LLC. For more information on any of S&P Dow Jones Indices LLC's indices please visit www.spdji.com. S&P® is a registered trademark of Standard & Poor's Financial Services LLC and Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC. Neither S&P Dow Jones Indices LLC, Dow Jones Trademark Holdings LLC, their affiliates nor their third party licensors make any representation or warranty, express or implied, as to the ability of any index to accurately represent the asset class or market sector that it purports to represent and neither S&P Dow Jones Indices LLC, their affiliates nor their third party licensors make any representation or warranty, express or implied, as to the ability of any index to accurately represent the asset class or market sector that it purports to represent and neither S&P Dow Jones Indices LLC, Dow Jones Trademark Holdings LLC, their affiliates nor their third party licensors shall have any liability for any errors, omissions, or interruptions of any index or the data included therein.

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Note regarding decomposition returns

Please note that the charts and figures which reference the decomposition of dollar performance into alpha, beta and risk free components only use data from January 2013, unlike other charts and figures which use data for the full 10 year period, namely August 2012. This variance in time period used to present data is due to there being insufficient data to accurately construct a decomposition for the period of August 2012 to December 2012.

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