ARDEN
ASSET MANAGEMENT LLC

CANTAB CORE MACRO

IC MANAGER FUNDING RECOMMENDATION MEMORANDUM

Updated September 2014

BACKGROUND INFORMATION	
Manager Name:	Cantab Capital Partners
Fund Name:	Cantab Capital Partners Core Macro Fund
Arden Strategy/ Sub-Strategy:	CTA
Coverage:	
Senior:	Ian McDonald
Primary:	Liang Simon Lai
Secondary:	John Sedlack III
Operational Due Diligence:	Arun Loomba
Date Submitted to IC:	September 3, 2014
Date Approved by IC:	September 3, 2014

FUND SNAPSHOT	
Inception Date:	January, 2013
Portfolio Manager (s):	Dr. Ewan Kirk
AUM ($):	
Fund:	$595 mn
Strategy:	$646 mn
Firm:	$3.1 bn

TERMS/OTHER	
Fees:	
Management Fee:	1.25% / 0.50%
Incentive Fee:	Zero / 10%
Liquidity Terms:	Daily with 3 days' notice
Gate (yes, no, %, type):	No
Side Pocket (yes, no, max %):	No
Side Letter (yes, no):	No
Regulatory Registration:	
SEC:	No
FCA:	Yes
Other (specify):	Cantab Capital Partners is registered with the CFTC and is a member of the NFA.
HedgeMark Approved (yes, no, other):	Yes

TABLE OF CONTENTS

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INVESTMENT REVIEW

SUMMARY OF INVESTMENT RANKINGS

Category	Score*
Overall outlook score	2
Return profile (right tail, left tail, core)	Core
Investment thesis: pros/cons/conclusion	2
Firm stability and background	2
Strength and quality of track record	2
Strength and quality of references	1
Transparency/HedgeMark	1.5

**Key: 1 (best) – 4 (worst)*

EXECUTIVE SUMMARY/RECOMMENDATION

Cantab Capital Partners was founded in 2006 by Ewan Kirk and Erich Schlaikjer. They previously worked together at Goldman Sachs in London, where Kirk ran the Goldman Sachs Strategies Group and was responsible for all of Goldman's quantitative technology, while Schlaikjer was European Chief Technology Officer of the Quantitative Strategies Group.

The Cantab Core Macro Fund is the firm's second fund. It is a CTA that employs two of the three strategies used in Cantab's flagship fund, the Cantab Capital Partners Quantitative Fund: momentum and value strategies. The third strategy in the flagship fund that is not included is the short-term trading strategy, which is highly capacity constrained and less scalable. Since the foundation of the firm, Cantab has had access to technology developed by Goldman Sachs.

The fund is approved for investment.

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INVESTMENT THESIS

INVESTMENT MERITS:

- The firm has had access to best-of-breed analytics software developed by Goldman Sachs since its foundation, which has given Cantab a higher caliber platform from which to develop sophisticated trading models, which benefits both the flagship fund and Core Macro Fund.
- The fund offers a scalable program (capacity is estimated at $25bn) which combines a broad suite of momentum and value strategies that trade across multiple markets.
    - The combination of momentum and value clusters provides differentiation and greater diversification
- Including backtested returns, Cantab Core Macro Fund has annualized at over 8.5% on a volatility of 10.5%.
    - The fund also has virtually zero correlation to equities, with correlation of 0.04 and beta of 0.03 to the S&P 500 Total Return Index, and most importantly, downside beta of -0.27 to the same index, illustrating its capability as a strong diversifier. However, the live track record of the fund since inception in January 2013 is less impressive, with an annualized return of around -1% with a volatility of over 10%
- Daily Liquidity and attractive fees:
    - Depending on the amount invested, fees range between 0.50% and 1.25% on the management side, and the performance fee is fixed at 10% except in the Leibniz class (for investments of over $100mn) which has a 1.25% management fee and no performance fee

KEY CONCERNS:

- The fund will be prone to occasional sharp drawdowns, as exemplified by performance in both May and June of 2013, when the fund lost 5.5% and 6.2%, respectively
    - The constant targeting of the fixed volatility of the portfolio can lead to highly levered exposures, which result in significant drawdown risk – though this has been addressed by a newly implemented “diversification volatility floor” model
- Given the struggles of the flagship fund over the same period, the firm’s reputation has suffered somewhat and Cantab has seen some significant asset outflows
- 2011 and 2012’s backtested returns were lackluster, albeit in an environment acknowledged as difficult for CTAs. Equally, the fund has struggled in performance terms since inception in January 2013, with an annualized return of -1% on volatility of 10%
- Cantab claims that the fund is a systematic macro fund that by design is expected to show lower correlation to traditional trend-following programs than such programs show to each other; however analysis on both the fund’s track record and backtests

show that the Core Macro Fund has still been highly correlated to mainstream trend-following CTAs
- From time to time the momentum and value clusters can become highly correlated (such as during the first half of 2014), which would reduce the diversification benefit of the combination of the two strategies

CONCLUSION

The Cantab Core Macro Fund offers the same sophisticated trading models as the flagship fund's momentum and value components. The program takes advantage of Cantab's ongoing research into investment strategies, risk management and execution systems. With daily liquidity and competitive fee options, the Cantab Core Macro Fund is a very attractive prospect compared to its peers and is a strong candidate as a "hybrid" systematic alternative beta strategy that aims to capture momentum and value risk premia, with more complex implementation with a blend of multiple models.

There are some concerns over the constant targeting of fixed volatility of the portfolio, which may result in highly levered exposures with significant drawdown risk. Since the launch of the fund, it has suffered a deep drawdown of 13%; one of the main causes was its highly levered bond carry and G10 FX trades in the value cluster in June 2013. This is slightly mitigated by the recently introduced volatility floor model, designed to avoid overleveraging low volatility assets.

Overall, Core Macro offers investors the opportunity to gain access to Cantab's models, analytics software and risk systems at discounted fees and with daily liquidity.

MANAGER/STRATEGY REVIEW & ANALYSIS

FIRM OVERVIEW/BACKGROUND

Cantab Capital Partners LLP is a quantitative hedge fund firm based in Cambridge, England, with a small office in London. The firm was founded in 2006 by Dr. Ewan Kirk and Erich Schlaikjer, who previously worked together at Goldman Sachs in London, where Kirk ran the Goldman Sachs Strategies Group and was responsible for all of Goldman's quantitative technology, while Schlaikjer was European Chief Technology Officer of the Quantitative Strategies Group. Cantab is owned by the two founders and five other partners, while Goldman Sachs also has a share of the partnership.

The firm consists of 49 employees, 31 of whom are fully dedicated to research, systems and trading. Cantab also has close ties to Cambridge University, with Professor Chris Rogers, who heads up the Quantitative Finance Group in the Statistical Laboratory of the University, advising Cantab on a consultancy basis.

Firm wide AUM now stands at \$3.1bn as of 30th June 2014, which has dropped from a peak of \$5.5bn as of April 2013. \$2.5bn is currently in the flagship Quantitative Fund (which had closed at \$4.75bn last year), with \$600mn in the Core Macro Fund. After the significant drawdown last year, plus the consequent client redemptions, the Quantitative Fund has now re-opened to new investors. The capacity is the same as previous closed level at around \$4.5bn.

The Cantab Core Macro Fund was launched in January 2013 after the flagship fund had closed due to capacity constraints. Core Macro was developed and created so that it would not be impacted by any such constraints, mainly by removing the capacity-constrained models (e.g. short-term trading models) and asset classes from the flagship fund.

The firm is continuing its two-stage plan to bring the technology infrastructure in-house from Goldman Sachs. The first stage was completed in 2012, and the final part is expected to be completed in 2015. Goldman Sachs retains a 9.9% stake in the firm.

A recent personnel change at the top-level; Chris Pugh, former COO and co-founder, left the firm in March 2014. Pugh decided to retire and spend more time with his family. He has been replaced by Fraser McIntyre, who joined Cantab in September 2013 as deputy COO from Meditor Capital Management. Pugh has continued to hold on to his partnership stake in the firm, though this will slowly decrease over time.

INVESTMENT STRATEGY

The Cantab Core Macro Fund employs a systematic CTA strategy. Cantab Core Macro uses many of the original models used in the CCP Quantitative Fund, but excludes those which are capacity constrained, for example short-term models such as those with time frames of between two and twenty days. The fund also moderates the flagship fund's aggressive hourly trading approach, focusing instead on signal flips, which reduces costs, and on value and momentum models. The fund will run with a 10% volatility target, and also offers investors low fees.

INVESTMENT PROCESS

Core Macro was conceived as a way of offering Cantab's expertise to investors without impinging on the capacity of their flagship fund, which, at the time of the Core Macro Fund's launch, had been reached. Cantab's approach was to adapt the flagship fund's strategy by removing all capacity-constrained models, asset classes and factors, as follows:

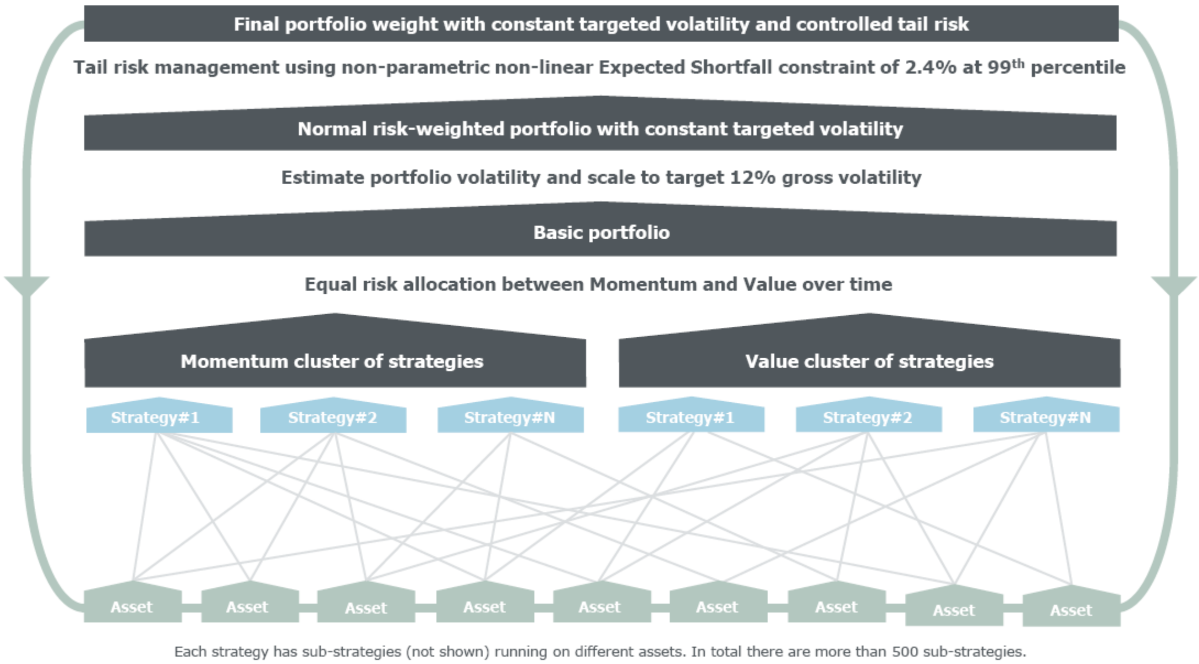
- Remove short-term models
- Reduce aggressiveness of volatility targeting process
- Reduce volatility target from 20% gross to 10% net (12% gross) to address the greater degree of noise associated with reduced aggressiveness
- Slow down the speed of trading: Core Macro still trades hourly but calibration points for trading signals are adjusted to slow down the speed of trading and lessen the market impact

Fundamentally, therefore, Core Macro offers its investors access to momentum and value models from the flagship CCP Quantitative Fund, with a different portfolio construction process given the smaller number of assets traded and models employed, and a lower volatility target. The fund’s two clusters of returns can be summarized as follows:

- **Medium-term trend following**. This encompasses four models implemented in different ways, with average holding periods of between 40 and 80 days, though the holding period may vary significantly between different markets/models. The models are standard pattern recognition models, which are relatively highly correlated, but the fact that there are four of them diversifies away model risk. The trend-following models run on all the markets Cantab trades (>100); risk is allocated based on the portfolio allocation model.
- **Value-oriented models.** This is not as simple as buying cheap stocks. The key is the portfolio algorithm, which results in an attractive source of return that is uncorrelated to the trend-following models. It offers relative value trades in FX, commodities, equities, bonds and short-term interest rates. There are four underlying models and each model is specific to an asset class. Typical trades include 1) 2yr vs. 10yr bond or bonds in different jurisdictions, 2) equity index with high dividend yield vs. low dividend yield, 3) FX carry, 4) commodity term structure/roll yield, etc. There is also a small component of a GTAA-like model that dynamically allocates across all asset classes. In their FX carry model in particular, instead of the typical high yielding currency vs low yielding currency approach, they also collect data from options to derive implied distribution and manage risk. For instance, AUD may be a strong buy due to its higher interest rate; however if the risk measure indicates that there is substantial downside risk, the model will reduce/unwind the position. They also trade developed market currencies and emerging market (EM) currencies in one basket; hence, there is a natural long EM FX bias within the portfolio. The value models performed well in 2011 and 2012 when the trend-following models struggled.

They do not use any fundamental or “econometric” factors (such as GDP forecasts or consumer sentiment indices) as inputs into their investment strategies. They base their research only on market data (prices, the difference in prices between assets, volatility surface, volume, etc.)

There are approximately 10-15 strategies that are applied to a diversified basket of assets, which results in more than 500 sub-strategies.



Source: Cantab

The portfolio trades hourly and the allocation to individual strategies, assets and specific markets changes dynamically, while the overall portfolio's volatility remains constant. The risk allocation to momentum and value clusters of investment strategies is broadly equal over time. This is based on their uncorrelated characteristics over the long term. However, while the value strategy's correlation properties tend to be more stable, the momentum strategy's correlation can vary over time.

While the fund retains a constant volatility target, previously there was a potential danger that the fund may be over levered if the two strategies were negatively correlated during any given time period. This was one of the main causes for the flagship fund's severe drawdown in May/June 2013, when the value and short term strategies became negatively correlated; in order to achieve the portfolio volatility target, both components were highly levered, and long EM FX exposures within the value (FX carry) strategy cost them dearly. Since then, Cantab has introduced a "diversification volatility floor" model, implemented at the end of summer 2013, which is designed to mitigate the skewing or the portfolio risk profile caused by wrongly forecasted correlation between trades as well as among clusters of strategies. This is a product of long-term research based on assets having a minimum believable volatility. Realized correlation among groups of strategies can be very different to its initial forecast. The dynamic of the “volatility floor” is applied when negative correlation is forecasted; in order to avoid over-gearing the positions, the model will deem the forecasted correlation to be zero (“the floor”). In this way, the fund uses that minimum level as the actual level to prevent the models from scaling up positions that potentially have offsetting volatility too much.

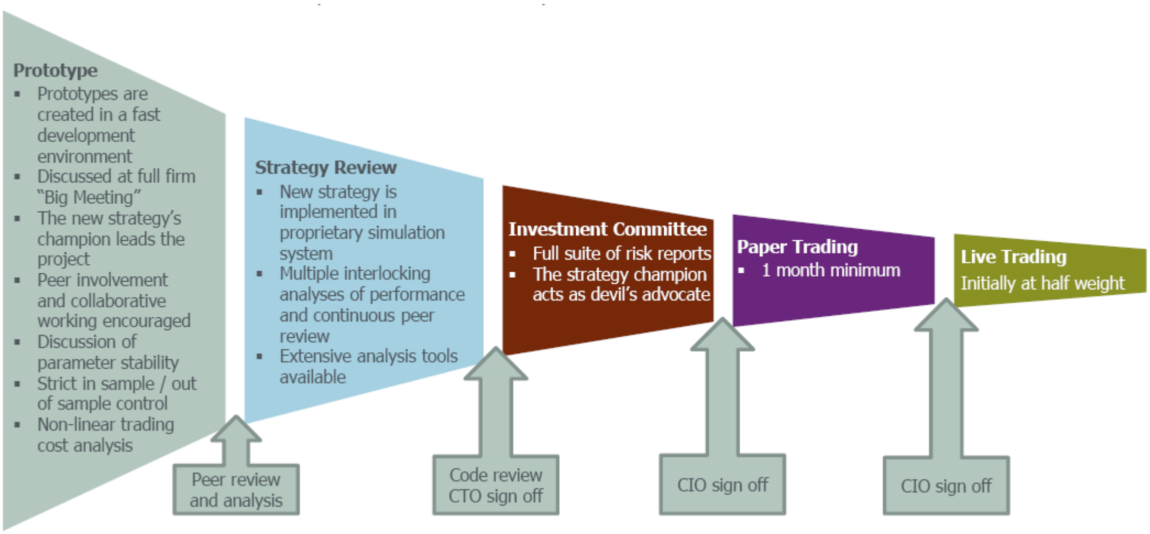
Cantab claims that if they had had the “volatility floor” model since the inception of the Core Macro Fund as well as their flagship Quantitative Fund, in events such as June 2013, Core Macro would have been down -4% instead of -6%, and the Quantitative Fund would have been down -9% instead of -14%. The model would, of course, also limit the performance on the upside; however, Cantab claimed the upside differential would have been much less noticeable.

The table below shows the timing for the “diversification volatility floor” being triggered and its percentage of down weight since July 2013; the latter can be understood as a de-levering factor assuming the fund is one times levered without the trigger. It illustrates that the floor has been triggered three times so far, and this has occurred during months when the fund struggled for performance. It seems that the implementation has indeed helped the fund to suffer less by reducing gross notional exposure of the portfolio during those down months.

Month	Top level DVF	Core Macro Fund Return
Aug-13	0.67	-2.62%
Sep-13	1	1.29%
Oct-13	1	1.94%
Nov-13	1	1.92%
Dec-13	0.96	-3.86%
Jan-14	0.84	-1.24%
Feb-14	1	2.74%
Mar-14	1	-0.29%
Apr-14	1	0.68%
May-14	1	2.48%

Management will only intervene in the model if there are potential operational issues. They do not have any discretionary overlay over the investment process or the portfolio allocation algorithm. For instance, there were decisions made to reduce risk in Japanese markets after the tsunami in 2011 due to the fear that the Tokyo Stock Exchange would be closed for a number of days; every year, due to less market activity and potentially less liquidity in the markets during the week of Christmas, the portfolio reduces its risk to 25%.

They have a rigorous, formally documented approach, which controls and manages the process from an initial prototype strategy to a fully-fledged live strategy.



Source: Cantab

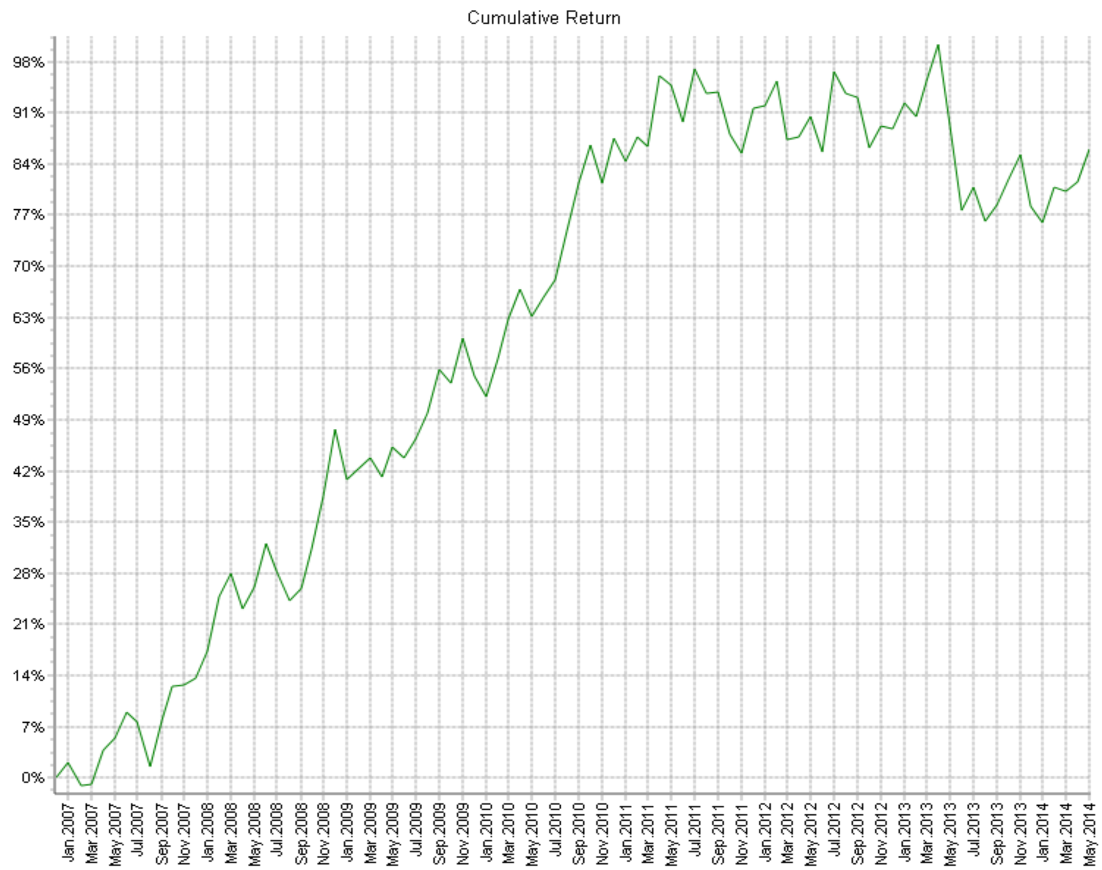
INVESTMENT THESIS SUPPORT/PERFORMANCE ANALYSIS/OTHER ANALYTICS

The track record of the Cantab Core Macro Fund, including a backtested track record, is as follows:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2006													0.00%
2007	2.10%	-3.10%	0.20%	4.70%	1.60%	3.40%	-1.30%	-5.60%	6.20%	4.30%	0.20%	0.70%	13.55%
2008	3.40%	6.30%	2.50%	-3.70%	2.40%	4.70%	-2.80%	-3.20%	1.30%	4.30%	5.50%	6.60%	30.05%
2009	-4.70%	1.10%	1.10%	-1.80%	2.80%	-1.00%	1.80%	2.50%	3.90%	-1.20%	4.00%	-3.20%	4.98%
2010	-1.80%	3.40%	3.40%	2.50%	-2.20%	1.60%	1.50%	3.90%	3.80%	2.80%	-2.80%	3.40%	20.94%
2011	-1.70%	1.90%	-0.70%	5.20%	-0.70%	-2.60%	3.80%	-1.70%	0.10%	-2.90%	-1.40%	3.30%	2.23%
2012	0.20%	1.70%	-4.10%	0.20%	1.50%	-2.50%	5.90%	-1.50%	-0.30%	-3.60%	1.60%	-0.20%	-1.49%
2013	1.92%	-0.97%	2.46%	2.62%	-5.53%	-6.17%	1.83%	-2.62%	1.29%	1.94%	1.92%	-3.86%	-5.62%
2014	-1.24%	2.74%	-0.29%	0.68%	2.48%								4.39%

Source: Cantab, Arden Research

Live performance began in January of 2013.



Source: Cantab, Arden Research

During the backtested track record, Cantab Core Macro has been consistently performing above the median of a defined peer group, year on year since 2007. However, during the first year of its launch in 2013, it was the second worst performer.

ROR	Aspect	BlueTrend	Altis	Lynx	Campbell	Cantab Core Macro	AHL	SEB	Transtrend	Winton	Newedge Trend	S&P 500
YTD (May)	-1.85%	3.34%	-9.48%	-0.57%	-7.53%	4.39%	5.31%	3.98%	6.21%	1.84%	-2.06%	4.07%
2013	-4.47%	-11.50%	-3.33%	12.12%	12.57%	-5.62%	-2.82%	3.77%	-0.79%	9.42%	2.67%	29.60%
2012	-10.65%	0.02%	-10.92%	-5.14%	4.44%	-1.49%	-2.52%	-5.19%	2.12%	-3.56%	-3.52%	13.41%
2011	4.53%	0.28%	-29.61%	-0.89%	-2.93%	2.23%	-5.90%	1.59%	-11.65%	6.29%	-7.93%	0.00%
2010	15.37%	15.98%	9.64%	18.54%	14.00%	20.94%	15.36%	2.00%	20.26%	14.46%	13.13%	12.78%
2009	-11.25%	4.37%	-8.25%	-8.52%	-4.46%	4.98%	-16.89%	-1.85%	-12.35%	-4.63%	-4.80%	23.45%
2008	25.44%	43.34%	56.91%	42.23%	5.83%	30.05%	33.23%	24.46%	32.81%	20.99%	20.88%	-38.49%
2007	8.17%	27.78%	22.24%	13.22%	-10.37%	13.55%	19.61%	9.07%	28.29%	17.97%	8.58%	3.53%

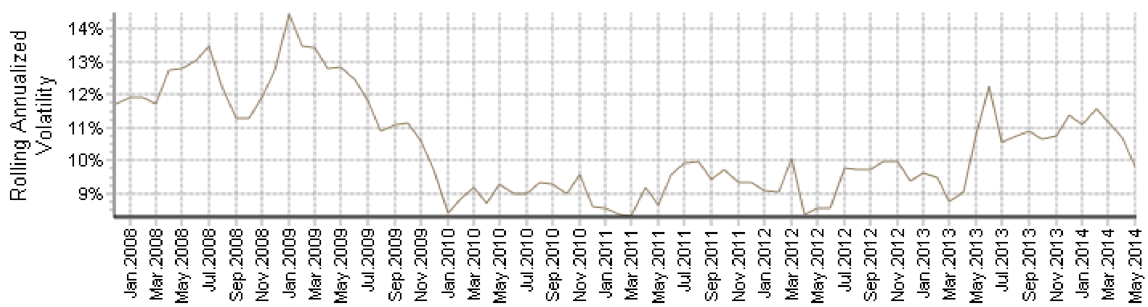
Source: Cantab, Arden Research

Over the whole period (including backtest), the fund has had the best risk-adjusted return profile.

(Jan-07 to May-14)	Aspect	BlueTrend	Altis	Lynx	Campbell	Cantab Core Macro	AHL	SEB	Transtrend	Winton
Annualised ROR	2.7%	10.0%	0.8%	8.5%	1.2%	8.7%	5.0%	4.8%	7.5%	8.1%
Rank	8	1	10	3	9	2	6	7	5	4
Annualised Vol	14.7%	14.4%	21.2%	15.3%	12.9%	10.4%	14.8%	8.3%	13.9%	9.7%
Rank	7	6	10	9	4	3	8	1	5	2
Sharpe Ratio	0.09	0.60	-0.03	0.47	-0.01	0.71	0.25	0.41	0.44	0.69
Rank	8	3	10	4	9	1	7	6	5	2

Source: Cantab, Arden Research

Realized volatility has ranged between 8% and 14%, relatively close to its 10% target.



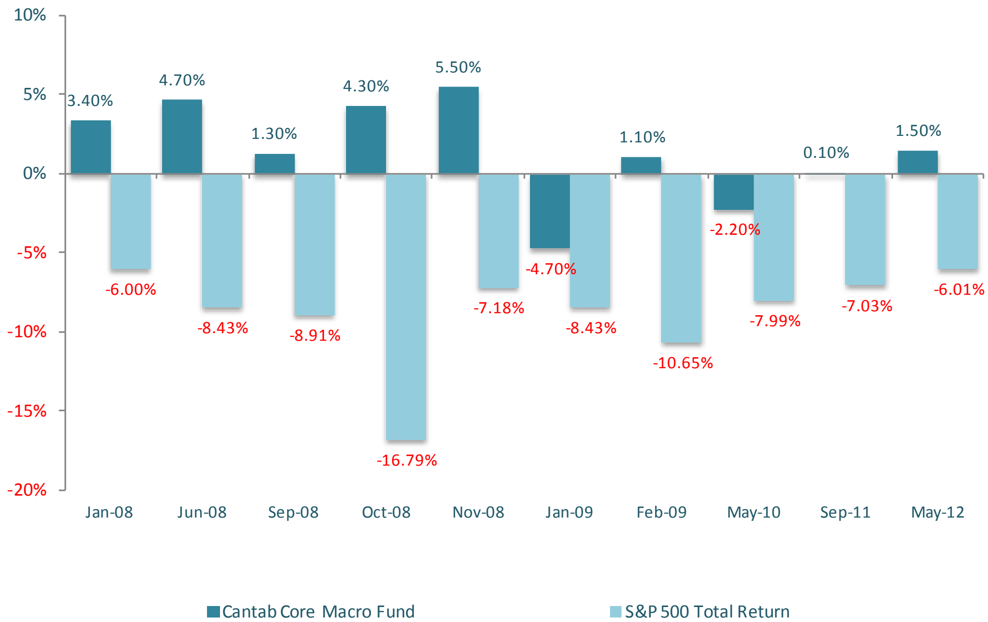
Source: Cantab, Arden Research

Though Cantab claims that the fund is by design expected to show lower correlation to traditional trend-following programs than such programs show to each other, analysis on both the fund's track record and backtest shows that Core Macro Fund is still highly correlated to mainstream trend-following CTAs.

Pairwise Correlation	0.80	0.77	0.68	0.77	0.66	0.76	0.76	0.76	0.74	0.76		
Correlation Matrix (Jan-07 to May-14)	Aspect	BlueTrend	Altis	Lynx	Campbell	Cantab Core Macro	AHL	SEB	Transtrend	Winton	Newedge Trend	S&P 500
Aspect	1.00	0.77	0.80	0.81	0.70	0.77	0.75	0.78	0.76	0.83	0.93	-0.13
BlueTrend	0.77	1.00	0.59	0.76	0.60	0.84	0.76	0.84	0.72	0.76	0.83	-0.05
Altis	0.80	0.59	1.00	0.67	0.51	0.65	0.61	0.63	0.70	0.67	0.79	-0.14
Lynx	0.81	0.76	0.67	1.00	0.66	0.73	0.81	0.81	0.70	0.76	0.86	-0.24
Campbell	0.70	0.60	0.51	0.66	1.00	0.64	0.61	0.60	0.67	0.62	0.81	0.12
Cantab Core Macro	0.77	0.84	0.65	0.73	0.64	1.00	0.73	0.73	0.69	0.75	0.83	0.04
AHL	0.75	0.76	0.61	0.81	0.61	0.73	1.00	0.79	0.71	0.75	0.81	-0.15
SEB	0.78	0.84	0.63	0.81	0.60	0.73	0.79	1.00	0.69	0.71	0.81	-0.22
Transtrend	0.76	0.72	0.70	0.70	0.67	0.69	0.71	0.69	1.00	0.71	0.86	0.03
Winton	0.83	0.76	0.67	0.76	0.62	0.75	0.75	0.71	0.71	1.00	0.86	-0.06
Newedge Trend	0.93	0.83	0.79	0.86	0.81	0.83	0.81	0.81	0.86	0.86	1.00	-0.01
S&P 500	-0.13	-0.05	-0.14	-0.24	0.12	0.04	-0.15	-0.22	0.03	-0.06	-0.01	1.00

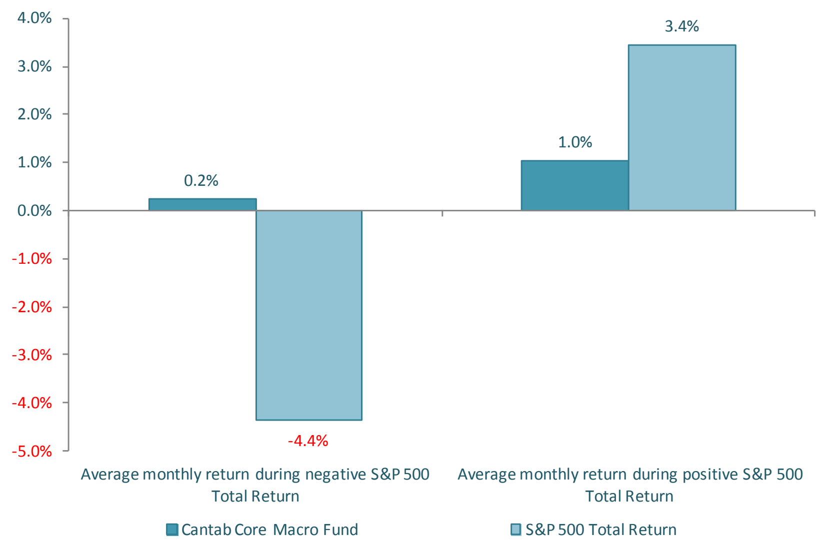
Source: Cantab, Arden Research

The chart below shows how the fund performed in the worst 10 months for the S&P since the start of the backtest in 2007. It demonstrates that the fund has been a good hedging facility during extreme stress months in equity markets, as generally expected of a trend-following strategy.



Source: Cantab, Arden Research

The fund has not only protected the equity downside but also participated in the upside.



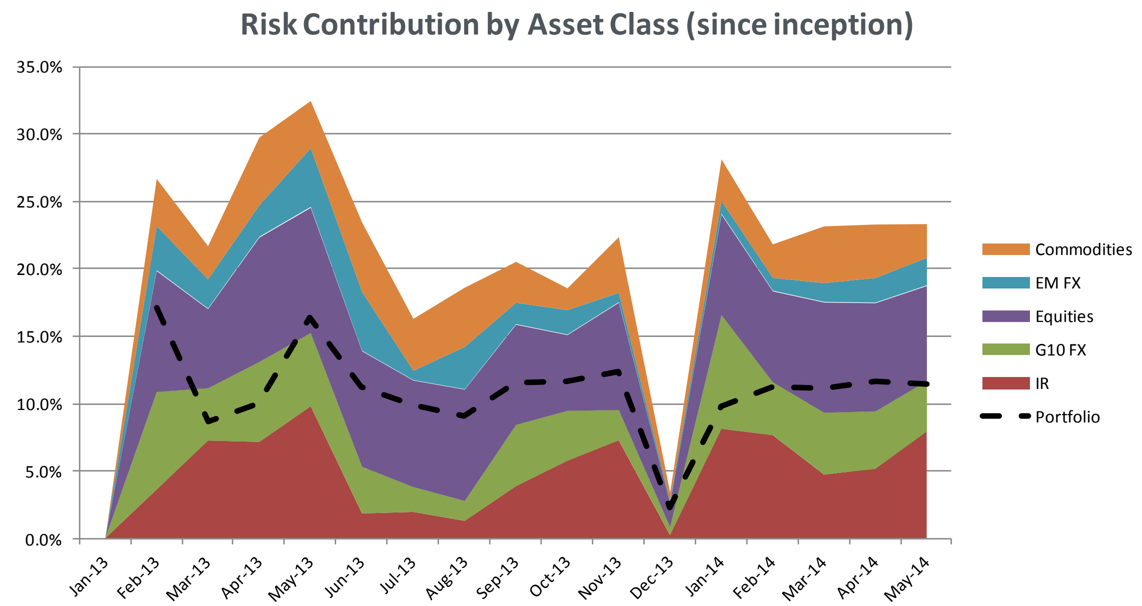
Source: Cantab, Arden Research

Over the long term, the fund is uncorrelated to all major asset classes.

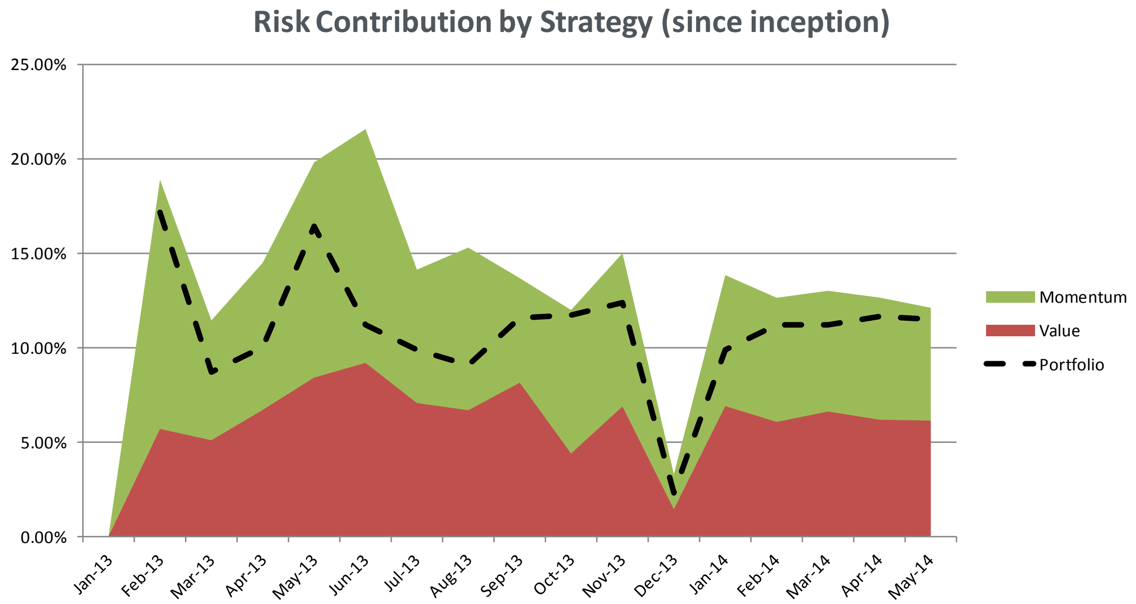
Assets	Cantab Core Macro Fund	Barcap Global Aggregate Bond	DJ - UBS Commodity	MSCI World Total Return (USD)	Newedge Trend Index	S&P 500 Total Return
Cantab Core Macro Fund	1	0.46	0.24	0.11	0.83	0.04
Barcap Global Aggregate Bond	0.46	1	0.33	0.37	0.14	0.27
DJ - UBS Commodity	0.24	0.33	1	0.64	0.20	0.57
MSCI World Total Return (USD)	0.11	0.37	0.64	1	0.04	0.97
Newedge Trend Index	0.83	0.14	0.20	0.04	1	-0.01
S&P 500 Total Return	0.04	0.27	0.57	0.97	-0.01	1

Source: Cantab, Arden Research

The below two charts show risk contribution by asset class and by strategy since the inception of the fund. It is notable that the risks that are generated are evenly distributed across asset classes, with a slight underweight in commodities, which is mainly driven by liquidity constraints. Risk is also evenly distributed between momentum and value clusters. The charts also demonstrate the diversification benefit between markets and strategies – the portfolio risk is much lower than the aggregation of individual market/strategy risks. The December de-risking reflected the aforementioned management intervention in the model, with the motivation being reduced market liquidity over the Christmas period – the chart shows the risk contribution as a snapshot at the end of the month rather than the average throughout the month.

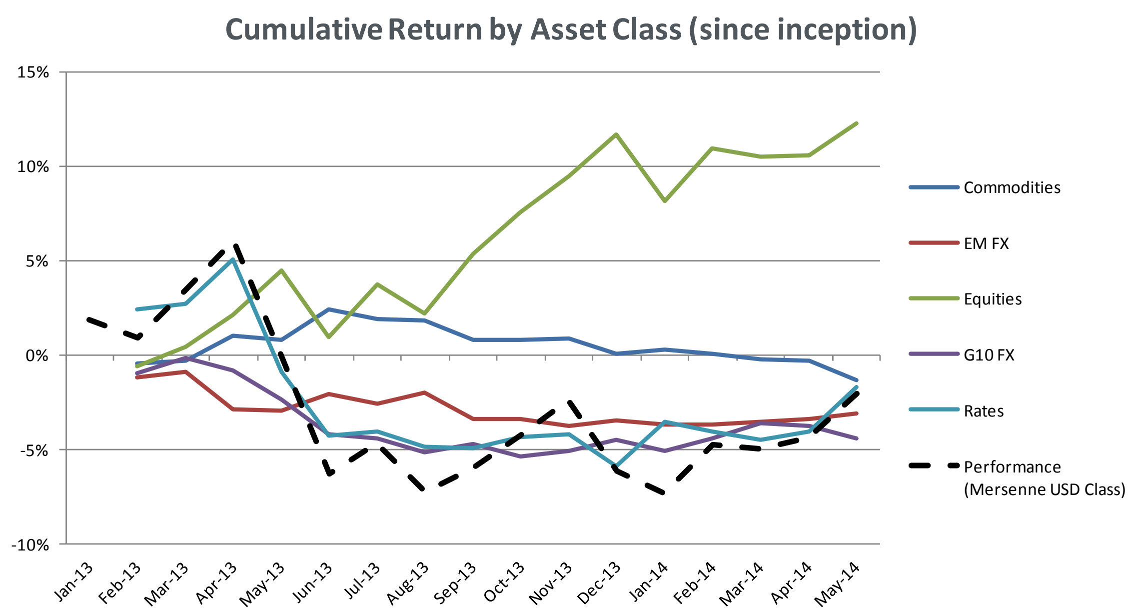


Source: Cantab, Arden Research



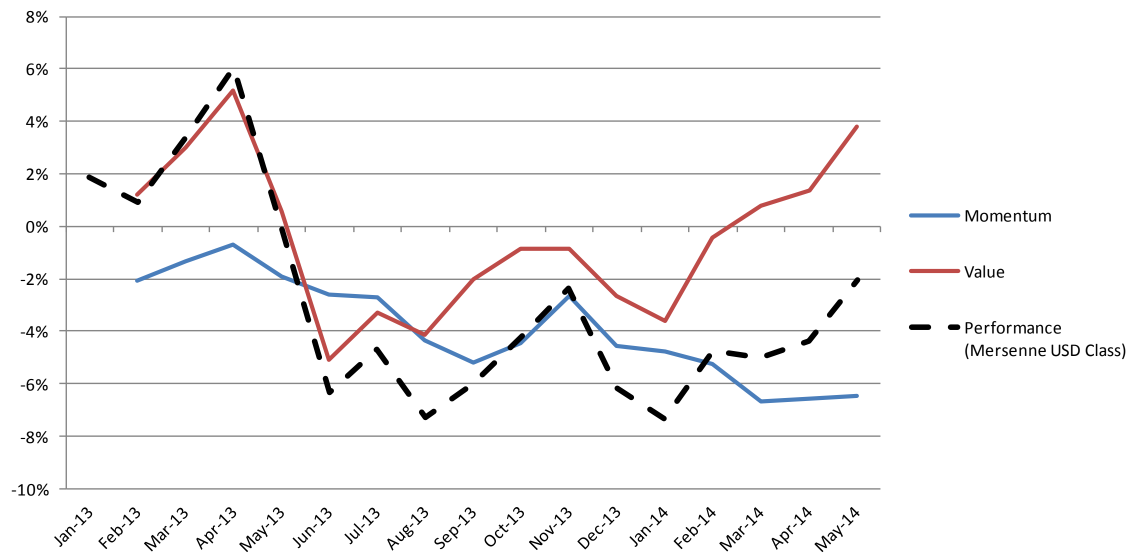
Source: Cantab, Arden Research

The fund was down 2% since inception as of the end of May 2014. Equities have been a strong positive contributor whereas bonds, FX and commodities have all negatively contributed. In terms of the strategies' return contribution, value has been positive and momentum has been a detractor.



Source: Cantab, Arden Research

Cumulative Return by Strategy (since inception)



Source: Cantab, Arden Research

PARTNER PROFILE/REFERENCES

Dr. Ewan Kirk, CEO, CIO & Partner, Cantab Capital Partners, 2006-present

EMPLOYMENT HISTORY

Goldman Sachs, Strategies Group, Europe. Kirk was responsible for all of Goldman Sachs' quantitative technology

EDUCATION

University of Southampton, PhD in Mathematics
University of Cambridge, Certificate in Advanced Study in Applied Mathematics
University of Glasgow, Natural Philosophy & Astronomy, First Class degree

Erich Schlaikjer, Chief Technology Officer & Partner, Cantab Capital Partners, 2006-present

EMPLOYMENT HISTORY

Goldman Sachs, Quantitative Strategies Group, Managing Director & European Chief Technology officer

EDUCATION

Harvard University, Magna Cum Laude in Latin & Greek

Dr. Tom Howat, Senior Scientist & Partner, Cantab Capital Partners, 2006-present

EDUCATION

Trinity College Cambridge, 2006, Degree in Mathematics and a PhD in Mathematical Biology

RECOMMENDED FOR INVESTMENT: ☒ YES ☐ NO _______ Other Recommendation (explain) *Pending items:* ☐ Reference checks ☐ HedgeMark

RISK MANAGEMENT/QUANT REVIEW

SUMMARY OF RISK RANKINGS

Category	Score*
Risk overall	2
Risk environment	2
Portfolio risk	2
Liquidity/complexity	1
Portfolio concentration	2

**Key: 1 (best) – 4 (worst)*

EXECUTIVE SUMMARY AND CONCLUSION

Cantab Core Macro Fund is a systematic managed futures strategy investing predominantly in equity index futures, bond and rate futures, FX forwards and commodity futures. As a systematic strategy, investment risk management is embedded within the fund's portfolio construction process. Risk management is at the heart of its process with dedicated risk teams monitoring and managing pre- and post-trade risks. The fund as a whole is highly levered mainly due to marginal based investment instruments but there is no explicit limit on the use of leverage. The portfolio is constantly adjusting its leverage to achieve the same volatility at the portfolio level, which is determined based on covariance between assets, strategies and clusters. The recently introduced "diversified volatility floor" mitigates the portfolio from being "overly" levered. The risk infrastructure in place allows the risk team to monitor the risk across the fund and manage it accordingly.

RISK ENVIRONMENT

Cantab takes a strictly quantitative approach to all aspects of trading. Strategy selection, portfolio construction, execution and risk control are all specified by algorithmic and systematic processes and do not rely on subjective judgement. At the core of their approach are their proprietary risk management and portfolio construction techniques.

Whilst market risk is manage using systematic strategies, Cantab has established a Risk Committee, comprising Dr Ewan Kirk (CEO/CIO), Adam Glinsman (Managing Partner), Erich Schlaikjer (CTO), Dr Tom Howat (Senior Scientist), Juan Perez (CFO/Risk Manager), Fraser McIntyre (COO), Paul Cole (Head of Operations) and Andrew Radford (General Counsel). The committee's mandate is to oversee the trading and operational risk environments within Cantab and make tactical and strategic decisions on all aspects of risk management. Each member of the Risk Committee has veto right over proposals tabled by the other members. The Committee is chaired by Juan Perez, who is the firm's Risk Manager.

The firm has proprietary state-of-the-art trading and risk management systems initially built by Goldman Sachs. Their position keeping systems are also proprietary.

Risk limits are monitored by Juan Perez. Any breaches are referred to the Risk Committee. Risk constraints are monitored in real time by the portfolio construction technology and are systematically implemented.

The portfolio construction process is loosely based on the Bayesian Black-Litterman framework. Simultaneously, the asset weighting in each individual sub-strategy is optimised, the weight in each strategy in each cluster is optimised and the portfolio constructed hierarchically to target a pre-defined level of volatility, whilst monitoring for tail risk. The resulting allocation to individual strategies and assets is the product of netting out the suite of signals across all the strategies and sub-strategies.

The investment style is fully systematic. The management would only override the systematic investment systems if they see the portfolio facing an operational risk, like that of an exchange closure. No investment views or market conditions can be used to override the systematic process of trading and portfolio construction. As a policy the management company has the authority on the approval of two of the seven partners to go to cash in the event of systemic market risk events like 9/11. During October 2013 they pre-emptively reduced risk in the portfolio in response to the perceived threat of a technical default of the US government. Once the immediate issues were resolved, they re-weighted the portfolio back to its natural weight.

There has been one occasion that their position limit has been breached. In June 2013 the intraday exchange limit in one market on the CME was breached for under ten minutes due to an error. The CME asked Cantab for more information in relation to this position limit breach in October 2013 and in January 2014 sent a letter reminding them of their duties. They then conducted a full review of the incident and have since strengthened the system, policies and procedures in place to minimise the risk of such an event happening again.

PORTFOLIO RISK

Cantab uses a variety of statistical and technical indicators as inputs into their investment strategies. They do not use any fundamental, or "econometric", factors (for example, GDP forecasts, consumer sentiments and so on). They only base their research on market data when, at the point of trading, they have contemporaneous real-time data. Risk management and portfolio construction are at the heart of their investment process. The portfolio algorithm responsible for maintaining constant risk levels runs in real time. The portfolio is scaled to target 12% gross volatility. Risk is optimised across strategies rather than assets, and therefore the risk in any one asset class can vary considerably.

The allocation to each asset class is the netted result of a complex interaction of multiple sub-strategies, strategies and clusters. The allocations between assets are dynamic and are driven by where the strategies see compelling opportunities. It is highly unlikely that the portfolio risk will be in any one asset class exceeds 50% of the portfolio.

As an orthogonal process to reallocating risk across the assets and strategies they deploy, the portfolio algorithm manages the tail risk of the return distribution to the expect shortfall (CVaR) measure of 2.4% at 99% confidence interval on a daily basis. This is calculated using a non-linear, non-parametric empirical risk of loss calculation.

Their portfolio construction process does not have any exogenous constraints and limits as to market sector allocation. There is no stop-loss or drawdown control as drawdowns can affect investors differently depending on the timing of the investment.

Leverage is a less than perfect metric to measure risk in global macro markets. Margin to equity averages around 10% over time. Neither leverage nor margin to equity form part of the inputs to the risk optimisation process.

The portfolio construction algorithm trades hourly and could aggressively down weight high volatility positions in real time. The portfolio construction algorithm takes consideration of trading costs from rebalancing the portfolio and keeping risk fine-tuned and constant. The process aims to find the best balance between rebalancing the portfolio to deliver constant volatility whilst not over-trading in order to keep trading costs down.

There are broadly two main reasons for a strategy's decay: a hypothesis failure and an implementation failure. The latter might be fixed – if the rationale underpinning a trading rule is not broken, the strategy could be re-implemented, for example at a different speed. As for the former – if the hypothesis underpinning a strategy is found to be broken, this strategy is permanently removed from the portfolio. The persistency of any systematic strategy is also at risk depending on many factors, such as changes in market structure, increased government intervention in markets, or growth in assets managed in accordance with similar investment strategies. Unfortunately, identifying either type of failure normally requires a prolonged period of underperformance.

The weakness of the programme is that no systematic strategy can ever capture exogenous market events (e.g. a 9/11-type event). The statistical effect of these events takes time to be built into market data and strategies may have a larger random component to their returns while this is happening. Arguably this is not entirely specific to systematic trading strategies. The diversification of the return streams beyond traditional medium-term momentum should enable the programme to perform in more states of the markets than just simple “strong trend” environments. The value strategies should pick up risk premium in choppy markets where medium-term momentum tends to suffer. However during rapid regime shifts between “risk-on” and “risk-off” market environments, the strategies may underperform.

The recent drawdown between May and June 2013 (-12%) was a very painful period for the Core Macro Fund. Cantab claimed that a drawdown of such magnitude is within the range of expectations for a 12% gross volatility product and they have seen similar periods of drawdown in their historical backtest. They have carried out a detailed and in-depth analysis of each strategy and the risk management and allocation process that underlies the portfolio. They are confident in their strategies and processes and continue to apply them exactly as before. There have been incremental improvements over the period, such as the “diversification volatility floor” described in the investment strategy section.

LIQUIDITY/COMPLEXITY

Liquidity risk is monitored by the Risk Manager and any concerns are brought to the attention of the Risk Committee. They monitor their “instant close out” and “close out over a day” cost for the entire fund and all managed accounts on a daily basis. They construct a measure based on liquidity in terms of volume, open interest, average market touch size and volatility to rank futures markets and trade those which are suitably high on this measure. They also consider the regulatory environment for every asset traded. They take into account regulatory changes such as the temporary banning of short selling, currency pegs and so on.

Given the highly liquid nature of the programme Cantab does not expect any issues in being able to liquidate a suitable part of the portfolio (without any material impact on the NAV) to return monies to investors. They continually monitor the size of the positions and the size of the trades against the open interest and average daily volume in every market that they trade. Since the trading strategy is focused on the most liquid FX and futures markets, their presence in the market is generally very small. They ensure that no position size would cause significant market impact, if it were to be traded out of in five days.

Under average market conditions they can redeem the entire portfolio in five days without impacting the market or NAV in any material way.

A list of instruments the fund is currently able to trade is below.

Exchange Traded Futures and Forwards

RIC	Exchange	Market Description
C	CME Group - CBOT	Corn
FV	CME Group - CBOT	5yr Treasuries
BO	CME Group - CBOT	Soybean Oil
LC	CME Group - CBOT	Live Cattle
S	CME Group - CBOT	CBT Soybeans
TY	CME Group - CBOT	10yr Treasuries
US	CME Group - CBOT	30yr Treasuries
SM	CME Group - CBOT	Soy Meal
YM	CME Group - CBOT	E-mini Dow
W	CME Group - CME	Wheat
ED	CME Group - CME	EuroDollar
ES	CME Group - CME	e-mini S&P 500
DM	CME Group - CME	e-mini S&P MidCap 400
LH	CME Group - CME	CME Lean Hogs
NQ	CME Group - CME	Nasdaq E-Mini
TU	CME Group - CME	2yr Treasuries
AD	CME Group - CME	USDAUD
SF	CME Group - CME	USDCHF
CD	CME Group - CME	USDCAD
BP	CME Group - CME	USDGBP
EC	CME Group - CME	USDEUR
JY	CME Group - CME	USDJPY
NE	CME Group - CME	USDNZD
MX	CME Group - CME	USDMXN
KW	CME Group - KCBT	CME Kansas Wheat
PA	CME Group - NYMEX	Palladium
NG	CME Group - NYMEX	Natural Gas

RIC	Exchange	Market Description
HO	CME Group - NYMEX	NY Heating Oil
CL	CME Group - NYMEX	WTI Crude
SI	CME Group - NYMEX	Silver
RB	CME Group - NYMEX	NYMEX RBOB Gasoline
MAL	LME	Aluminium
MPB	LME	Lead
MCU	LME	Copper
MZN	LME	Zinc
MNI	LME	Nickel
MSN	LME	Tin
MFX	MEFF	IBEX-35
VX	CBOE	CBOE Volatility Index
FDX	Eurex	DAX
FGBL	Eurex	Bunds
FGBM	Eurex	Bobl
FGBS	Eurex	Schatz
STXE	Eurex	Euro Stoxx
FES	Euronext NYSE	Euro Swiss
FCE	Euronext NYSE	CAC-40
FLG	Euronext NYSE	Gilts
FSS	Euronext NYSE	Short Sterling
FEI	Euronext NYSE	Euribor
FFI	Euronext NYSE	FTSE-100
COM	Euronext NYSE	Rapeseed
LRC	Euronext NYSE	Robusta Coffee
AEX	Euronext NYSE	AEX Index
LCO	ICE	Brent Crude

Exchange Traded Futures and Forwards

RIC	Exchange	Market Description
LGO	ICE	Gas Oil
CC	ICE	Cocoa
KC	ICE	Coffee
SB	ICE	Sugar no. 11
TFS	ICE	Russell 2000
DX	ICE	US Dollar Index
RS	ICE	Rapeseed (Canola)
IFS	IDEM	MIB-30
HCE	HKE	China H-Shares
CGB	Montreal	CAD Bonds
BAX	Montreal	CAD 90 Day BA
SXF	Montreal	S&P/TSX 60
YIB	SFE	30 Day Inter Bank
YBA	SFE	90 Day Bank Bill AUD
YTT	SFE	3yr AUD Bond
JNM	Osaka	Nikkei 225 mini
SIN	SGX	India Nifty 50
STW	SGX	MSCI Taiwan
SSG	SGX	MSCI Singapore
JEY	TFX	EuroYen
JTI	TSE	Topix
JGB	TSE	Japanese Treasuries

OTC FX and FX Options

Currency	Product
AUD	Spot/Forward/Options
BRL	NDF
CAD	Spot/Forward
CHF	Spot/Forward
CLP	NDF
CZK	Spot/Forward
EUR	Spot/Forward/Options
GBP	Spot/Forward/Options
HKD	Spot/Forward
INR	NDF
JPY	Spot/Forward/Options
KRW	NDF
MXN	Spot/Forward
MYR	NDF
NOK	Spot/Forward/Options
NZD	Spot/Forward/Options
PLN	Spot/Forward
RUB	NDF
SEK	Spot/Forward
SGD	Spot/Forward
TRY	Spot/Forward
TWD	NDF
ZAR	Spot/Forward

Source: Cantab

PORTFOLIO CONCENTRATION

The investment philosophy of the fund is based on a multi-strategy, multi-asset approach. They have created multiple robust statistical strategies, which capture returns systematically across macro markets. These strategies, typically 10-15, are applied to a highly diversified basket of assets and grouped around two distinct and broadly uncorrelated sources of returns: momentum and value. Each one of their investment strategies applies to multiple assets. Momentum strategies apply to all of the assets they trade. Value strategies are asset specific and are grouped around rates and bonds, equity indices, commodities and FX markets. As a result, the 10-15 strategies result in more than 500 sub-strategies.

Portfolio selection and position sizes are determined by a number of interlocking and complementary systems. These include: signal strength in an individual sub-strategy, the relative weighing of the sub-strategy within a strategy, the relative weighting of a strategy within its cluster, the expected volatility of the portfolio and the resulting rescaling to the constant volatility level, and down-weighting as a result of the unconstrained portfolio having a CVaR greater than 2.4% on a 99th percentile basis, and liquidity constraints as a result of exchange limits. However, they include liquidity and volume information in the weighting of the strategies to ensure that risk is not concentrated in less liquid positions.

As mentioned in the investment strategy section, the correlation between the momentum and value clusters can increase from time to time hence reducing portfolio diversification at the clusters level.

The fund currently invests in a diversified portfolio of over 70 futures markets, over 20 currency forwards – around 66% of traded instruments are exchange-traded futures and the remainder is OTC forwards (FX). In addition, the fund invests in US treasury bills for cash management purposes, which provide T0 liquidity.

All futures in the fund are cleared with Goldman Sachs, with Newedge as a back-up provider, whilst FX forwards are cleared with UBS. Managed accounts have their own clearers.

RECOMMENDED FOR INVESTMENT:

☒ YES ☐ NO ______ Other Recommendation (explain)

ARDEN
ASSET MANAGEMENT LLC

OPERATIONAL DUE DILIGENCE ("ODD") REVIEW

SUMMARY OF ODD RANKINGS

Category	**Score***
Overall score	White
Pricing/valuation	1
Organizational viability	2
Tradeflow/back office/IT	1
Ownership structure/management investment	2
Service providers	1
Current investor base	1

**Key: 1 (best) – 4 (worst)*

OVERVIEW

Cantab was formed in 2006 by Ewan Kirk and Erich Schlaikjer. They had lifted out of GS but utilized GS's technology and code along with receiving start-up capital from GS in the beginning years and now have a 9.99% profit share agreement in perpetuity with GS.

ASSESSMENT

Cantab has a well built out team and process with good separation of controls and a liquid and easy to value book.

FLAGS/CONCERNS

Cantab has recently moved into the equities space and is increasing its headcount; team and AUM flows should be monitored to ensure growth is done in an orderly manner.

OPERATIONAL SCORE

2 (White)

ODD MEETING SUMMARY

Prime Brokers/Custodians: GS for equities, UBS and Citi for F/X,
FCM: NewEdge & GS
Fund Administrator: IFS
Auditor: KPMG
Legal Counsel: Bingham McCutchen (US), Maples and Calder (Cayman), & Schulte, Roth and Zabel
Systems: Internally built

• Ownership Structure: Cantab was formed in 2006 by Ewan Kirk and Erich Schlaikjer. Tom Howat joined the partnership in 2011. Goldman Sachs became a partner in December 2012. Genia Diamond and Matthew Killeya joined the partnership in April 2013 and Adam Glinsman in July 2013. Chris Pugh became a retired partner at the end of 2013, and Fraser McIntyre joined the partnership in April 2014. Chris Pugh has a sunset provision and his stake will be bought out over the next few years.

The firm does not disclose the partnership stake, just that Ewan Kirk is the majority owner, and GS has a 9.99% profit sharing stake with no voting rights.

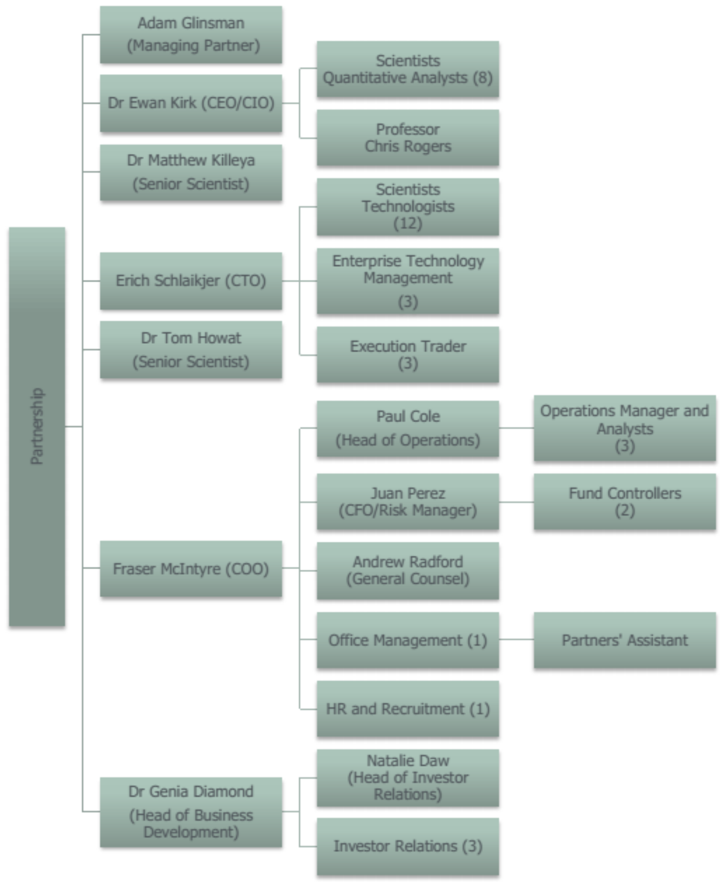
When Ewan Kirk and Erich Schlaikjer came over from GS they were allowed access via a firewalled server to the GS servers and code they had written while there. Additionally GS provided Cantab with start-up capital for which GS received a 20% profit share. At the end of 2012 Cantab had internally written their own code and no longer needed access to GS technology; as per their agreement the GS profit sharing stake dropped to 9.99%. Cantab still has 1.5 years remaining on the license fee. Once that is over they will not have to pay GS anything but the 9.99% profit share fee. The team at Cantab did not know if they have a buyout agreement with GS, but they have no intention of buying GS out. The 9.99% is in perpetuity.

• Fund Structure: The funds are structured as a Cayman master feeder, however with both feeders being domiciled in the Caymans.

• Affiliated broker-dealer/entities: Though GS is an owner in the firm, it is not legally deemed as an affiliated broker dealer. GS does act as the main prime for futures and equities.

• Staffing: Cantab has 49 internal employees and a compliance consultant. The main office is based out of Cambridge, England with a marketing office located in London.

There have been two material departures of note from Cantab in 2014 and one in 2013; the CFO left in May the head programmer left in April and as previously noted Chris Pugh left at the end of Dec 2013. Cantab promoted Juan Perez to CFO and is still looking to add a head programmer. Additionally, Cantab is looking to add an operations associate, a fund accountant, a few people to join the core equity team, and two quants.



Source: Cantab

• AUM: Cantab has $3.1bn in AUM as of 30th June 2014. Of the $3.1bn, $1.6bn is in the flagship fund, $809mn in the managed account that trades pari passu to the flagship fund, $596mn is in the macro fund and $51mn in the managed account that trades pari passu to the macro fund.

• Investor Base: The breakout is 84% institutional, 11% FoF, 4% HNWI, and 1% internal. The investor base is predominantly from the US, with 60% coming from the US/Canada, 30% from the UK, 6% from the rest of Europe and 4% Australia. The largest investor is an institution and has an 18% stake. The top five investors are all institutional and aggregate to 61% of AUM.
ERISA comprises of 18% of the flagship fund and 2% of the macro fund.

• Service Providers: The service providers are noted above. Citi was added as a new PB for F/X in 2014. Cantab is in talks with MS to add them as the 2nd equities PB.

• Counterparty Agreements: All counterparty agreements are negotiated and approved by the general counsel and the external legal counsel. All ISDAs are tri-party margining with BoNY as the custodian. The triggers typically range form 15-20/25-30/40 for monthly/quarterly/annually defaults, respectively.

The funds do not hold any bank debt or privates or any other derivatives.

• Cash Management: Unencumbered cash is maintained at the BoNY in the form T-Bills. All external wires require the approval of 2 partners, upon their approval the admin is notified and is responsible for moving the money after their own review.

• Leverage Facilities: Cantab has a minimum of 15-day margin lock-up with a maximum of 30-day margin lock-up with its equity PBs.

• Daily Ops & Controls: Cantab has 3 traders who execute the trades based on the output of the models. There are a handful of researchers who also have the ability to execute trades but no one has the authority to execute at their discretion, trades are executed based on the model.
Trades are typically executed electronically, 99% of tickets are electronic, and 90% of the size weighted trades are electronic. Once the trades are executed, they are sent STP to the accounting system and a FTP file is sent to the PBs multiple times a day. The internally built system has real time pricing.
Trades are automatically allocated on a pro rata basis. There are no cross trades between the funds.

• Pricing & Valuations: Pricing for this portfolio is very simple as everything is liquid and exchange traded. All prices can be pulled directly from Bloomberg or Reuters. The administrator is responsible for pricing the book on a daily basis. In the event there is a discrepancy between the administrator's price and Cantab's price (very rare), Cantab will just provide a print out of their price.

• Fund Accounting/Tax/Audit: Cantab has never had a NAV restatement of qualified audit. They did have to delay one of their NAV statements because of Lehman. They had created a $25mn side pocket that has subsequently been sold out of and closed.

• Regulatory Compliance/Legal Issues: Cantab is registered with the FCA, CFTC, and NFA. They have a QEP exemption under the CFTC. They have been labeled a C3 by the FCA and are visited up to once a year. To date, they have not had an official review by any regulatory body; they have provided supporting information regarding some of their trades but have never heard back from the regulator beyond that point.

Cantab was AIFMD approved on 30th June 2014; they registered in a few countries (UK, Iceland) but will rely on reverse inquiries for most of the non-UK European countries as they feel it is too cumbersome to register and monitor.

Cantab has contracted with Kinetics to assist in compliance review and perform mock audits.

Cantab has also upgraded its Board of Directors; they now have four independent members and two internal members. Cantab hired directors with diverse backgrounds, one has a fund admin background, one was previously a COO, one was an operations associate and one has been an offshore director for funds. They felt by getting a diverse group the directors would better be able to assist with complex/different problems when needed.

• IT/BCP: Cantab has a data center, which houses the main servers and is located several miles from the office. There is also a back-up server located in Cambridge, which is replicated on a near real-time basis. Cantab performed a penetration test last year and had minimal "items of note" which were corrected within a month.

• Side Letters: Cantab does not have any side letters.

RECOMMENDED FOR INVESTMENT:

☒ YES ☐ NO _____ Other Recommendation (explain)

Pending Due Diligence Items:
☐ Service provider verification ☐ Background Checks ☐ Manager Documents
☐ Other

Explain: