

To: Tim Nguyen, Interim CIO, ERSRI Date: April 26, 2017

From: Pension Consulting Alliance, LLC

Re: CPC Systematic Trend Following Manager RFI Process and Manager

Recommendations

The following memo summarizes the systematic trend following manager RFI process and manager recommendations of ERSRI investment staff and PCA.

Executive Summary:

The Employees Retirement System of Rhode Island ("ERSRI") strategic policy allocation to the Crisis Protection Class ("CPC") is 8% of plan assets (approximately \$600 million). The class is designed to offset large negative returns in the portfolio's growth asset portfolio in times of market crisis. The class is composed of a 50/50 allocation to long-duration U.S. Treasury securities and systematic trend following ("STF") strategies.

PCA, in consultation with the ERSRI investment staff, issued a Request for Information ("RFI") for systematic trend following manager services to 10 asset management firms. After an initial review and rating of the technical proposals, six proposals were considered "low fee" as well as high quality. Of these six, four were more highly rated and were evaluated in greater detail. In addition to reviewing each firm's technical proposal and fees, on-site manager due diligence meetings were conducted with four top rated firms at their respective office. After a detailed RFI evaluation process, reference checks and review of proposers' best and final fee offers, the ERSRI investment staff and PCA recommend the Rhode Island SIC hire Credit Suisse Asset Management, LLC, Crabel Capital Management, LLC and Welton Investment Partners as systematic trend following managers.

Background:

The CPC portfolio is composed of two investment strategies, long-duration U.S. Treasuries and systematic trend following strategies.

Systematic Trend Following (STF) is a long-standing investment strategy that involves buying (going long) markets that have been rising and selling (going short) markets that have been declining, in the belief that those price trends will continue. The markets traded typically include equity index markets, interest rate markets, currency markets, and commodity markets; the largest and most liquid markets in the world. The signal that



indicates the position to be taken in each market is determined by assessing the past return in that market over the relevant look-back horizon. A positive past return is considered an "uptrend" and leads to a long position; a negative past return is considered a "downtrend" and leads to a short position. The strategy holds either a long or short position in every market traded depending upon the signal for that market over the look back period. Trend identification and scaling methods for positions vary by the system utilized.

The objective of the trend following allocation in the CPC portfolio is to capture broad market trends in a systematic (meaning "rules-based") manner. Outperforming a systematic trend following market benchmark index is desirable over a reasonable horizon, but not the primary objective of the mandate. Rather, the primary objective is to catch the trend and to generate positive returns when equity markets are falling.

Systematic trend following portfolio:

The STF portfolio is anticipated to be a \$300 million allocation, allocated equally among three investment products. The STF portfolio is to be constructed of complementary, but diversifying styles, including one low cost index replication manager.

Manager RFI Review Process:

PCA distributed RFI documents to 10 investment firms on December 9, 2016. All 10 firms were believed to be capable providers of systematic trend following portfolio management services.

- Firms submitting proposals are listed in Appendix A.
- The RFI scope of services is included in Appendix B.
- Proposer required minimum qualifications ("RMQ") are included in Appendix C.

The RFI covered the following issues: firm ownership and resources, experience managing STF portfolios, client base, client service model and capabilities, personnel tenure with the firm, responsibilities and experience, investment management philosophy and process, risk management, analytical tools, product performance, client references and fees.

Manager responses were due January 6, 2017. Manager fees and technical proposals were reviewed by the ERSRI investment staff and PCA.

Strategies from the following four firms were highest rated and received further review.

- Aspect
- Crabel
- Credit Suisse
- Welton



Onsite-visits were scheduled with the firms in their offices between February 8, 2017 and February 24, 2017.

In addition to the on-site meetings, several conference calls were conducted with the proposers, the ERSRI investment staff and PCA to review account structure.

All four proposers were asked to submit a best and final fee proposal. The proposals were rerated. The investment staff and PCA recommend the Rhode Island SIC retain the following firms to provide systematic trend following portfolio management services: Crabel, Credit Suisse, and Welton.

Crabel Advanced Trend Strategy (18% target volatility)

Investment Services:

Crabel Capital Management implements a systematic trend following strategy utilizing the very low latency algorithmic trading systems developed over the years by Crabel in connection with the Crabel Multi-Product strategy. Controlling costs and achieving execution savings is absolutely critical in this flagship strategy, since it trades 18,000 round trips a year. Market intelligence, gathered from short term tick data, is utilized to determine the statistical quality of the signals for the Advanced Trend strategy, particularly in the weighting of positions. The strategy is a pure trend following strategy.

Organizational Overview, Firm Background:

Crabel Capital Management specializes in the short-term trading of financial instruments, which has been the firm's primary focus since its founding in 1992. In 2004, Crabel augmented its initial short-term trading offerings with a more classic, longer-term trend allocation, which steadily grew in the ensuing years. Crabel's longer-term trend investments now comprise approximately 12% of its flagship strategy's risk budget, and have been offered separately to clients through its Advanced Trend mandate, which became available as a stand-alone product in 2014. As such, this strategy is relatively new as a stand-alone offering, but has a longer history of running "live" within Crabel's broader flagship product.

Key Personnel:

Michael Pomada, Chief Executive Officer and President, graduated in three years from the University of California at Berkeley in 1997 and received his MBA from the University of Southern California with a concentration in investments and statistics. Mr. Pomada began his career in the Interactive Entertainment industry in Sales and Business Development. After completing his MBA, Mr. Pomada went to UBS before managing portfolios for Manchester Trading (Niederhoffer) & Coast Asset Management. Upon joining Crabel in April 2008, Mr. Pomada managed an equity portfolio while assisting in the oversight of Crabel Equity Main strategies. Starting in late 2009, Mr. Pomada & Mr. Moe led the effort



to revamp the firm's execution processes, infrastructure and algorithmic trading/microstructure research. Mr. Pomada joined the Executive Committee in June 2010 and became Chief Operating Officer in June 2011. Mr. Pomada took an active role in helping Mr. Crabel lead the overall business, and in July 2016 he was promoted to CEO and President. In this role, Mr. Pomada will focus on research and product development and will continue to oversee the front office teams.

Alden Melbourne, Senior Manager, graduated in 1996 with a BS in Computer Science from Rensselaer Polytechnic Institute. During high school, Mr. Melbourne started working part-time for Crabel Capital Management in June 1993. Mr. Melbourne continued working for Crabel part-time while he earned his bachelor's degree in three years. After college, Mr. Melbourne transitioned to a full-time programmer. He developed much of the software that is still utilized by Crabel. Today, Mr. Melbourne spends his time overseeing software development, conducting research and reviewing research. Mr. Melbourne joined the Executive Committee in June 2010.

Grant Jaffarian, Portfolio Manager of the Advanced Trend program and Chief Investment Officer of AlphaTerra LLC, graduated from Wheaton College, IL with a double major in Economics and English in 2001. In 2010 Mr. Jaffarian received an MBA from the University of Chicago. Mr. Jaffarian began his career at Belgium based Analytic Investment Management, a high turnover futures manager acquired by Robeco Bank. Upon leaving Analytic Investment, Mr. Jaffarian founded Petra Intraday, a short term systematic emerging manager. In 2004, Mr. Jaffarian joined Efficient Capital Management, LLC where he served as Chief Investment Officer before departing in December 2012 to found AlphaTerra, LLC to work with promising quant systematic trading strategies. In April 2014 AlphaTerra was acquired by Crabel Capital Management, and Mr. Jaffarian assumed the role of Portfolio Manager for the Advanced Trend program while also continuing to carry the title of CIO for AlphaTerra. Mr. Jaffarian joined the Crabel Executive Committee in April 2016.

Portfolio Management:

All systematic trend followers are highly correlated. Crabel decided to err on the side of simplicity for their strategy. They use five signals on all markets, but the lookback periods differ by market. They use a pure momentum signal, trade one of the five time frames by instrument with a lookback ranging from 20 days to 600 days (the average lookback of the portfolio is dependent upon the market environment). Executing when volatility is high, you want lookback to be shorter (shorter time frame), and when market volatility is low, you want to be patient (utilize a longer lookback time frame).

The Advanced Trend strategy is designed to capture "medium-term" market trends (average 100 days). The price of the instrument is the primary input, and the signals are

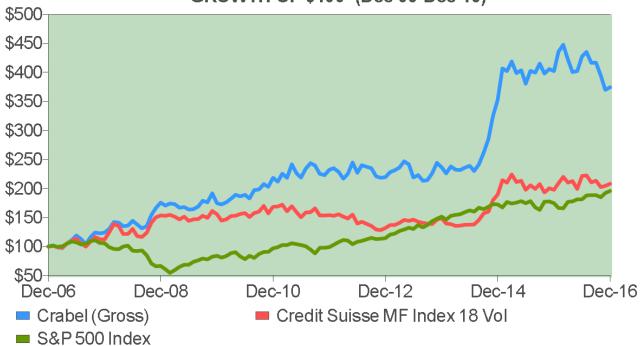


based purely on momentum models. The question is whether the market is higher or lower based on a given lookback period.

Gross of Fees Performance: (performance prior to December 2012 are simulated)

ANNUALIZED	1M	3M	YTD	1Y	3Y	5Y	10Y
Crabel Advanced Trend	1.29	-10.20	-6.88	-6.88	16.58	10.02	14.11
CS MF 18 Target Vol BM	1.75	-2.39	5.15	5.15	11.82	6.21	7.59

GROWTH OF \$100 (Dec 06-Dec 16)



MPT STATISTICS	Alpha 5yr	Beta 5yr	R-Squared 5yr	Correlation 3yr	Correlation 5yr
vs. CSMF 18v	4.78	0.88	0.5998	0.84	0.77
vs. BC Agg	3.55	3.52	0.3178	0.55	0.56
vs. S&P 500	13.64	-0.18	0.0108	-0.15	-0.11

RISK STATS	Standard	Downside	Sortino	Sharpe	Tracking
(3 Year Annualized)	Deviation	Deviation	Ratio	Ratio	Error
Fund	19.30	9.29	3.03	0.88	10.69
CSMF 18v	18.40	9.99	1.83	0.69	0.00

RISK STATS	Standard	Downside	Sortino	Sharpe	Tracking
(5 Year Annualized)	Deviation	Deviation	Ratio	Ratio	Error
Fund	18.15	10.06	1.44	0.61	11.66
CSMF 18v	16.07	9.55	0.86	0.45	0.00

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Management Fee (best and final fee proposal)

Fee of 50 basis points on assets under management.

Merits:

- Pure trend strategy
- Trades 200 markets, most diversified of managers recommended
- Highest expected / realized return
- Crabel is an excellent trader, lowest trading costs by a factor of at least 4x
- Utilize trading intelligence gathered via their flagship to benefit this strategy
- 50 bps management fee, extremely low trading cost

Considerations:

- Not the flagship offering of the firm
- They run lean, but as a systematic strategy, this strategy has few resource needs
- Live track record is relatively short, but this is the least complex strategy they run

Credit Suisse Managed Futures Target Vol 18 Index

Investment Services:

Credit Suisse implements a systematic trend following strategy, according to pre-defined, systematic index rules of the **Credit Suisse Managed Futures Liquid Index™** series. This systematic trend following strategy trades a total of 18 futures contracts, seeking to provide liquid and diversified exposure to market trends across asset classes, geographies and time horizons, at low cost. The strategy tracks 16 time horizon signals to identify trends across various horizons. This pure trend strategy is relatively simple, liquid and low cost.

<u>Organizational Overview, Firm Background:</u>

Credit Suisse is a publicly-traded company with registered shares listed on the SIX Swiss Exchange (ticker: CSGN) and on the New York Stock Exchange in the form of American Depositary Shares (ticker: CS). Parent Credit Suisse is a global financial services company employing approximately 48,000 people in over 50 countries.

Credit Suisse Asset Management (CSAM) is an asset manager with approximately 2,300 professionals around the globe and \$335 billion in assets under management. The Quantitative Investment Strategies ("QIS") team, an investment boutique within CSAM, provides liquid alternative investment solutions to a broad range of clients. QIS models risk and return across asset classes and across a variety of risk premia. They incorporate this fundamental understanding of alternative trading strategies in developing and refining proprietary trading and asset allocation strategies which are implemented in portfolios with various objectives, including absolute return, dynamic multi-asset balanced and strategy replication. The QIS team was founded in 2007 and the Credit Suisse Managed Futures strategy went live in February 2011.



Key Personnel:

Yung-Shin Kung, Director, is Head and CIO of Credit Suisse's Quantitative Investment Strategies (QIS) group, an industry pioneer in the development and management of liquid alternative investment strategies. Since 2009, he has held various leadership positions in Credit Suisse's Asset Management area, including Head of Portfolio Management – Americas and Global Head of Hedge Fund Research within the Alternative Funds Solutions group. Yung-Shin was a Director at Merrill Lynch in the Financial Products Group.

Sheel Dhande, Director, is a member of Credit Suisse's Quantitative Investment Strategies (QIS) group. He joined Credit Suisse in 2008 and has worked on the research and portfolio management of the Liquid Alternative Beta (LAB) suite of QIS products. His research has focused on the development of various quantitative trading strategies, including Managed Futures, Merger Arbitrage and Multi-Asset risk premia based strategies. Prior to joining Credit Suisse, Mr. Dhande worked in the Quantitative Portfolio Strategies group in the Fixed Income division at Lehman Brothers.

Portfolio Management:

CSAM approaches trend investment from the point of view that trends are a fundamental part of the fabric of trading markets. Thus, there is a fundamental belief that trends will continue to be a part of markets, and while they may be quiet for a period of time, they will resurface in the future.

Using a systematic approach, the Credit Suisse Managed Futures strategy seeks to capture trends across asset classes, geographies and time horizons, while minimizing costs in order to improve net returns for investors. CSAM is trying to capture <u>significant trends</u> over <u>major asset classes</u>, providing representativeness across the major asset classes, across time frames, and remaining balanced across asset classes on a risk basis. The focus from the outset has been efficiency and robustness. It is more valuable to be able to invest (buy and sell freely) in assets that are sensitive to a regime shift. The strategy is highly liquid, providing easy access to capital even in stressed market environments. They seek to be in line with the median systematic trend following manager over time gross of fees, and top quartile on a <u>net of fees</u> basis.

Asset classes traded include equities, currencies, government fixed income, and commodities. Portfolio construction targets equal risk contribution from classes on average. There are five short-term signals, six medium-term signals, and five long-term signals. The strategy tracks 16 time horizon signals to identify trends across various horizons, ranging from shorter-term moving average (60 trading days) to longer-term moving average (360 trading days). The average length of moving average signal utilized is a 210 trading days moving average.



Gross of Fees Performance of the index:

ANNUALIZED	1M	3M	YTD	1Y	3Y	5Y	10Y
CS MF 18 Target Vol	1.75	-2.39	5.15	5.15	11.82	6.21	7.59

GROWTH OF \$100 (Dec 06-Dec 16)



■ Credit Suisse MF Index 18 Vol ■ S&P 500 Index

MPT STATISTICS	Alpha 5yr	Beta 5yr	R-Squared 5yr	Correlation 3yr	Correlation 5yr
vs. S&P 500	11.22	-0.29	0.0339	-0.18	-0.18
vs. BC Agg	3.31	1.81	0.1077	0.45	0.33

RISK STATS	Standard	Downside	Sortino	Sharpe	Tracking
(3 Year Annualized)	Deviation	Deviation	Ratio	Ratio	Error
CSMF 18v	18.40	9.99	1.83	0.69	22.95
S&P 500	10.74	5.89	2.68	0.83	0.00

RISK STATS	Standard	Downside	Sortino	Sharpe	Tracking
(5 Year Annualized)	Deviation	Deviation	Ratio	Ratio	Error
CSMF 18v	16.07	9.55	0.86	0.45	20.67
S&P 500	10.37	5.55	8.22	1.37	0.00

Management Fee (best and final fee proposal)

Fee of 23.5 basis points on assets under management.

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Merits:

- Index replication
- Pure trend strategy
- Provides liquid and diversified exposure to market trends across asset classes
- Simple, liquid and low cost

Considerations:

- Lower return to risk (and lower fees) than anticipated from active strategies
- Note that while the parent company Credit Suisse AG plead guilty to tax fraud, paying a \$1.8 billion settlement in 2014, the parent is distinct from the Credit Suisse Asset Management

Welton Investment Partners Global Trend Following (GTF) Strategy

Investment Services:

Welton Global Trend Following (GTF) is structured to provide reliable, systematic, global trend following in futures markets and forward FX markets, tailored to volatility levels necessary to suit investors. The strategy attempts to capture various recurrent market phenomena generated by behavioral inefficiencies of market participants, which result in trending price movements related to short, medium and longer term phenomenon. GTF trades 58 highly liquid markets globally across equity indices, fixed income, currency and commodities and is designed to deliver trend following style class performance at a low cost. The strategy employs three different analytical designs to identify trends.

Organizational Overview, Firm Background:

Founded 28 years ago, Welton Investment Partners provides alternative investment management services for clients in a variety of alternative investment strategies. They have striven to improve their processes continually and have built their business around providing uncorrelated, active trading strategies to institutional clients globally. Each of the markets they trade is deep and liquid, including: sovereign bond futures, equity index futures, currency futures and forwards, commodity futures, and developed market cash equities. Each of the underlying strategies that they trade on behalf of clients is systematic, transparent and scalable for institutional clients. The firm is committed to aligning and working with institutional investors to deliver investment returns necessary to meet the needs of institutions in a difficult investing environment.

Key Personnel:

Patrick Welton, Chief Executive Officer & Chief Investment Officer

Dr. Welton is a principal of the firm and the CEO and CIO. He chairs the Investment Committee and participates in ongoing research. He has been an active investor for more than three decades and an investment manager since 1989. Dr. Welton has served on committees for the Managed Funds Association (MFA) and as a member of the Board



of Directors of the National Futures Association (NFA) from 1997-2000. His former research experience includes molecular biological work in gene sequencing, biophysics with a focus on positron emission neurofunctional brain imaging, and oncology through clinical cancer trials. He holds undergraduate, doctoral and postdoctoral degrees from the University of Wisconsin, University of California, Los Angeles (UCLA), and Stanford University respectively.

Justin Balas, CAIA, Head of Quantitative Macro Group

Mr. Balas is a principal of the firm and oversees the firm's proprietary research and product development for the Quantitative Macro group. In his role, he draws upon both his deep experience as an investor and trader, and his demonstrated management skill overseeing large teams of technical professionals. As an investor, Mr. Balas brings a cross-sectional experience-base that includes open outcry markets as well as quantitative trading and portfolio management. Prior to Welton, he ran a proprietary quantitative equity and equity derivatives portfolio specializing in high frequency trading within listed NYSE equities and implied volatility spread strategies between S&P 500 and Nasdaq 100 index option markets. Prior to this, he served as COO of a California multimedia firm, managing a multi-national development team of software and web application engineers in India and the U.S. Mr. Balas is a graduate of the Stanford Executive Program and holds a BA from the University of California, Santa Cruz. He joined Welton in 2004.

Portfolio Management:

GTF incorporates three different analytical designs to identify trends: 1) time series trend identification (utilizing multiple moving-average crossover signals), 2) statistical trend identification (designed to respond more quickly, employing statistical measures of overbought and oversold market conditions, accelerating position entrance and exit, based on size and dispersion of price moves), and 3) geometric trend identification that identifies trends via distance from baseline (breakout identification) to mitigating the time dependent nature of the time series and statistical strategies.

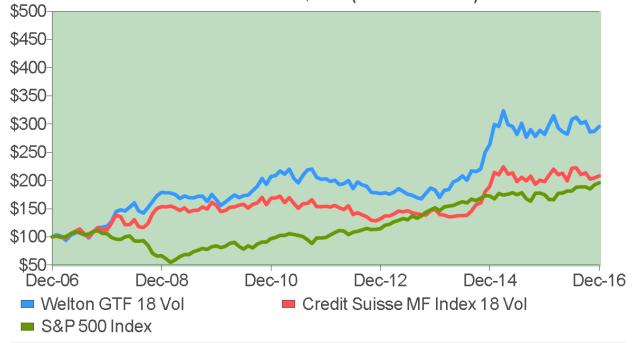
At a high-level, the portfolio is constructed by allocating an equal amount of risk to each strategy within certain diversification limits. In essence, Welton will only allow a certain amount of capital to be allocated to the four major asset classes and to specific underlying markets within those four major asset classes. Additionally, Welton limits how much capital can be allocated to aligned signals to maintain diversification. This step is a recursive process that is monitored daily. The portfolio targets an annualized 18% volatility on a daily basis. In summary, the underlying portfolio construction principals are equal risk-weighting within an extremely diversified construct. Portfolio construction techniques result in a portfolio that is consistently diversified along multiple dimensions



Gross of Fees Performance:

ANNUALIZED	1M	3M	YTD	1Y	3Y	5Y	10Y
Welton Global Trend Following	2.91	-2.81	4.97	4.97	17.33	7.82	11.45
CS MF 18 Target Vol BM	1.75	-2.39	5.15	5.15	11.82	6.21	7.59

GROWTH OF \$100 (Dec 06-Dec 16)



MPT STATISTICS	Alpha	Beta	R-Squared	Correlation	Correlation
	5yr	5yr	5yr	3yr	5yr
vs. CSMF 18v	2.47	0.90	0.6809	0.85	0.83
vs. BC Agg	2.80	2.86	0.2269	0.49	0.47
vs. S&P 500	8.97	-0.01	0	0.03	0.00

RISK STATS (3 Year Annualized)	Standard Deviation	Downside Deviation	Sortino Ratio	Sharpe Ratio	Tracking Error
Fund	20.12	10.65	3.00	0.89	10.81
CSMF 18v	18.40	9.99	1.83	0.69	0.00

RISK STATS	Standard	Downside	Sortino	Sharpe	Tracking
(5 Year Annualized)	Deviation	Deviation	Ratio	Ratio	Error
Fund	17.46	9.83	1.06	0.51	10.00
CSMF 18v	16.07	9.55	0.86	0.45	0.00

Management Fee (best and final fee proposal)

Fee and administration cost of 29 basis points on assets under management.

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Merits:

- Three different trend models makes it diversifying to other strategies
- Time series trend model, statistical trend model, breakout (distance related) model
- Most reactive, can respond inter-day if movements are significant enough
- Significant value delivered per dollar of fees

Considerations:

- Smaller firm, AUM of approximately \$1 billion
- Standalone strategy track record is five years, before that is a carveout



Appendix A:

Firms submitting RFI proposals:

- Alpha Simplex
- Aspect
- Crabel
- Credit Suisse
- Fort
- Graham Capital
- GSA Capital
- Man / AHL
- Rotella
- Welton



Appendix B:

<u>Scope of Services:</u> The RFI includes the following services:

- 1. Systematic Trend Following (STF) strategy management services The intent of this allocation is to provide consistent, pure, systematic trend following strategy exposure at a target risk level of 18% standard deviation.
- 2. Managers will agree to provide daily liquidity, in a separate account, so accordingly should manage the strategy in deep and liquid markets. Managers will be responsible for managing (trading) the account and will work with external service providers, chosen by the client, to administrate the account.



Appendix C:

MINIMUM QUALIFICATIONS – Systematic Trend Following Investment Management Services

1) Required Minimum Qualifications (RMQs)

The Proposer must meet all of the following RMQs, otherwise its proposal will be rejected. For each RMQ, the Proposer must provide a detailed response (one sentence or more) stating how the Proposer complies and must initial alongside each RMQ, indicating that the Proposer has met the RMQ as of September 30, 2016. A response that is limited to a mere reference to other sections of the RFI will be insufficient. Any known deviations from the RMQs below must be disclosed in detail on this form.

- Proposing firm must have been in existence for at least five (5) full years.
- Assets under management at the firm must exceed \$500 million.
- It must be registered with the Securities and Exchange Commission (SEC) or foreign equivalent, a Bank, or a licensed Insurance Company Affiliate.
- It must not have been censured by the SEC, CFTC, or subject to regulatory action within the last three (3) years.
- Proposer must be willing to run the strategy on a third party managed account platform.
- Proposer will complete the RFI questionnaire in its entirety.
- The Proposer must be directly responsible for the management of the account, and all personnel responsible for the account must be employees of the firm.
- There must be at least five investment professionals dedicated full time to the proposed strategy.
- AUM of the proposed strategy currently exceeds \$100mm.
- There must be at least 15 professional employees within the firm.
- The firm must agree to a client-specified benchmark. Performance versus the benchmark will primarily be examined over a full market cycle.



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An investment in the Fund is speculative and involves a degree of risk and no assurance can be provided that the investment objectives of the Fund will be achieved. Investment in the Fund is suitable only for sophisticated investors who are in a position to tolerate such risk and satisfy themselves that such investment is appropriate for them. The Fund may lack diversification, thereby increasing the risk of loss, and the Fund's performance may be volatile. As a result, an investor could lose all or a substantial amount of its investment. The Fund's governing documents will contain descriptions of certain of the risks associated with an investment in the Fund. In addition, the Fund's fees and transferring shares of the Fund. It is unlikely that there will be a secondary market for the shares. There are restrictions on redeeming and transferring shares of the Fund. In making an investment decision, you must rely on your own examination of the Fund and the terms of the offering.