



*REVOLUTION CAPITAL MANAGEMENT*

# *PRODUCT OVERVIEW*



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# IMPORTANT NOTICES

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# NOTICE REGARDING HYPOTHETICAL RESULTS

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PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM.

ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS AND ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS.

PAST PERFORMANCE IS NOT NECESSARILY INDICATIVE OF FUTURE RESULTS.

# REVOLUTION'S OBJECTIVE

Develop quantitative, statistically rigorous, and well-researched systematic trading systems that have low correlations to existing managed futures offerings.

# WHO IS RCM?

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- Company details
  - Revolution Capital Management (RCM) is a Colorado-based Limited Liability Company (LLC) formed in 2004. RCM's main office is located in Broomfield, Colorado.
  - RCM is registered with the National Futures Association as a CTA and CPO and has been trading proprietary capital since January 2005 (7 years).
  - RCM was co-founded by the three principals: Michael Mundt, Mark Chapin, and Rob Olson.
- Company philosophy
  - All programs are systematic and quantitative.
  - Products are targeted to well-defined specifications.
  - Rigorous statistical analysis is applied to all aspects of research, development, and operations.
  - Automation and technology are critical enablers for achieving superior risk-adjusted returns.
- Program details
  - RCM offers three programs: Alpha, Mosaic, and Global Stock Index.
  - RCM directs trading for about \$950 million across these three programs.

*See Appendix A for more Company information.*

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# CORE SYSTEM ELEMENTS



- Matlab, C, Java code bases
- Automated data ingest
- Automated signal and order generation
- Multi-level consistency checks on data and trade directives
- Automated error notifications
  
- Enterprise-grade Linux servers
- Co-location of hardware
- R+D/Ops separation

# INVESTMENT THESIS

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- News can cause nearly-instantaneous adjustments in market prices (per the efficient market hypothesis, or EMH).
- However, real news/information is rare. The remainder of the time, markets generate their own dynamics.
- In this regime, patterns in prices can and do arise (in contrast to the EMH).
- With a rigorous systematic, statistical approach, these price patterns can be targeted by trading algorithms.

*See Appendix B for more details.*

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# SYSTEM DEVELOPMENT APPROACH

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- Our engineering backgrounds underpin our philosophy and approach to research and development.
- Pricing inefficiencies can be identified using a combination of sensible hypothesis formulation and sophisticated statistical analyses, and they can be exploited with systematic trading methodologies.
  - Not a black box.
  - Technical indicators are useful as inputs but not necessarily as rules for trading.
- Our general system-development methodology can be summarized as *statistical pattern recognition*.

# SYSTEM DEVELOPMENT APPROACH

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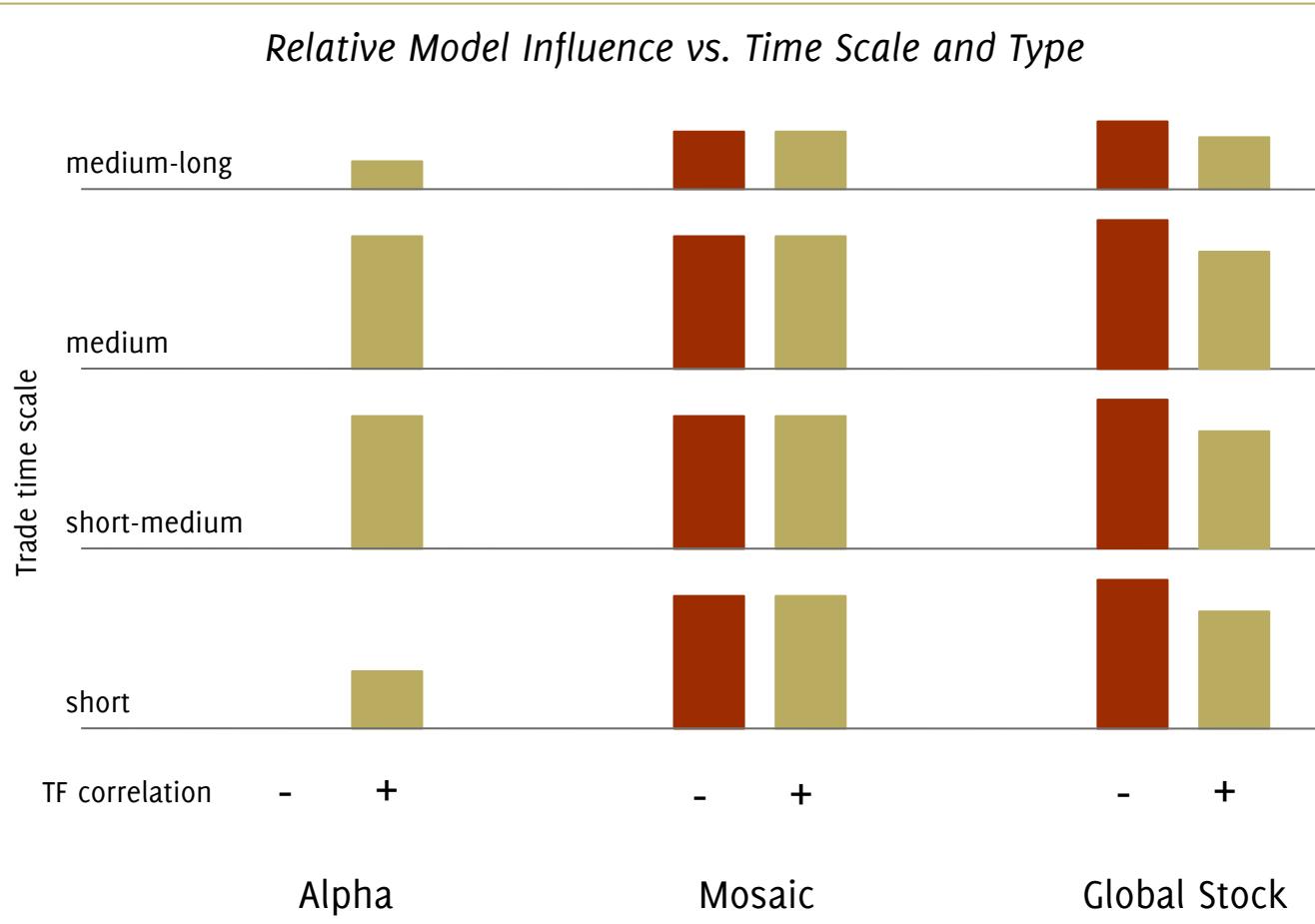
- “Pattern recognition”
  - Trends and counter-trends are the simplest patterns.
  - Pattern recognition generally refers to higher-order price movements.
- Pattern characteristics
  - Only patterns that are stable over time and across the full spectrum of liquid markets are used; this reduces the chances of data mining/over-fitting.
  - Multiple patterns and multiple variants per pattern are employed to maximize generalization and further minimize over-fitting.
- Finding patterns
  - Technical indicators are used as the starting point for pattern identification.
  - Sophisticated computational tools (e.g. computer clusters, parallel programming, et al.) are utilized to facilitate research and development efficiency.
  - Special attention is given to understanding and comparing in-sample versus out-of-sample results.
- Patterns versus trends
  - Ultimately, positions can only be taken with or against the prevailing trend.
  - Diverse patterns must be carefully balanced in the overall portfolio to produce desirable program properties.

# TRADING ALGORITHMS

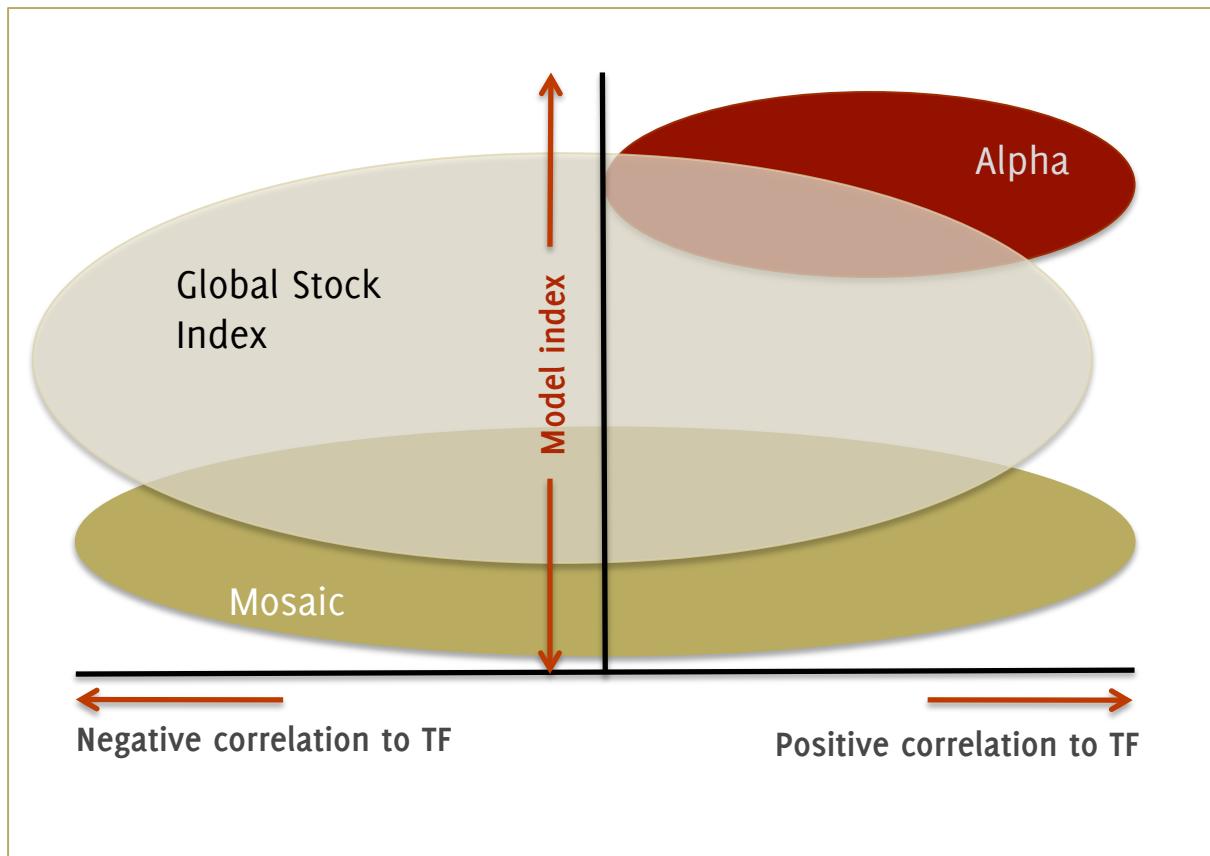
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- Trading models
  - Currently, a total of 45 models are being utilized across all programs.
  - Each model has roughly 100 sub-models/elements.
  - Thus, there are about 4,500 total signals processed for each market in each trading period (equates to roughly 250,000 per day).
- Model research and development
  - New models are developed on an ongoing basis.
  - Models are evaluated and incorporated into the ensemble when they are conclusively shown to benefit the portfolio.
  - Automated search processes are used to help improve efficiency in the R+D cycle.
- Model deployment
  - Depends on target trend-following correlation and trading frequency of program.
  - Cross-program overlaps are taken into consideration.

# PRODUCT RELATIONSHIPS



# PRODUCT RELATIONSHIPS



# PRODUCT HIGHLIGHTS

Alpha	Mosaic and Mosaic Institutional (MI)	Global Stock Index
Diversified	Diversified	Stock Indices
Short- and medium-term pattern recognition	Short-term pattern recognition	Short- and medium-term pattern recognition (tuned to stock index dynamics)
High capacity (>\$4 billion)	Medium capacity (>\$1.5 billion)	Medium capacity (>\$1.0 billion)
Targets a 0.5 correlation to trend following	Targets a zero correlation to trend following	Targets a zero correlation to trend following
Expected zero correlation to S+P 500	Expected zero correlation to S+P 500	Expected zero correlation to S+P 500
12-14% targeted annual volatility	12% targeted annual volatility for MI, 36% for Mosaic	12% targeted annual volatility
2,500 RT/M/Year	3,500 RT/M/Year (MI)	1,300 RT/M/Year



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# TARGET PRODUCT CORRELATIONS

*Target Correlation Coefficients*

	Alpha	Mosaic	GSI	Barclay CTA Index	S+P 500
Alpha	-	0.50	0.30	0.50	0.00
Mosaic	0.50	-	0.30	0.00	0.00
GSI	0.30	0.30	-	0.00	0.00

# ALPHA PROGRAM

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- Characteristics
  - Diversified (trades 34 markets, domestic and foreign, in all major sectors).
  - Targets a 0.5 correlation to trend following benchmarks.
  - Average holding period of 8 days.
  - Maximum expected margin-to-equity is approximately 25%.
  - Targeted annualized volatility (based on monthly returns) is approximately 12%.
- History
  - The fund started in January 2005 as a domestic-market trend-following program.
  - A multi-strategy system trading global markets was introduced in August 2006.
  - The managed account program (with the multi-strategy system) started in May 2007.
  - The realized post-fee Sharpe ratio is in excess of 1 for both the fund and the program.
- Target niche
  - Alpha provides a return stream that correlates to trend followers, but...
    - We believe we can provide better risk-adjusted performance.
    - Alpha tends to do well when trends are weak to moderate, unlike pure trend following.

# ALPHA FUND OVERVIEW



- Multi-strategy program began August 2006
- Annualized return: 13.8%
- Annualized volatility: 13.4%
- Sharpe ratio: 1.03
- Correlation to Barclay CTA Index: 0.50

PERFORMANCE TABLE														
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD	
2011	3.15	-3.51	-2.80	-1.14	-1.82	-0.03	1.38	-0.07	-1.00	2.17	N/A	N/A	<b>-3.83</b>	
2010	-7.93	4.68	4.09	6.14	0.27	1.91	2.19	2.28	4.32	5.93	-4.53	0.47	<b>20.54</b>	
2009	-0.62	-0.11	-0.49	-1.53	-0.88	-1.51	-4.13	2.68	2.49	-1.79	3.05	-2.53	<b>-5.50</b>	
2008	5.56	3.16	-1.32	2.70	3.33	0.33	-0.52	-0.91	2.58	4.35	3.17	4.53	<b>30.17</b>	
2007	8.33	-0.91	1.33	12.99	12.82	4.54	-5.27	-1.42	7.90	4.67	2.56	0.38	<b>57.36</b>	
2006	-3.85	-0.86	5.19	-1.21	-0.33	-3.71	-2.68	2.81	0.24	2.45	7.08	5.34	<b>10.18</b>	
2005	-1.68	-4.31	-2.79	-6.72	0.15	3.09	0.63	-2.34	1.15	2.53	9.14	-0.39	<b>-2.41</b>	

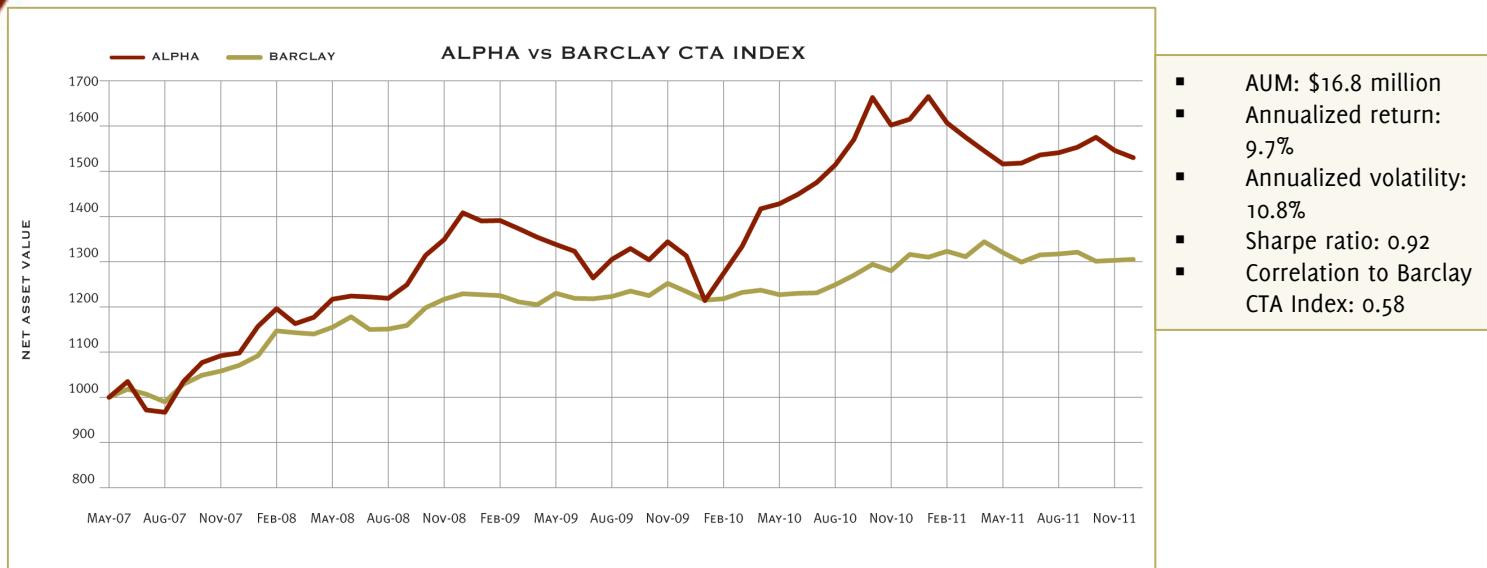
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# ALPHA PROGRAM OVERVIEW



PERFORMANCE TABLE													
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD
2011	3.06	-3.43	-1.99	-1.92	-1.88	0.09	1.19	0.36	0.75	1.44	-1.86	-1.01	-5.26
2010	-7.49	4.94	4.71	6.23	0.76	1.43	1.83	2.65	3.68	5.92	-3.66	0.83	23.06
2009	-1.27	0.04	-1.26	-1.42	-1.18	-1.11	-4.45	3.20	1.87	-1.85	3.07	-2.37	-6.79
2008	5.33	3.42	-2.81	1.26	3.34	0.58	-0.11	-0.30	2.51	5.20	2.68	4.35	28.23
2007						3.54	-6.17	-0.42	6.99	4.06	1.39	0.56	9.82

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# MOSAIC PROGRAM

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- Characteristics
  - Deployed in conjunction with a strategic partnership with Dunn Capital Management.
  - Diversified (trades 52 markets, domestic and foreign, in all major sectors).
  - Targets a 0.0 correlation to trend-following benchmarks.
  - Average holding period of 4 days.
  - Maximum margin to equity for Mosaic Institutional is expected to be 20% (for Mosaic, the expectation is 60%).
  - Expected annualized volatility (based on monthly returns) is 12% for Mosaic Institutional, 36% for Mosaic.
- History
  - Original (3x) program started in October 2006.
  - Institutional (1x) program started in September 2009.
  - Multiple enhancements have been deployed since inception in order to enhance capacity, maintain de-correlation, and improve risk-adjusted returns.
  - Realized Sharpe ratio of approximately 1.
- Target niche
  - Mosaic is intended as a pure diversifier relative to trend-following returns. The various models are balanced in order to target a correlation of zero to major trend-following indices such as the Barclay CTA index.

# DUNN: STRATEGIC PARTNER FOR MOSAIC

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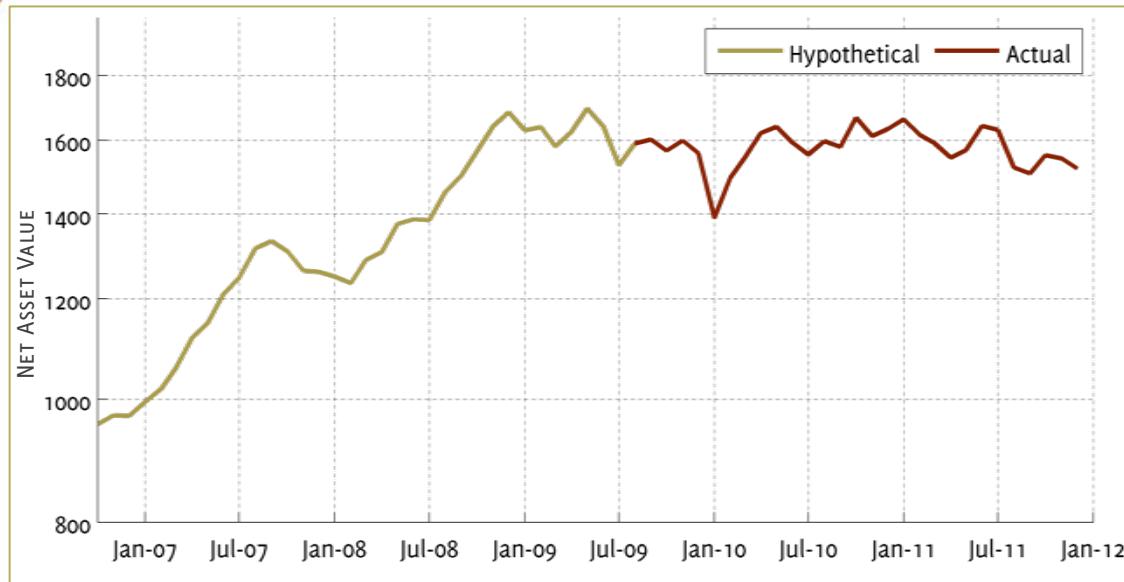
- Company details
  - DUNN Capital Management, LLC (“DUNN”) was founded in 1974 by William A. Dunn, Ph.D., a pioneer in applying computer technology to portfolio management.
  - DUNN is registered with the National Futures Association as a CTA and CPO and has been trading client money since October 1974 (36 years). The firm is located in Stuart, FL.
  - DUNN manages over \$1B AUM in strictly systematic, computer-based portfolios.
  - DUNN has 20 employees (including 9 traders and 5 dedicated research analysts).
- Risk management philosophy
  - DUNN has a long track record of accurate and successful risk targeting. Since inception in 1974, DUNN’s nominal risk profile targets a 1% probability of a -20% or worse return in any rolling one-month period. In actual trading (434 months) this 20% monthly loss level has been penetrated 6 times, or 1.38%.
- Strategic relationship
  - Mosaic is owned by RCM. DUNN is a strategic partner to RCM and has an exclusive license on the Mosaic program. DUNN and RCM share fees.
  - DUNN provides trading execution, back-office services, risk management and marketing.
  - DUNN invests a large portion of proprietary capital in the Mosaic program.

# REVOLUTION/DUNN SYNERGIES

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- REVOLUTION
  - RCM's system development philosophy and approach are underpinned by the engineering backgrounds of the principals and enabled by the employment of cutting-edge technology.
  - RCM places the highest priority on research and analysis. Work in this area is constant and ongoing in a continual effort to enhance the Mosaic program and increase its capacity.
- DUNN
  - DUNN has the experience and capability to transition computer-based research and models into a viable, fully-functional, real-time trading program.
  - DUNN has the operational experience, infrastructure and skill to provide efficient and effective trading execution, back-office services and distribution support.

# MOSAIC INSTITUTIONAL OVERVIEW



- AUM: \$820 million
- Annualized return: 8.3%
- Annualized volatility: 12.4%
- Sharpe ratio: 0.71
- Correlation to Barclay CTA Index: 0.12
- Black denotes actual monthly returns below, while gray is hypothetical.

PERFORMANCE TABLE													
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	Nov	DEC	YTD
2011	1.82	-2.80	-1.49	-2.59	1.37	4.54	-0.73	-6.65	-1.09	3.38	-0.56	-1.82	<b>-6.89</b>
2010	-11.14	7.53	3.71	4.59	1.14	-2.88	-2.13	2.47	-1.04	5.45	-3.29	1.29	<b>4.38</b>
2009	-3.22	0.60	-3.50	2.72	4.35	-3.21	-6.82	4.02	0.75	-2.03	1.88	-2.27	<b>-7.16</b>
2008	-0.86	-1.19	4.32	1.45	5.24	0.83	-0.17	5.28	3.01	4.52	4.63	2.58	<b>33.60</b>
2007	2.61	2.42	3.83	5.55	2.78	5.48	2.93	5.46	1.32	-1.79	-3.51	-0.21	<b>29.85</b>
2006										-4.46	1.63	-0.07	<b>-2.97</b>

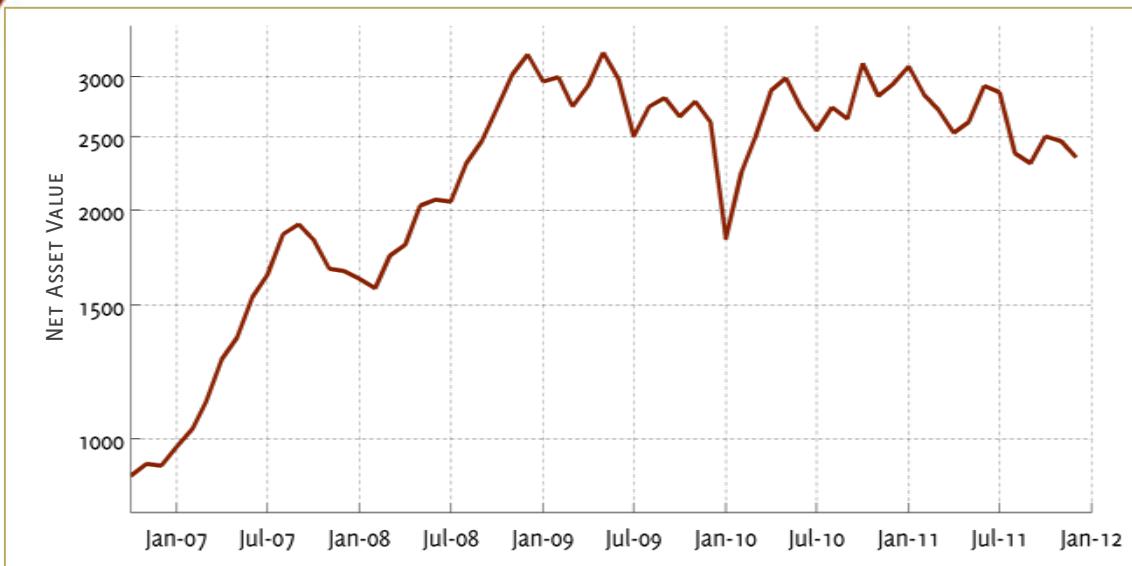
Mosaic Institutional is available to Qualified Eligible Participants only.  
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# MOSAIC PROGRAM OVERVIEW



- AUM: \$98 million
- Annualized return: 17.7%
- Annualized volatility: 32.5%
- Sharpe ratio: 0.67
- Correlation to Barclay CTA Index: 0.12

PERFORMANCE TABLE														
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD	
2011	5.44	-8.28	-4.32	-6.82	3.39	11.55	-1.95	-16.88	-3.03	8.57	-1.45	-4.79	<b>-19.93</b>	
2010	-29.94	22.48	11.31	15.06	3.98	-8.90	-6.46	7.31	-3.43	18.36	-9.49	3.79	<b>12.20</b>	
2009	-7.91	1.34	-8.44	6.48	10.49	-7.85	-15.86	9.49	2.67	-5.51	4.75	-6.05	<b>-18.52</b>	
2008	-2.30	-2.86	10.41	3.39	12.66	1.80	-0.65	12.40	6.97	10.37	10.93	6.19	<b>92.95</b>	
2007	5.96	5.52	8.87	13.52	6.68	13.16	6.98	13.13	3.01	-4.60	-8.37	-0.74	<b>80.47</b>	
2006	-	-	-	-	-	-	-	-	-	-10.59	3.66	-0.59	<b>-7.86</b>	

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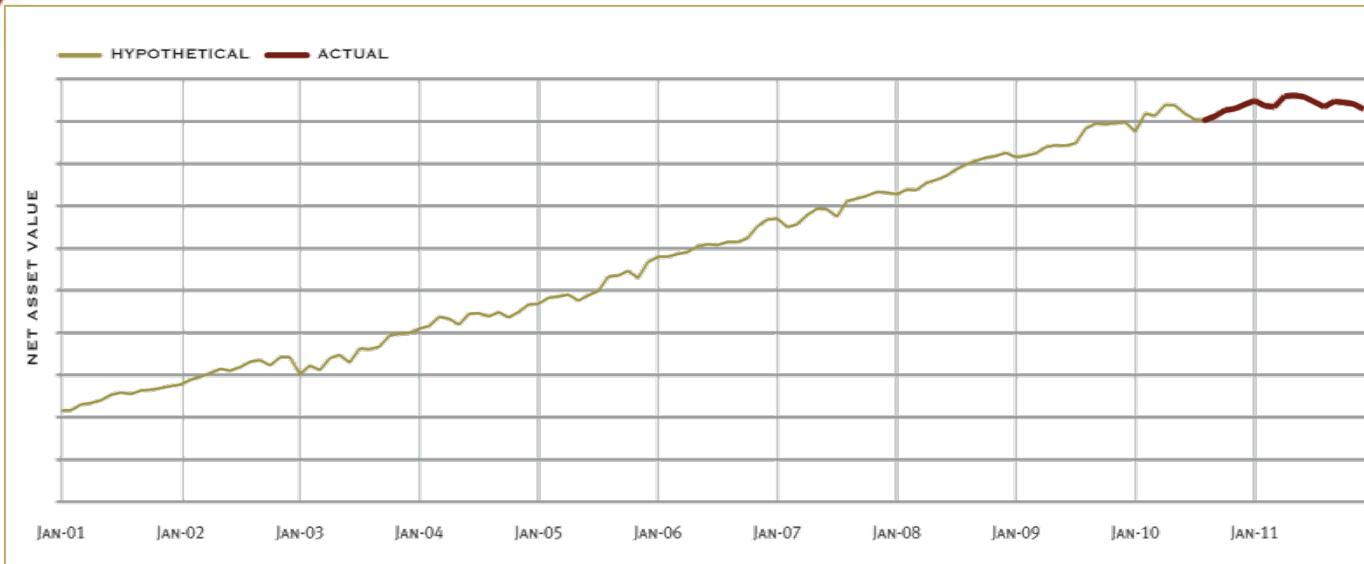
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# GLOBAL STOCK INDEX PROGRAM

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- Characteristics
  - Equity-index based (trades 10 products, domestic and foreign, in all major geographic locales).
    - U.S. (DJ30, S+P 500, Nasdaq)
    - Europe (Euro Stoxx 50, Cac 40, Dax, FTSE)
    - Asia/Pacific (Nikkei, Hang Seng, SPI 200)
  - Targets a 0.0 correlation to trend following benchmarks and to the S+P 500.
  - Models tuned expressly for dominant equity-index dynamics.
  - Average holding period of 5 days.
  - Maximum expected margin-to-equity is approximately 25%.
  - Targeted annualized volatility (based on monthly returns) is 12%.
  - Simulated profit attribution for past 8 years is consistent with geographic diversification (Europe is 40% of markets and 43% of profits, US is 30% of markets and 26% of profits, Asia/Pacific is 30% of markets and 31% of profits).
- History
  - Program started in September 2010.
- Target niche
  - GSI is intended as a pure diversifier relative to trend-following returns and also to major equity indices such as the S+P 500.

# GLOBAL STOCK INDEX OVERVIEW



PERFORMANCE TABLE														
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD	
2011	2.16	-2.88	-0.61	5.81	0.48	-0.89	-2.62	-2.74	3.03	-0.59	-0.96	-2.76	<b>-2.92</b>	
2010	-	-	-	-	-	-	-	-	2.09	3.17	0.96	2.27	<b>8.76</b>	

Global Stock Index is available to Qualified Eligible Participants only.

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# CHALLENGES WITH SHORT-TERM TRADING

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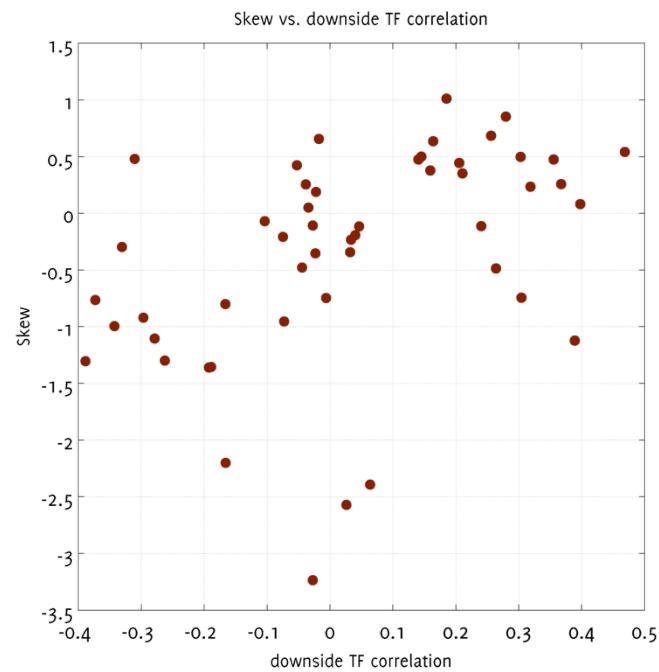
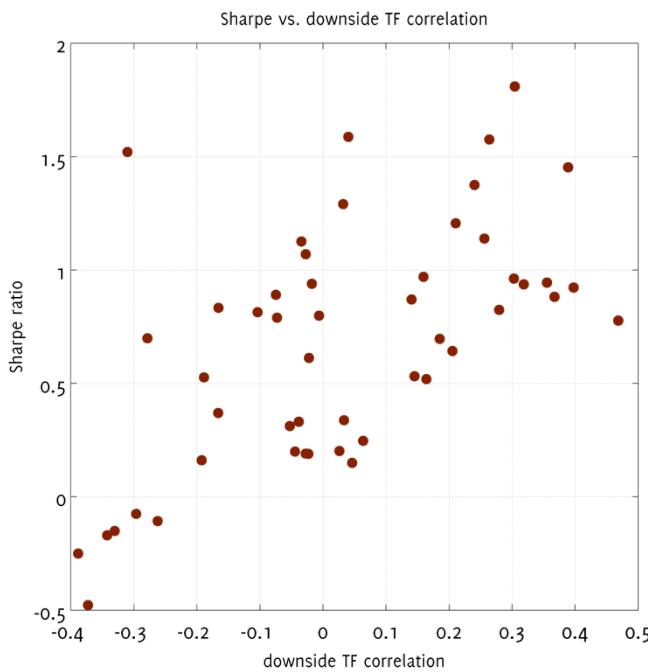
- Trading system development
  - Trends dominate, so counter-trend trading is difficult.
  - Simple “building block” study yields the following results:
    - As correlation to trend following decreases, so does model performance.
    - As correlation to trend following decreases, skew of returns becomes more negative (thus, achieving negative correlation to trend following generates high negative-skew returns).\*
    - Minimum correlation is limited to -0.3 or so, but with very poor performance (zero correlation is the practical limit if reasonable performance is required).
  - Thus, fine balancing is required to achieve de-correlation while still maintaining solid risk-adjusted returns.
- Risk management\*
  - Counter-trend strategies accumulate risk before profits accrue (trend followers only “give back” profits).
  - As a result, short-term returns have tendencies towards negative skew.
  - Existing risk approaches are necessary but not quite sufficient.
  - New tools (dynamic risk monitoring and mitigation) have been developed to account for short-term holding periods.

*\*These topics are explored in detail in a separate presentation on risk.*

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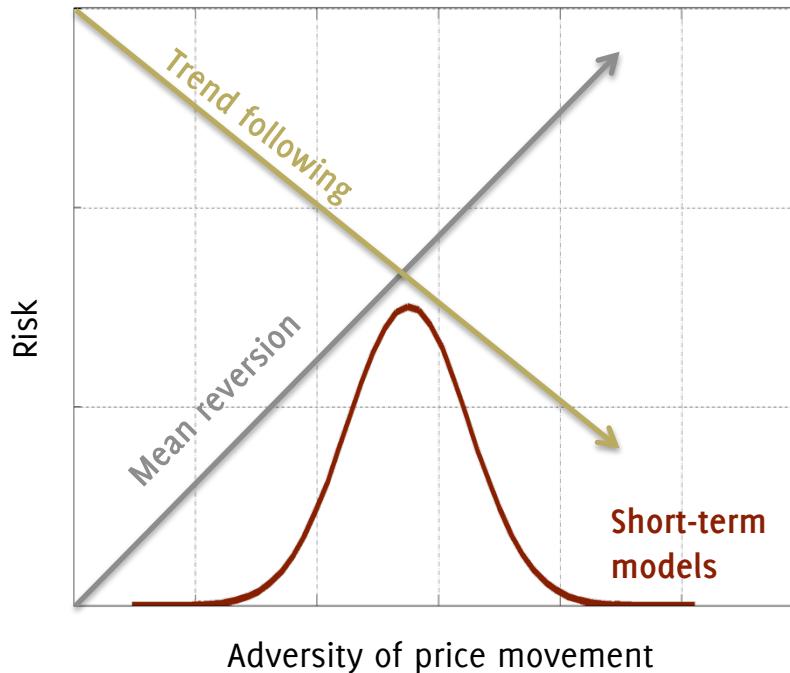
# CHALLENGES WITH SHORT-TERM TRADING

*Skew, Sharpe ratio, and TF correlations*



# CHALLENGES WITH SHORT-TERM TRADING

*Nonlinear Risk Profile of Short-term Models*



# RISK MANAGEMENT

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- The base risk management model accounts for:
  - Per-market volatility, both long-term and short-term
  - Inter-market correlations
  - Risk profile target and type
  - Historical system performance
  - Trading program characteristics
  - Time to approach “normality” (see next page)
- Program volatility/risk targets:
  - Alpha, Mosaic Institutional, and Global Stock Index: 12% annualized
  - Mosaic: 1% probability of a -20% return or worse in a rolling 21-day trading period (currently equates to a 36% annualized volatility)
- Per-market exposure bounds are enforced, as well as total-portfolio exposure bounds.
- All information is re-evaluated on a daily basis, and positions are re-sized accordingly.
- Dynamic risk monitoring and mitigation is also being utilized as of September 2010 (see next page).

*A detailed exploration of risk management can be found in a separate, stand-alone presentation.*

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# RISK MANAGEMENT

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- “Normality” constraints
  - Opportunistic trading involves variable position sizing, which causes additional “fat tails” on the daily return distribution.
  - We aim to mitigate this as quickly as possible via multiple model classes, multiple models per class, and multiple variants per model.
  - Thus, part of the portfolio construction process involves looking at the rate at which the downside returns approach normality.
- Dynamic risk monitoring and mitigation
  - Multiple approaches were examined.
  - Intra-month de-leveraging is neutral to marginally beneficial for trend-following systems but undesirable for our short-term systems (due to negative serial correlation of returns over 20-40 day time scales).
  - Drawdown-based de-leveraging has many undesirable properties and was not deemed suitable.
  - We utilize dynamic, opportunistic de-leveraging. High-correlation regimes correspond to times of lower expected risk-adjusted return for our systems. De-leveraging is done opportunistically to mitigate risk during these periods.

# ONGOING R+D

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- Continue to innovate and develop independent return streams.
  - Competitive analysis.
  - New applications of existing knowledge.
  - Establish apparent limits of diversification and possible work-arounds.
- Deploy short-term (intra-day) algorithms to complement current inter-day systems.
  - Real-time testing has been underway for most of 2010.
  - Planned deployment into existing products in mid 2011.
- Further develop our understanding of risk and ways to manage/mitigate it.
  - Examine strategy-level solutions.
  - Enhance volatility estimation.
  - Explore exogenous indicators.
- Enhance our execution strategies to facilitate larger trading capacities.
  - Automation has been a useful by-product of intra-day development.
  - Automated execution may be more efficient based on preliminary data, especially if order book information is used effectively.

# Appendix A

## Company Information

# RCM PERSONNEL

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- **Mark Chapin (Research and Development, Operations)**
  - Education: M.S., Mechanical Engineering, University of California at Berkeley, 1999.
  - Primarily involved in model development and validation.
  - Previously employed as a mechanical engineer at Seagate Technology.
  - Holds 12 patents in the area of disk-drive head/disk mechanics.
- **Geoffrey Dix (Software development)**
- **Michael Mundt (Research and Development, Business/Marketing)**
  - Education: Ph.D., Aerospace Engineering, University of Colorado, 1993.
  - Primarily involved in model development and business/marketing/compliance.
  - Previously a principal at Analytic Investments, an NFA-registered CPO.
  - Previously employed as a mechanical engineer at Seagate Technology, a major hard-disk-drive manufacturer.
  - Holds 19 patents in the area of disk-drive head/disk mechanics.
- **T. Robert Olson (Operations, Business/Marketing)**
  - Education: Ph.D., Aerospace Engineering, University of Colorado, 1996.
  - Primarily involved in the architecture and development of the computing infrastructure, daily operations management, and business/marketing.
  - Previously employed as a software engineer at Raytheon Systems.
- **Jeff Perini (Research and Development, Operations)**

# PRINCIPAL BIOGRAPHIES

## **MARK ANDREW CHAPIN**

Mark's primary focus is the development of short-term trading methodologies for RCM. Mark received his Bachelor of Science degree from Clarkson University in 1997 and his Masters of Science degree from the University of California at Berkeley in 1999. Both degrees are in mechanical engineering. Mark has an extensive background and also a strong interest both in algorithms and also their implementation in numerical code. Mark was employed by Seagate Technology, a hard-disk-drive company, between June 1999 and July 2007, where he worked on advanced concepts in the head/media department. He currently holds twelve U.S. patents in the area of disk-drive head/disk mechanics and has co-authored several peer-reviewed journal articles. Mark has been registered with the NFA as an Associated Person since 06/11/2008 and has been a listed Principal of RCM since 10/10/2005.

## **MICHAEL DAVID MUNDT**

Michael's tasks primarily consist of model development, business/marketing, and coordinating RCM's overall business and trading strategy. Michael's background is in engineering and applied science. He received his Bachelor of Science degree in Aerospace Engineering from the University of Colorado in 1989. He was awarded a Ph.D. in Aerospace Engineering in 1993, also from the University of Colorado; his thesis involved the exploration of chaos and turbulence in simple weather/climate models. After the completion of his academic studies, Michael transitioned into the technology industry. He was employed by Seagate Technology (a hard-disk drive company) as an engineer specializing in computational fluid mechanics between March 1998 and July 2007. He currently holds nineteen U.S. patents in the area of disk-drive head/disk mechanics. Michael has been registered with the NFA as an Associated Person since 12/27/2004 and has been a listed Principal of RCM since 12/27/2004.

## **THEODORE ROBERT OLSON**

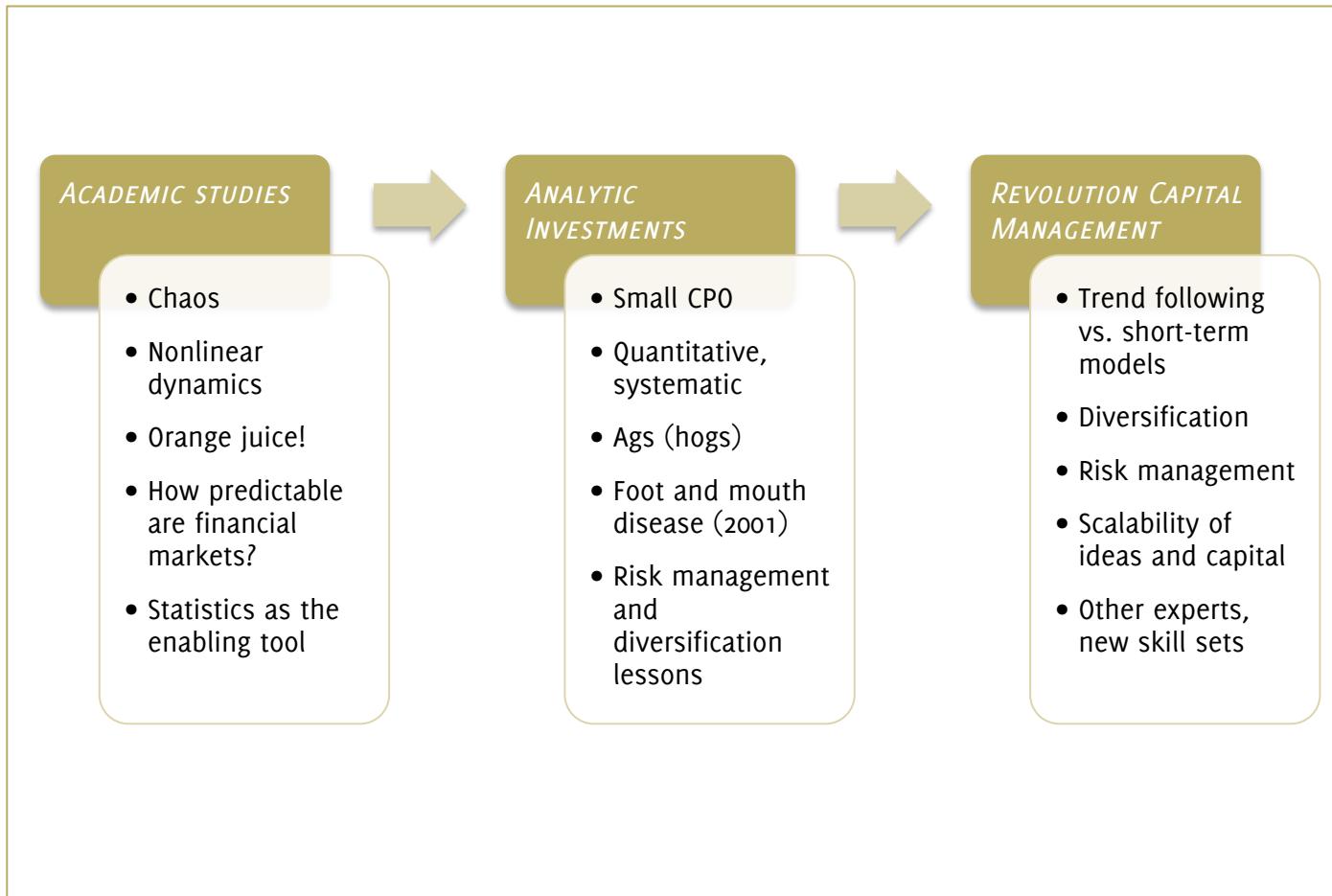
Rob oversees the architecture and development of the hardware and software computing infrastructure at RCM. Rob received his Bachelor of Science degree in Aerospace Engineering at the University of Arizona in 1989. He received his Master's and Doctorate degrees in Aerospace Engineering at the University of Colorado in 1992 and 1996, respectively. Rob was employed at Raytheon Technology, an aerospace defense contractor, from June 1996 through June 2006. His primary job duties included code/software development, data analysis, and the development of statistical algorithms to process high-frequency, real-time data. Rob is familiar with a wide range of computing languages (e.g. Fortran, C, C++, Java), operating systems (e.g. Windows, Linux, Unix, Mac OS X), and application software (e.g. Perl, Matlab, Tcl/Tk). Rob has been registered with the NFA as an Associated Person since 06/19/2008 and has been a listed Principal of RCM since 09/02/2005.



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# THE ORIGINS OF REVOLUTION CAPITAL



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# Appendix B

## Trading Ideology

# OUR APPROACH

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- People place trades for reasons, and much of the time those reasons are based on analyses of prices and price movements. This has generated an entire field of study known as “technical analysis”.
- Technical analysts have devised a multitude of different indicators to characterize price movements (as well as volume, volatility, etc).
- Further, many technical rules have been formulated that attempt to predict future price movements based on current technical measures.
- These rules have a general form:

IF {indicator} SATISFIES {condition} THEN {action}

# OUR APPROACH

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- As a simple example, consider a “breakout” rule:
  - The **{indicator}** can be defined as the 10-day moving average of close prices minus the 20-day moving average of close prices.
  - The **{condition}** is that the difference must change from negative to positive (i.e. the 10-day crosses the 20-day from below).
  - The **{action}** is to buy (go “long”) if the above condition is met.
- With such technical rule sets, the **{action}** decision is pre-ordained.
- But how do we know this is the correct action?

# OUR APPROACH

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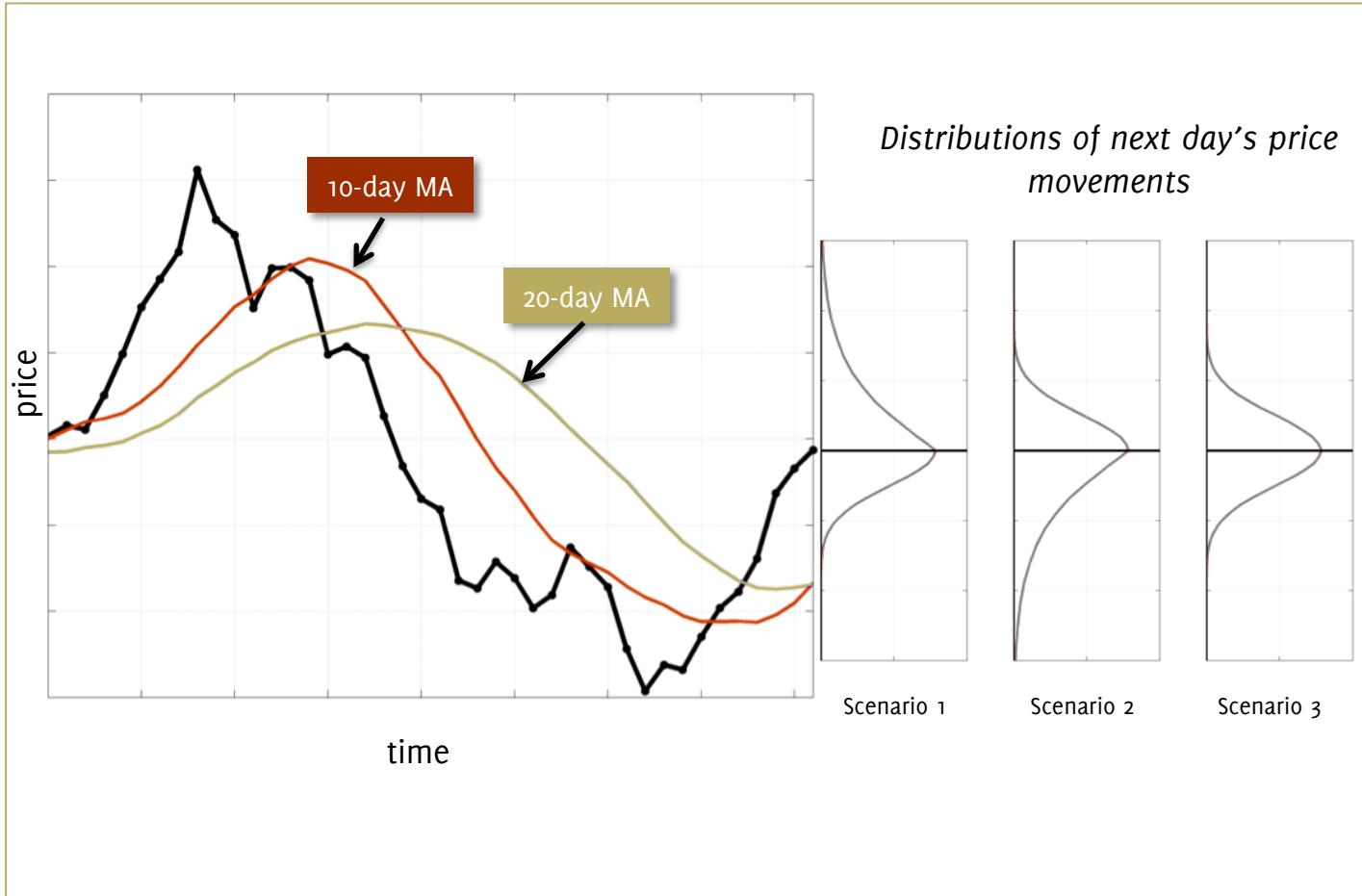
- Generally speaking, there are only 3 possible outcomes:
  - The technical rule has merit, and the 10-20 day crossover does indicate a continuing upward trend.
  - Some people believe in the rule, and others prey off of these believers. In other words, they wait for the buyers relying on the rule to pile in on the long side and then overwhelm the market with sell orders once the buying has been exhausted.
  - Everyone knows the rule, so therefore no one can profit off of it. Thus, the 10-20 day crossover has no significance whatsoever.

# OUR APPROACH

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- RCM's approach is completely agnostic.
  - We start with an array of technical indicators as inputs.
  - However, we let historical data, *not* technical rules, dictate the action that we take.
  - If the markets are random (scenario 3), then no significant signals can be found.
  - However, if either of the other two scenarios (scenarios 1 and 2) shows a significant non-random response, our system will be trained to respond to both.
  - We do this by looking through historical data for statistical biases in price movements, conditioned on technical indicator values.

# OUR APPROACH



# SUMMARY OF OUR APPROACH

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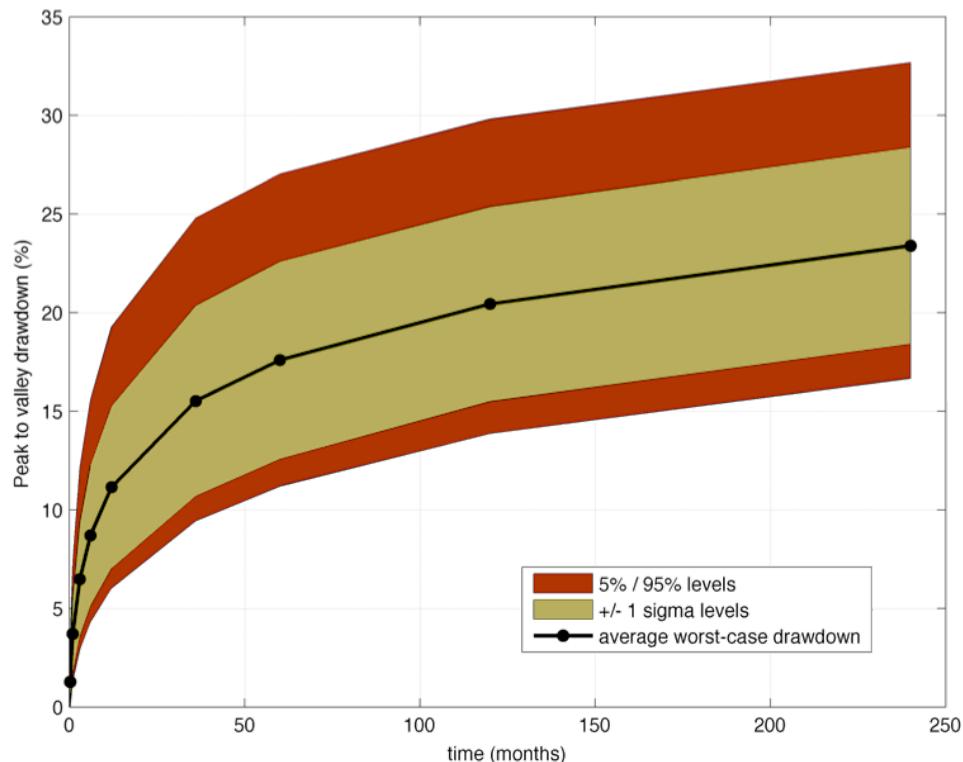
- Markets are not entirely efficient. Rule-based trading by the trading community at large generates patterns.
- RCM uses technical indicators as the starting point to identify instances when patterns are likely to exist.
- These patterns can be uncovered with a rigorous systematic, statistical approach.
- Trading algorithms are then created to react to these patterns.
- Alternate (and equivalent) interpretation is that of an asymmetric risk/reward situation.

# Appendix C

## Risk Management

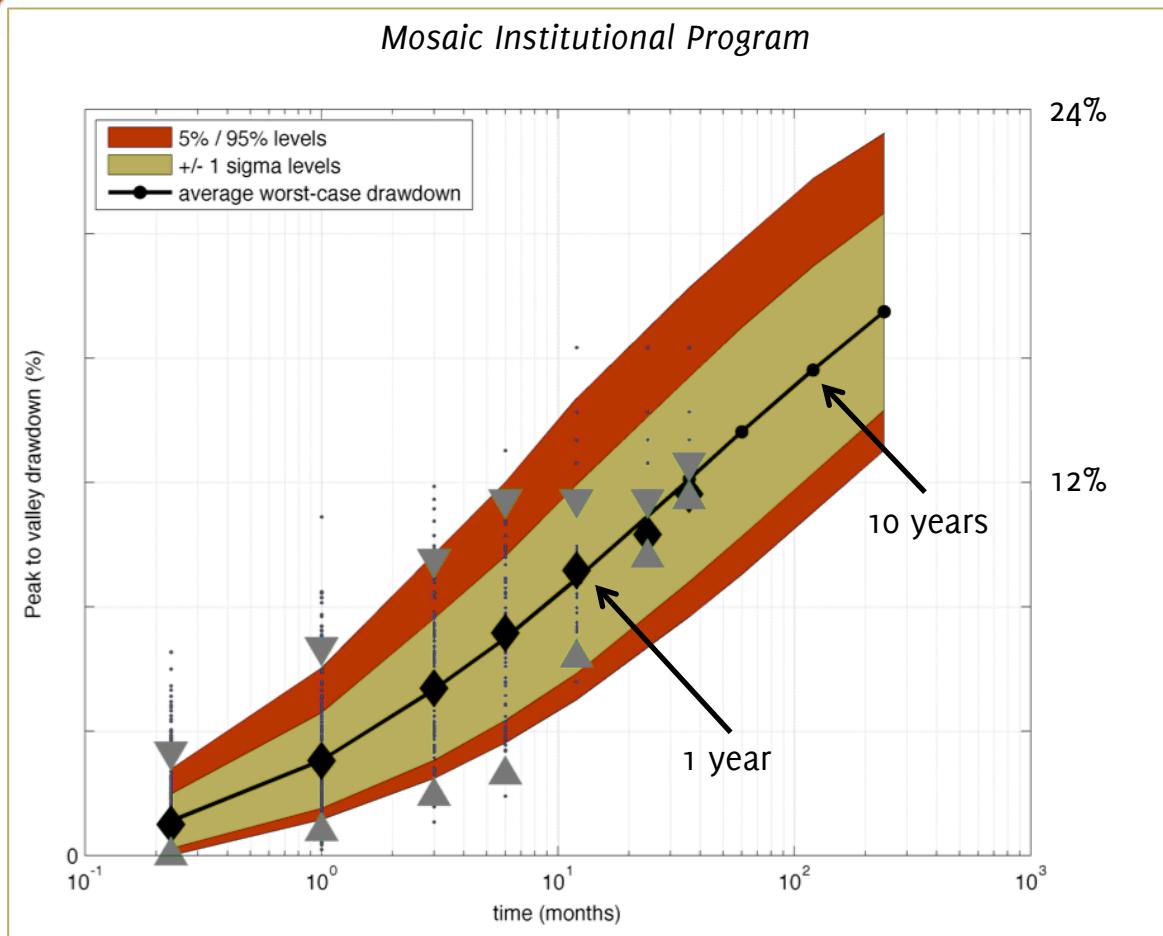
# DRAWDOWN EXPECTATIONS

*Distributions of worst observed peak-to-valley drawdown in any N-month period  
(for Sharpe=1.5, 15% annualized volatility)*



- RCM uses Gaussian-based Monte Carlo simulations as the starting point for risk estimation.
- We have no expectation for under-drawdown since we don't exploit trend following.
- Gaussian simulations are reasonably accurate for 20+ days.
- These simulations help tie together volatility and risk.

# DRAWDOWN REALIZATIONS



- 3.5 years of empirical data shows excellent agreement with Monte Carlo expectations
- Black dots: empirical samples
- Black diamonds: empirical means
- Gray triangles: empirical 5% and 95% levels

# Appendix D

## Competitive Analysis (Alpha)

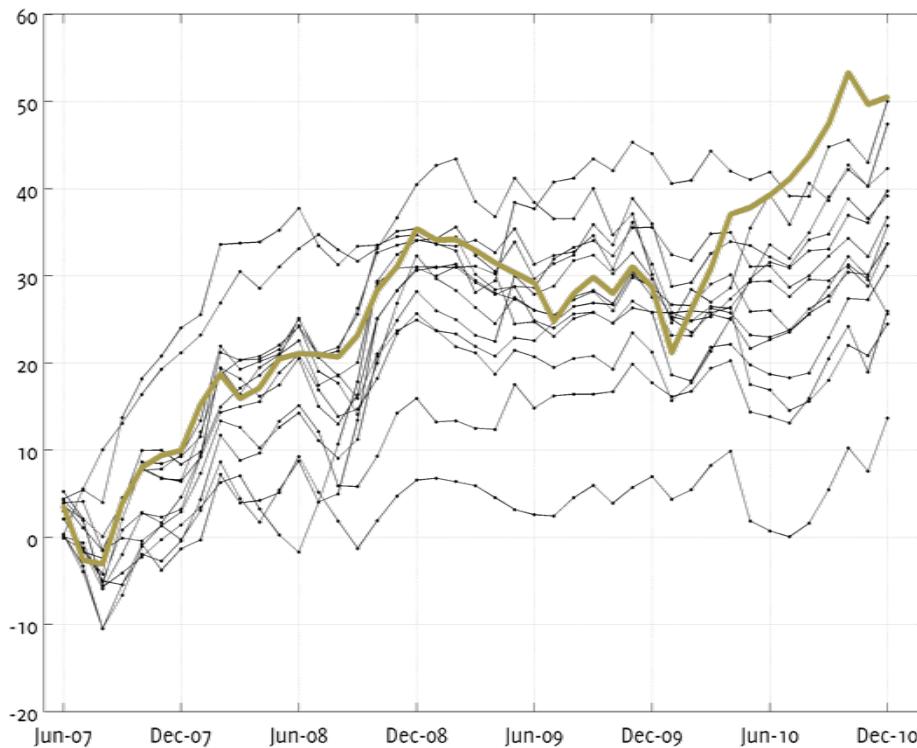
# COMPETITIVE COMPARISON SUMMARY

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- Alpha, Mosaic, and Global Stock Index are compared to peer programs for the duration of their respective real-time track records (through December 2010).
- The Alpha peer group is comprised of programs with a strong correlation to the Barclay CTA index (generally  $>0.5$ ) and with several hundred million \$ in AUM (the largest CTAs are excluded).
- The Mosaic peer group is comprised of CTAs in the Newedge Short-Term Traders Index (these programs typically have a low correlation to the Barclay CTA index). Those with track records shorter than Mosaic and those programs that employ intra-day trading are excluded.
- The GSI peer group is comprised of the few CTAs that exclusively trade stock index futures (plus one exception).

# ALPHA COMPETITIVE COMPARISON

*Alpha Comparison (Jun. 2007\* – Dec. 2010)*



PAST PERFORMANCE IS NO GUARANTEE OF FUTURE PERFORMANCE.

Competitor returns have been adjusted so that volatility is equal to the Alpha program over the time period shown.

\*June 2007 was Alpha's first full month of trading



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# ALPHA COMPETITIVE COMPARISON

Program	Correlation to Barclay CTA index	Correlation to Alpha	Sharpe ratio	Performance rank via Sharpe ratio
RCM Alpha	0.66	-	1.23	1
Beach	0.90	0.62	0.82	10
Blackwater	0.80	0.39	1.22	2
Chesapeake	0.78	0.56	0.33	15
DKR Fusion	0.77	0.53	0.63	13
Drury	0.72	0.51	0.90	7
Eckhardt	0.81	0.54	1.16	3
EMC	0.89	0.72	0.76	11
Estlander	0.80	0.52	0.97	5
Graham	0.81	0.66	0.96	6
Kaiser	0.38	0.37	1.03	4
Nuwave	0.24	0.34	0.63	12
Quality	0.88	0.63	0.82	9
Sunrise	0.82	0.55	0.60	14
Welton	0.85	0.73	0.87	8

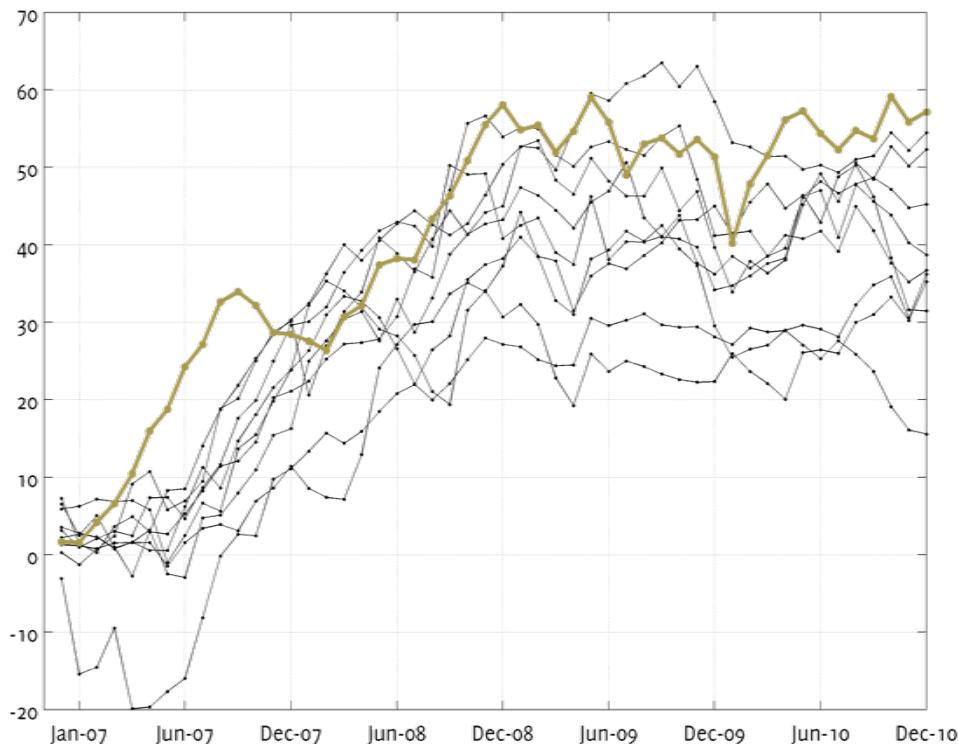


# Appendix E

## Competitive Analysis (Mosaic)

# MOSAIC COMPETITIVE COMPARISON

*Mosaic Comparison (Nov. 2006\* – Dec. 2010)*



PAST PERFORMANCE IS NO GUARANTEE OF FUTURE PERFORMANCE.

Competitor returns have been adjusted so that volatility is equal to the Mosaic program over the time period shown.

\*November 2006 was Mosaic's first full month of trading



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# MOSAIC COMPETITIVE COMPARISON

Program	Correlation to Barclay CTA index	Correlation to Mosaic	Sharpe ratio	Performance rank via Sharpe ratio
RCM Mosaic	0.23	-	1.09	1
Alphaquest	0.58	0.25	0.69	7
Amplitude	0.13*	0.05	0.87	4
Boronia	0.50	-0.04	0.67	8
Conquest	0.20	0.01	0.74	5
Dominion	0.04	0.15	0.60	9
Kaiser	0.46	0.45	1.00	3
Mapleridge	0.15	0.13	0.30	10
Niederhoffer	0.14	0.13	0.70	6
QIM	0.09	0.34	1.04	2

\*Correlation increases to 0.45 on 6-month time scales

Values highlighted in red show those with a substantial correlation to the Barclay CTA index



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# Appendix F

Competitive Analysis (Global Stock Index)

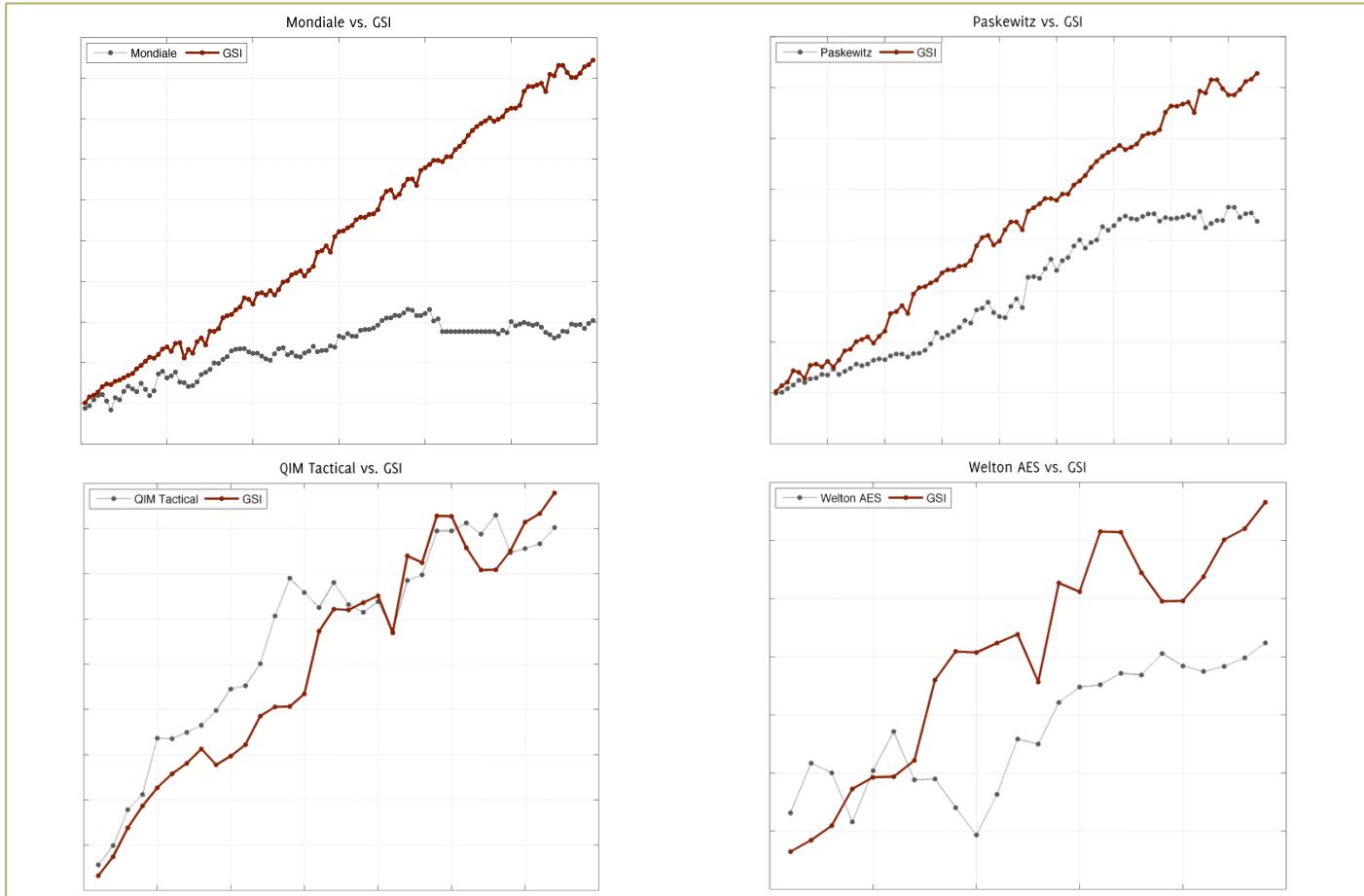
# GSI COMPETITIVE COMPARISON

Program	Inception date [number of months trading]	Correlation to Barclay CTA index	Correlation to S+P 500	Correlation to GSI
RCM Global Stock Index	September 2010 [4]	0.05**	0.18	-
Mondiale	September 1997 [160]	0.14	0.33	0.06
Paskewitz	December 2003 [85]	-0.05	0.02	0.34
QIM Tactical*	May 2008 [32]	0.01	-0.14	0.33
Welton AES*	January 2009 [24]	0.10	-0.23	0.00

\*Equity-based fund-only product.

\*\*Based on simulations from January 1996 to August 2010, and real data for September 2010 to December 2010.

# GSI COMPETITIVE COMPARISON\*



\*GSI values are hypothetical prior to September 2010



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# Appendix G

A Comparison Between RCM's Programs and Trend Following

# TREND FOLLOWING VS. SHORT-TERM TRADING

## *TREND FOLLOWING*

- Buy strength, sell weakness
- Intrinsically loss-limiting
- Intermittent by nature
- Lots of small losses, occasional large gains
- Large capacity
- Well-established strategy

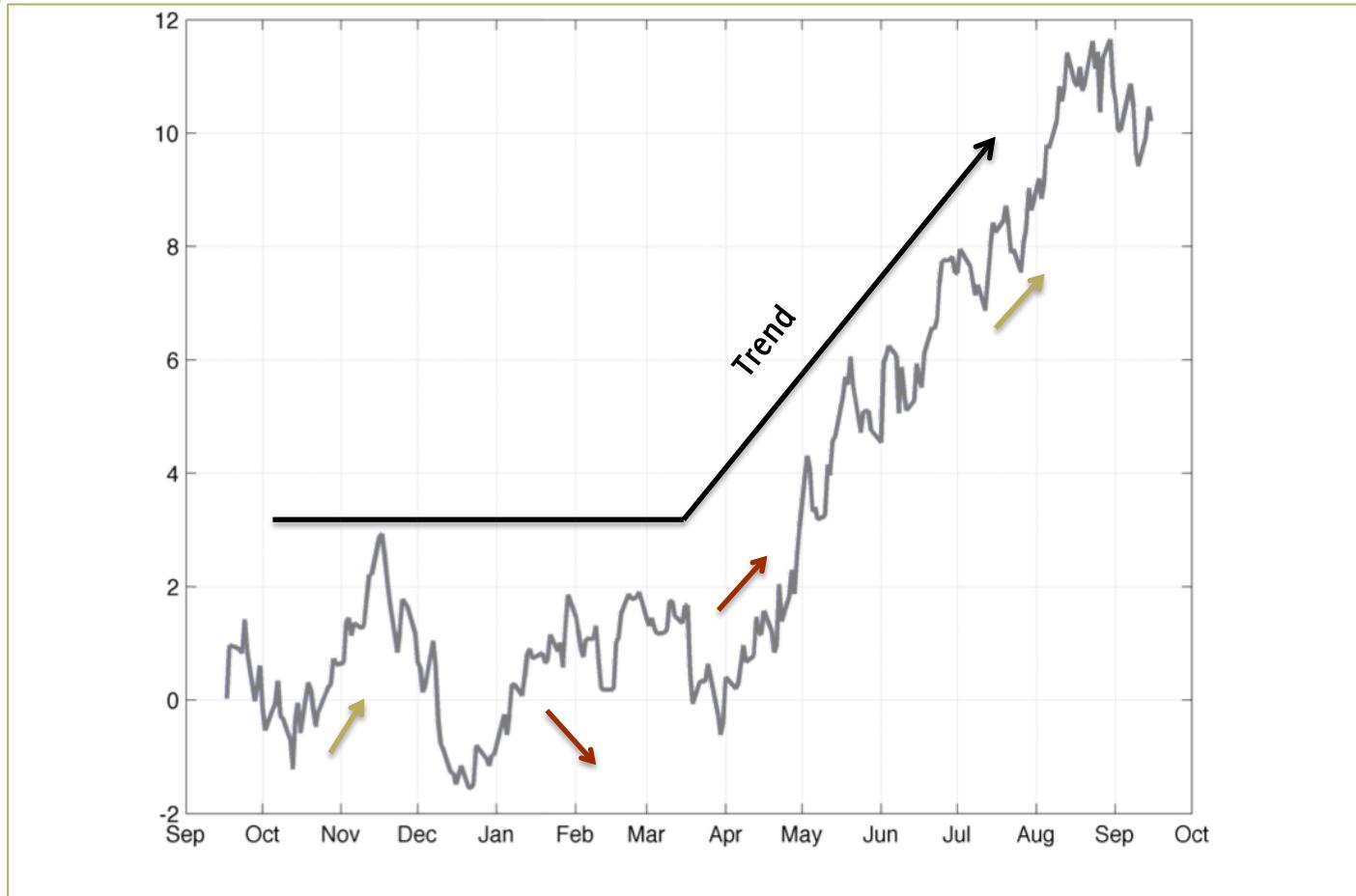


## *SHORT-TERM PATTERN RECOGNITION*

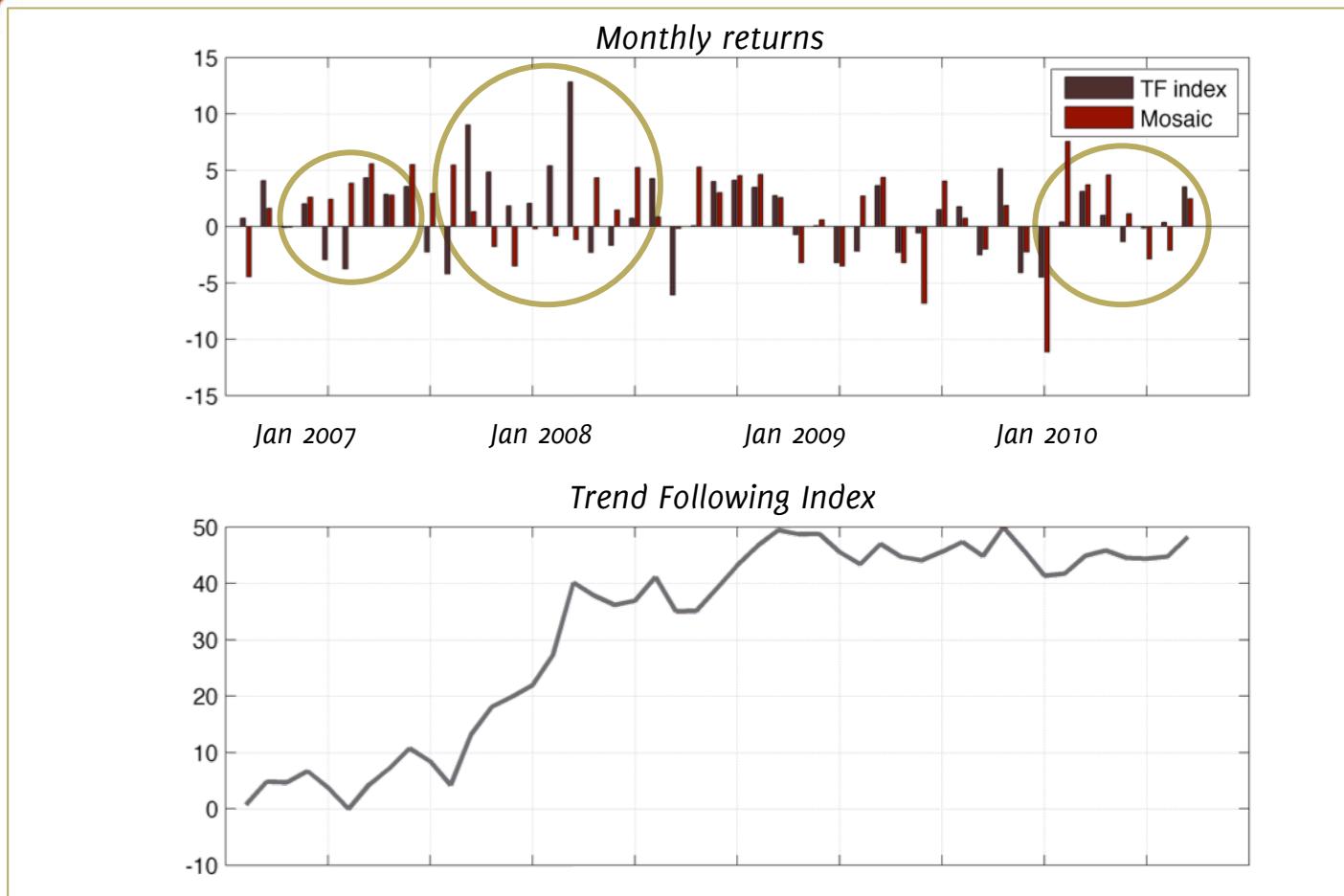
- Identify multiple price anomalies
- Risk management is more challenging
- More consistency over time
- Gains and losses are symmetric
- Moderate capacity
- Low/zero correlation to trend following



# US NOTE EXAMPLE (2009 – 2010)



# MOSAIC VS. TREND FOLLOWING



# PROGRAM COMPARISON (10/2006 – 07/2010)

	Annualized return	Annualized standard deviation	Sharpe ratio	Maximum drawdown	Correlation to Barclay CTA index	Nominal fee structure
Winton	11.3%	11.2%	1.02	9.6%	0.82	1/20
BlueTrend	21.6%	14.7%	1.41	8.3%	0.77	2/20
Aspect	8.1%	17.0%	0.54	17.2%	0.79	2/20
AHL	5.7%	14.5%	0.45	20.7%	0.85	3/20
Transtrend	13.4%	12.7%	1.06	15.1%	0.75	3/25
Lynx	12.5%	15.1%	0.86	11.6%	0.81	1/20
RCM Alpha	19.7%	11.8%	1.59	13.8%	0.62	0/25
RCM Mosaic Institutional (1x)	12.3%	12.9%	0.96	18.1%	0.20	0/25
50/50 Alpha & Mosaic Inst. blend	16.1%	10.7%	1.46	15.6%	0.46	0/25

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# CORRELATIONS

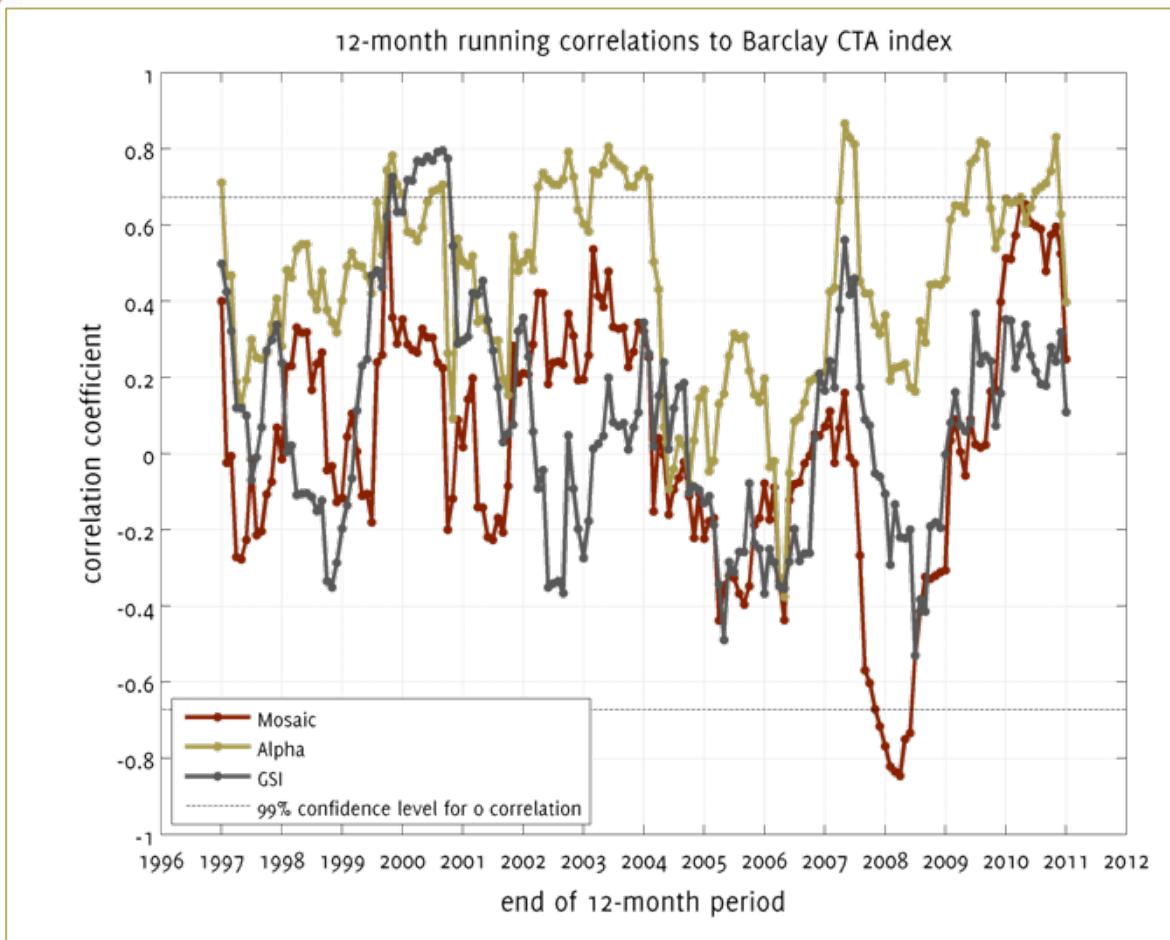
	Winton	Blue Trend	Aspect	AHL	Trans-Trend	Lynx	RCM Alpha	RCM Mosaic Inst (1x)	50/50 Alpha/MI	Barclay CTA Index
Winton	1	0.78	0.81	0.85	0.74	0.75	0.71	0.19	0.50	0.82
Blue Trend	-	1	0.81	0.83	0.71	0.82	0.63	0.22	0.49	0.77
Aspect	-	-	1	0.83	0.78	0.80	0.68	0.20	0.49	0.79
AHL	-	-	-	1	0.77	0.86	0.66	0.22	0.50	0.85
Trans-Trend	-	-	-	-	1	0.68	0.71	0.31	0.58	0.75
Lynx	-	-	-	-	-	1	0.61	0.30	0.52	0.81
RCM Alpha	-	-	-	-	-	-	1	0.49	0.85	0.62
RCM MI (1x)	-	-	-	-	-	-	-	1	0.87	0.19
50/50 Alpha/MI	-	-	-	-	-	-	-	-	1	0.46
Barclay CTA Index	-	-	-	-	-	-	-	-	-	1

Note low correlations of Mosaic and the Alpha/Mosaic blend to trend followers and the Barclay CTA index (as highlighted in bold red font).

# Appendix H

Product Correlations to the Barclay CTA Index

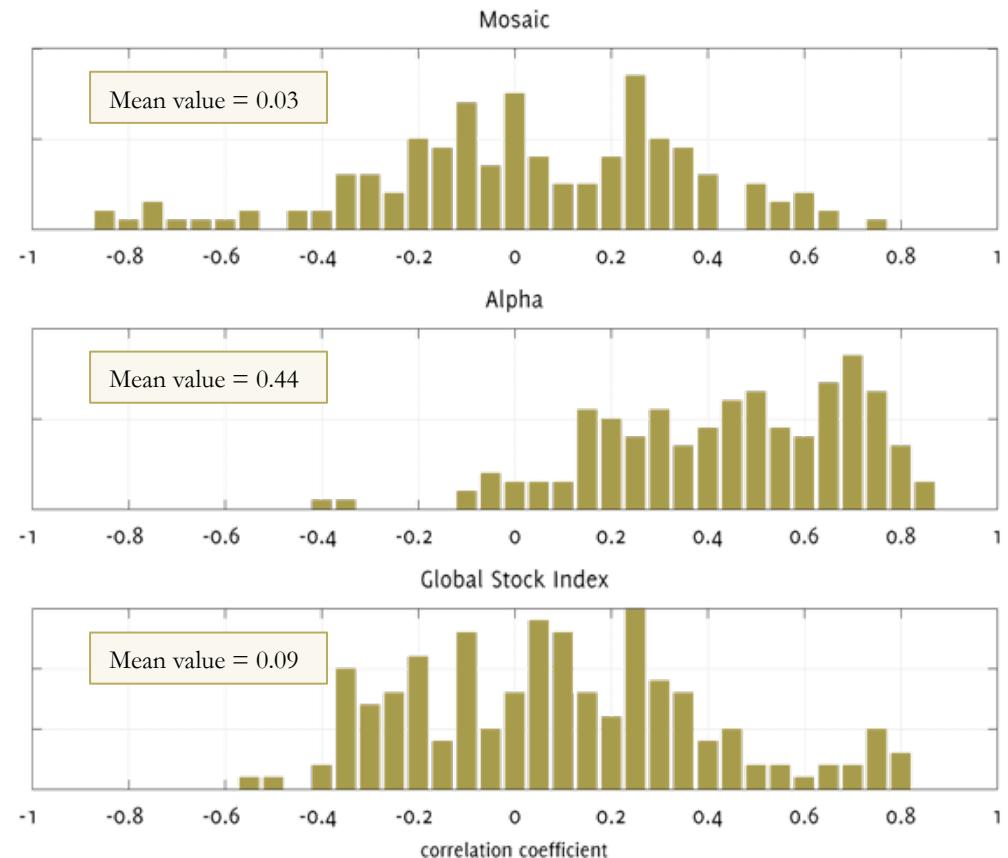
# CORRELATIONS TO BARCLAY CTA INDEX



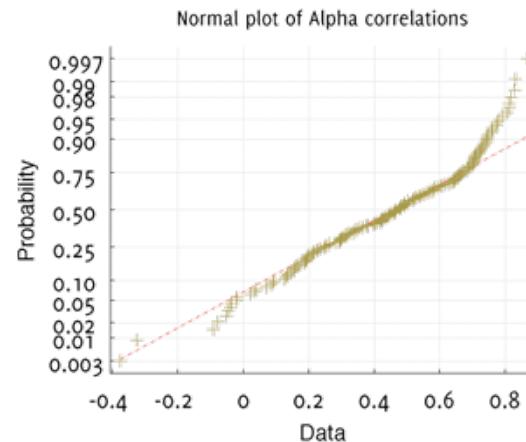
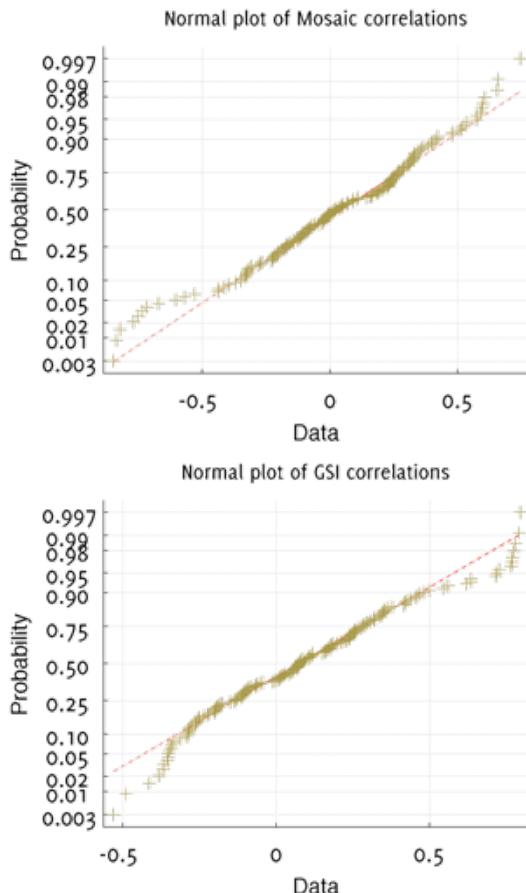
Running correlations are constructed using monthly data through January 2011.

Correlations are valid for systems as they are **currently** defined. Simulated data is used prior to inception of current programs; actual data is used from inception forward (December 2009 for Alpha and Mosaic; September 2010 for GSI).

# CORRELATIONS TO BARCLAY CTA INDEX



# CORRELATIONS TO BARCLAY CTA INDEX



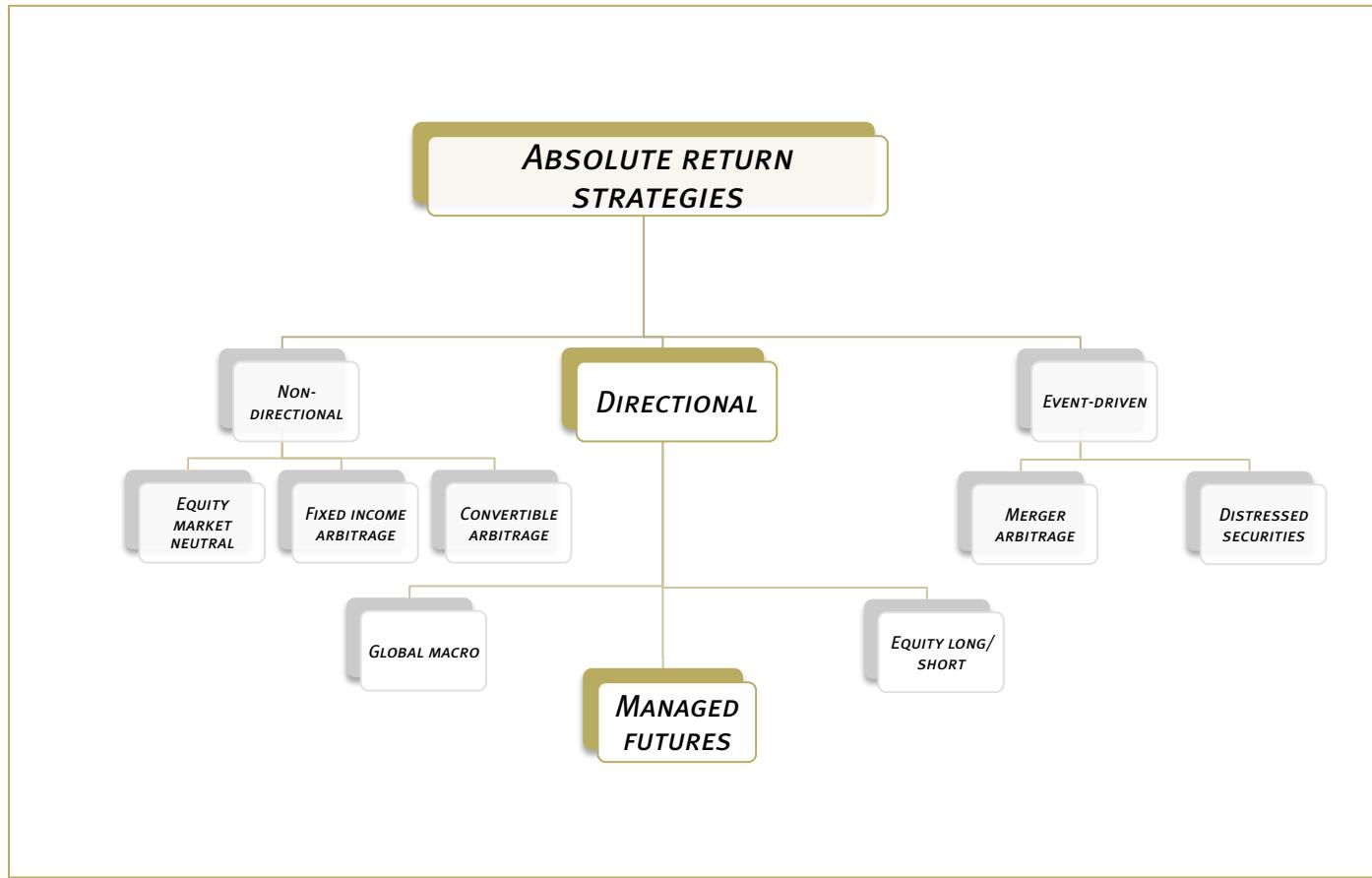
Mosaic and GSI correlation distributions are largely normal (Gaussian).

The Alpha correlation distribution has a “skinny” tail on the positive-correlation side of the distribution.

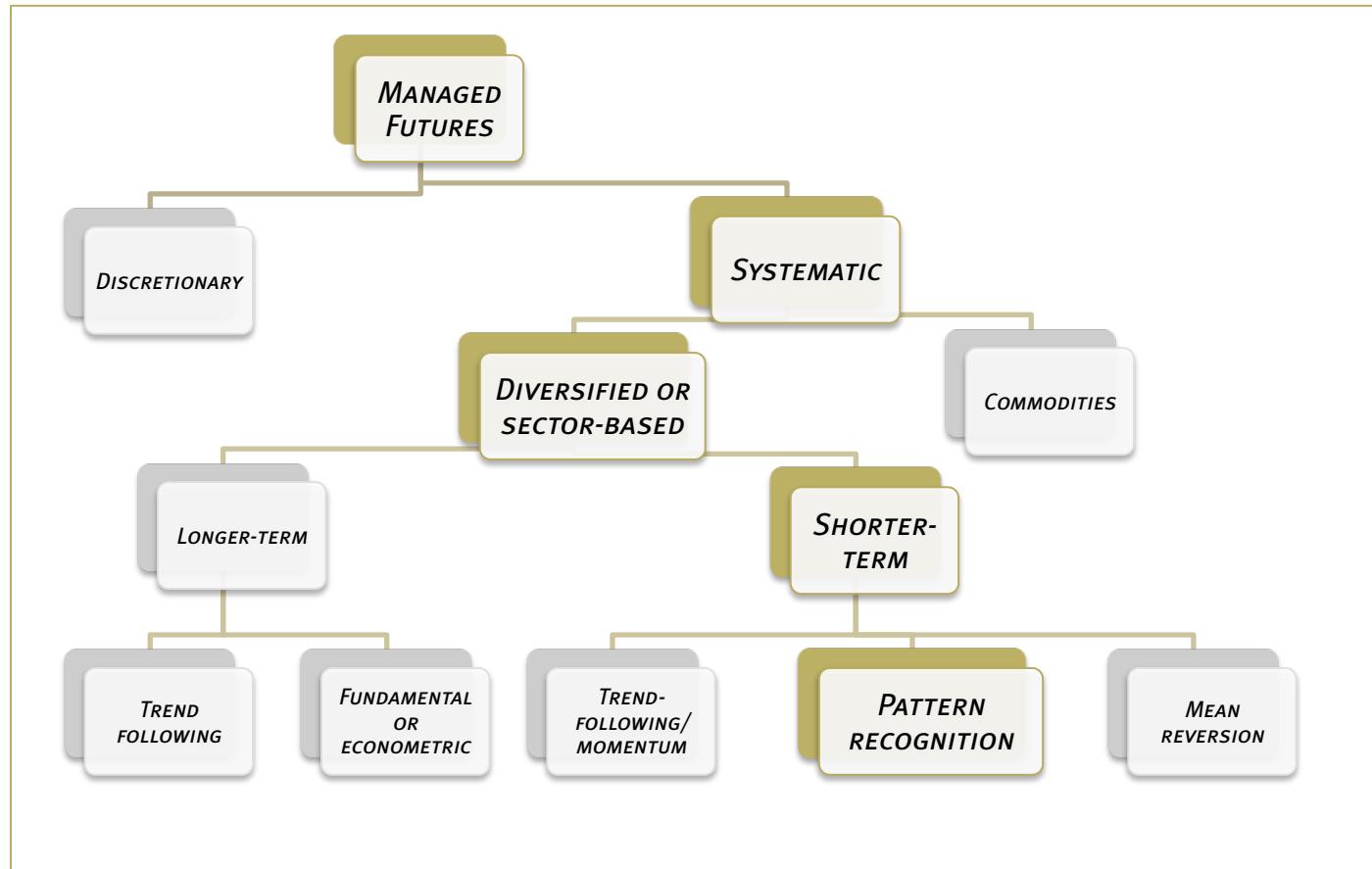
# Appendix I

A Comparison to Equity-based Products

# ABSOLUTE RETURN TAXONOMY



# MANAGED FUTURES TAXONOMY



# A COMPARISON OF “FUNDAMENTALS”

## *EQUITIES*

- Metrics
  - P/E
  - Earnings growth
  - Revenue growth
- Styles
  - Value, growth, relative value (pairs trading)
- Challenges
  - No true P/E standard
  - Value and price don't always equate (tech bubble)
  - Corporate shocks
- Bottom line
  - “Laws” appear immutable but are often ignored for long periods (Buffett, 1999)

## *SYSTEMATIC FUTURES*

- Metrics
  - Momentum
  - Overbought, oversold
  - Higher-order statistics
- Styles
  - Trend following, counter-trend, pattern recognition
- Challenges
  - No fundamental laws
  - Tendencies are statistical, not rule based
  - Macro-economic shocks
- Bottom line
  - “Laws” are phenomenological but persistent (not a black box, requires fundamental research)

# ABSOLUTE RETURN STRATEGY

## CORRELATIONS

	S+P 500	CTA Index	Equity Long/ Short	Equity Market Neutral	Conv. Arb.	Fixed Income Arb.	Merger Arb.	Dis- tressed	Global Macro
S+P 500	-	-0.19	0.78	-0.15	0.45	0.46	0.59	0.59	0.35
CTA Index		-	0.04	0.36	-0.05	-0.10	0.05	-0.07	0.62
Equity Long/ Short			-	0.24	0.55	0.48	0.78	0.72	0.66
Equity Market Neutral				-	0.13	0.11	0.24	0.21	0.45
Conv. Arb.					-	0.76	0.58	0.72	0.32
Fixed Income Arb.						-	0.49	0.76	0.27
Merger Arb.							-	0.60	0.57
Distressed								-	0.41
Global Macro									-

Data source: Barclay CTA and Hedge Fund Indices, 1/2001 to 8/2010



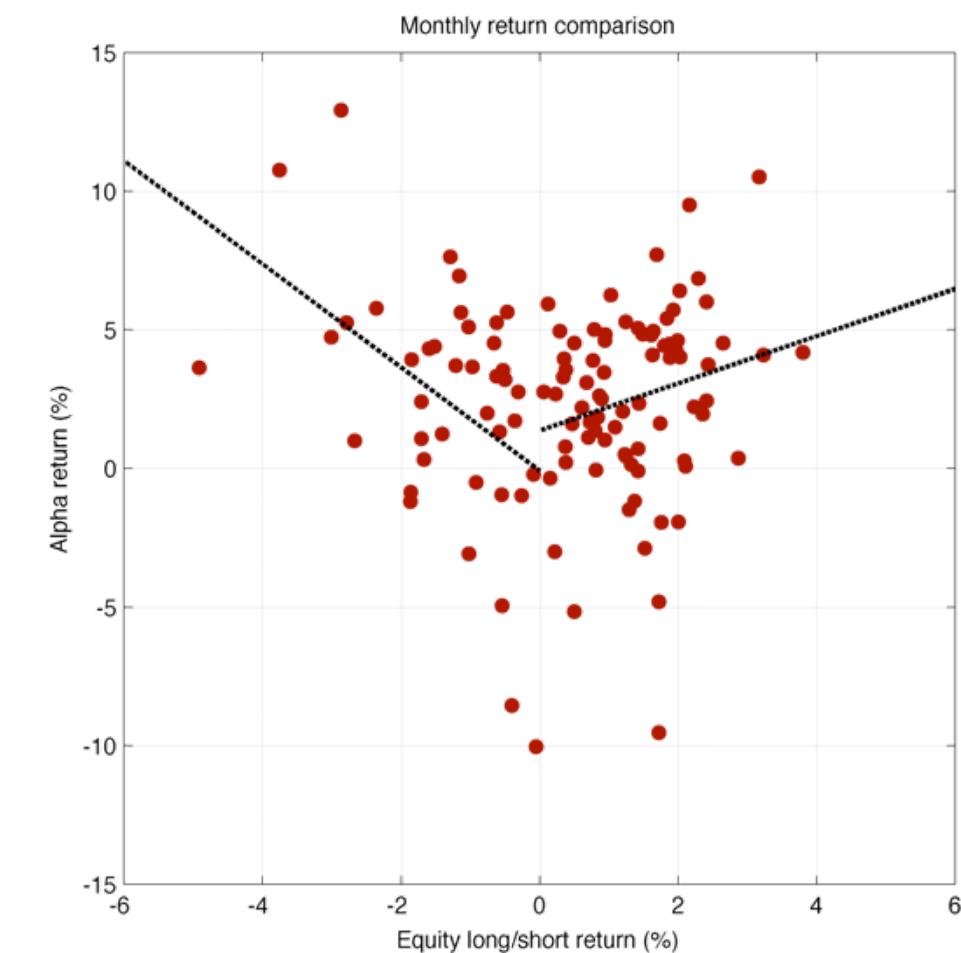
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# CROSS-VEHICLE STRATEGY CORRELATIONS

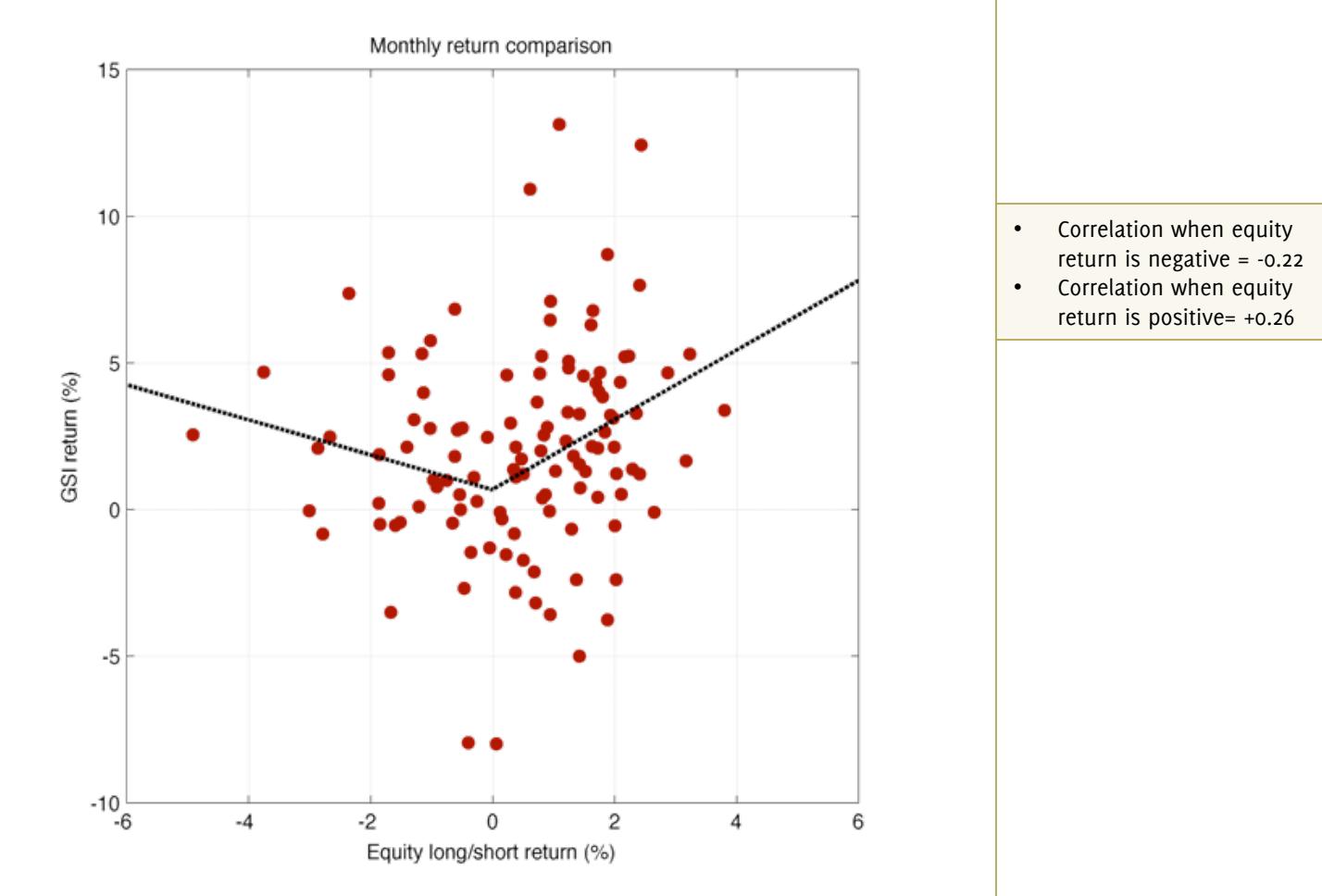
	S+P 500	CTA Index	Equity Long/Short	Global Macro	Alpha	Mosaic	GSI
S+P 500	-	-0.19	0.78	0.35	-0.15	0.11	0.10
CTA Index		-	0.04	0.62	0.46	0.12	0.00
Equity Long/Short			-	0.66	-0.05	0.14	0.15
Global Macro				-	0.18	0.04	0.08
Alpha					-	0.52	0.27
Mosaic						-	0.40
GSI							-

# ALPHA VERSUS EQUITY LONG/SHORT

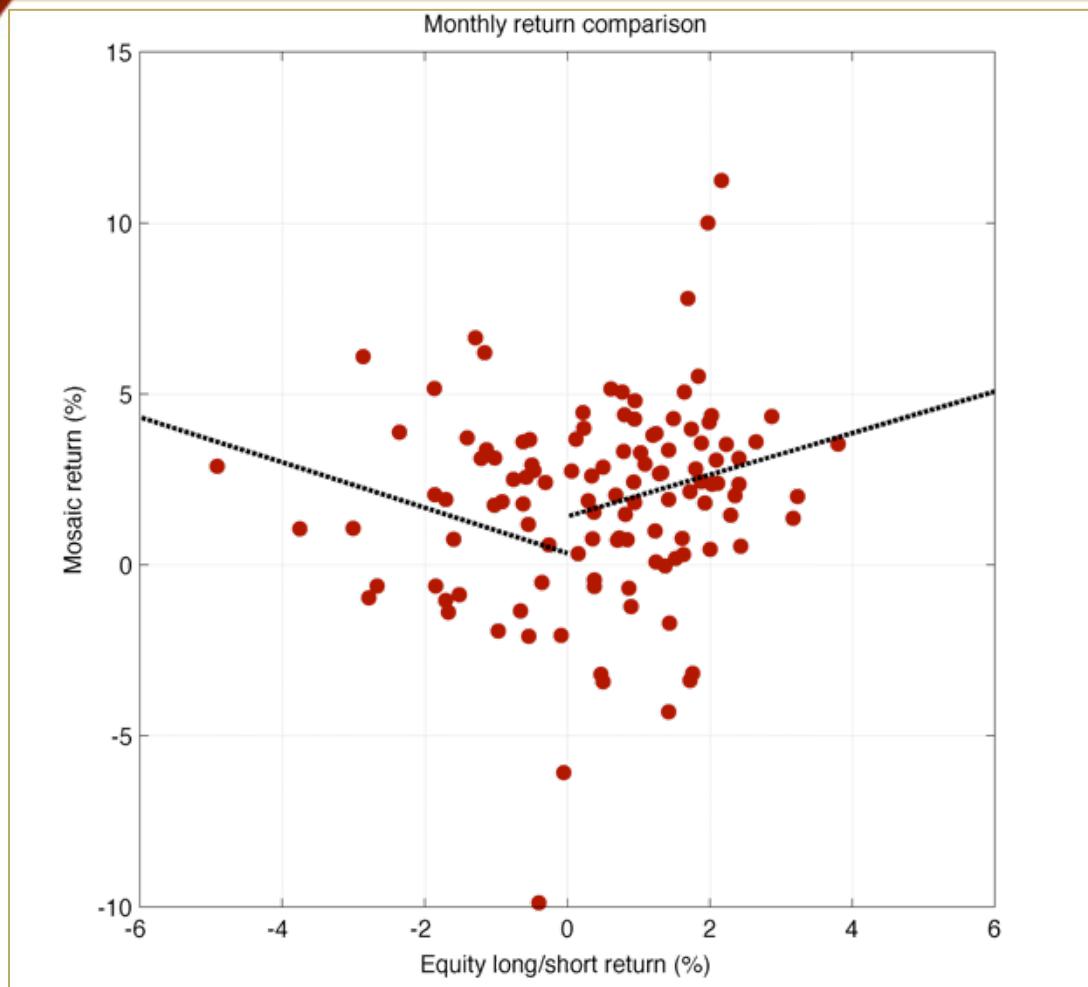


- Correlation when equity return is negative = -0.45
- Correlation when equity return is positive= +0.21

# GSI VERSUS EQUITY LONG/SHORT



# MOSAIC VERSUS EQUITY LONG/SHORT



- Correlation when equity return is negative = -0.22
- Correlation when equity return is positive= +0.19