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The Merits of Absolute Return Quantitative Investment Strategies

Cambridge University Finance Seminar, Lent Term, 2005

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4 March 2005

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Outline

- Some definitions: asset class, alternative strategy, quantitative strategy
- Current trends in hedge fund investing and role of quantitative strategies
- Subjective taxonomy and performance record of quantitative strategies
- Why do these strategies succeed: the quantitative investment paradox
- Potential risks and ideal market conditions for quantitative strategies
- How to build effective quantitative strategies
- Points to remember & a final thought...

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Asset class definition

- There are only two “**mainstream**” assets
 - equity assets and fixed income assets
- Within equities, there are several distinct groups
 - domestic, international, developed, emerging, large cap, small cap, public, private, etc.
- Within bonds also, there are several distinct groups
 - government, corporate, emerging, investment grade, high yield, convertible, callable, etc.
- In addition to the “mainstream” asset classes, there are several “**alternative**” asset classes
 - land, real estate, commodities, timber, antiques, art, fine wine, classic cars, etc.

“Assets have distinct features & intrinsic value independent of investment strategy”
“Hedge funds are not alternative assets, they are just alternative investment strategies!”

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Alternative strategy definition

Alternative strategies have two distinguishing characteristics:

- Alternative strategies can deploy **more tools** (e.g. leverage, derivatives)
- Alternative strategies are subject to **fewer restrictions** (e.g. short selling, benchmarks)

**“Alternative strategies are just investment strategies
that use more efficient portfolio construction techniques!”**

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Quantitative strategy definition

- Any **objective** and **repeatable** investment strategy
- Main characteristics of quantitative strategies:
 - Rigorous thinking
 - Emotional detachment
 - Reliance on empirical data
 - Ability to cope with large universe
 - Ability to analyse complex relationships
 - Ability to quantify exposures, risks, and costs
 - More flexibility due to lack of human infrastructure!

“The quant gladiators against the army of analysts!”

Current trends in hedge fund investing

- Historically, alternative strategies were predominantly aimed at wealthy **individuals**
- Recently, **institutions** have been making increasing allocations to these strategies
- Evidence of this trend:
 - US university endowment allocations to HF went from 3% in 1999 to 6% in 2003*
- Key factors behind this trend:
 - Low return environment
 - More emphasis on liability benchmarks
 - Separation of alpha and beta through core / satellite structures

*J. Yoder, 2004, "Endowment Management: A Practical Guide", Association of Governing Boards of Universities & Colleges, Washington DC

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The role of quantitative strategies

- Institutions emphasise liquidity, transparency, consistency, repeatability, and risk control
- Quantitative strategies are naturally better equipped to fulfil these institutional requirements:
 - Restrictions on TO, leverage, beta neutrality, dollar neutrality more easily accommodated
 - Better liquidity, e.g. hard to borrow names can be replaced more easily with other stocks
 - Better monitoring of country, sector, style, size concentration
 - Easier and more detailed performance analysis and attribution
 - Natural fit with portable alpha and derivative overlay strategies

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A subjective taxonomy of quantitative strategies

- Global macro strategies (managed futures, tactical allocation, currency overlay, etc)
- Statistical arbitrage strategies (pairs trading, spread arbitrage, volatility arbitrage, etc)
- Security selection strategies (factor models, decision trees, non-linear algorithms, etc)

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Track record of global macro strategies

Monthly Summary Statistics 1995 - 2003

	Mean Return (bp)	Standard Deviation (bp)	Downside Deviation (bp)	Correlation with S&P	Correlation with SWGBI
Discretionary Strategies					
1995 - 1999	99	335	236	0.62	0.05
1999 - 2003	61	159	60	0.57	-0.08
1995 - 2003	80	262	172	0.55	0.01
Systematic Strategies					
1995 - 1999	82	392	183	0.08	0.60
1999 - 2003	97	354	154	-0.19	0.41
1995 - 2003	90	371	168	-0.06	0.50

Statistics based on monthly performance data for the EACM100(r) Index - Onshore Funds, Global Asset Allocator Strategy Group

Source: EACM Advisors LLC, Thomson Financial Datastream, HSBC Asset Management

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Track record of statistical arbitrage strategies

Excess Returns on Unrestricted Pairs Trading Strategies

Portfolio	Top 5	Top 20	20 after top 100	All Pairs
Panel A: Excess Return Distribution (no waiting)				
Mean (committed capital)	0.0598	0.0601	0.0451	0.0410
Std error (Newey-West)	0.0065	0.0055	0.0038	0.0038
T-statistic	9.1363	10.8866	11.8900	10.7022
Panel B: Excess Return Distribution (1 day waiting)				
Mean (committed capital)	0.0368	0.0396	0.0354	0.0288
Std error (Newey-West)	0.0051	0.0042	0.0034	0.0033
T-statistic	7.2635	9.3286	10.4686	8.6709

Summary statistics of the 6m excess returns on equally weighted portfolios of pairs. A position is initiated when the prices of the stocks in the pair diverge by two historical std deviations. The "top n" portfolios include the n pairs with least distance measures and the portfolio "20 after top 100" has the pairs after the top 100 pairs. The avg number of pairs in the all-pair portfolio is 1870. There are 408 observations from 02/63 - 12/97

Source: Gatev, Goetzmann, Rouwenhorst, 1999, "Pairs Trading: Performance of a Relative Value Arbitrage Rule", working paper, Yale University

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Track record of security selection strategies

Performance Relative to S&P 500 1989–2001

	Active Return (bp)	Tracking Error (bp)	Information Ratio	Pairwise Correlation
Quantitative Managers (64 Managers)				
Average	43	209	0.26	0.08
Median	52	221	0.28	0.08
Top Quartile	92	266	0.44	0.27
Bottom Quartile	-4	147	-0.02	-0.10
Traditional Managers (561 Managers)				
Average	53	821	0.05	0.13
Median	53	769	0.07	0.14
Top Quartile	201	971	0.27	0.36
Bottom Quartile	-120	619	-0.16	-0.10

Source: Plan Sponsor Network (PSN) database of institutional manager returns

Reported in: Alford, Jones, and Winkelmann, "A Spectrum Approach to Active Risk Budgeting", JPM, Fall 2003

Why do these strategies work: quantitative investment paradox I

- Many quantitative strategies are fairly well documented and publicised
- However, they continue to work because the majority of market participants:
 - Fail to understand or choose to overlook the objective statistical evidence
 - Make investment decisions based on subjective qualitative assessments
 - These assessments are prone to cognitive errors and emotional biases

**“An investment process based on quantitative models is not a black box...
...an investment process based on subjective assessments and gut feeling is!”**

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Why do these strategies work: quantitative investment paradox II

- Quantitative strategies are emotionally detached
- They exploit investors' emotional involvement, behavioural biases, and cognitive errors
- Fortunately, emotional and behavioural reasons prevent their widespread acceptance!

Short term mean reversion - the liquidity premium

- Statistical arbitrage strategies exploit short term mean reversion:
 - They look for correlated securities that diverge in performance
 - They bet that divergence is temporary & will be corrected shortly
- Why do these strategies earn a positive payoff - the **normative view**:
 - Divergence in performance may be due to large information trade
 - Statistical arbitrage strategies provide insurance against this risk
- Why do these strategies earn a positive payoff - the **behavioural view**:
 - Human nature wants to buy stocks that have risen / sell stocks that have fallen
 - Statistical arbitrage strategies exploit this bias in subjective decision making

Medium term serial correlation - the momentum premium

- Many systematic global macro strategies include a momentum signal:
 - They look for turning points and newly emerging trends in prices
 - They bet that these new trends will persist over the medium term
- Why do these strategies earn a positive payoff - the **normative view**:
 - These strategies result in non-linear exposure to market risk
 - By assuming market risk, these strategies earn a risk premium
- Why do momentum strategies earn a positive payoff - the **behavioural view**:
 - The market is anchored in past performance and under-reacts to new information
 - Momentum strategies exploit this under-reaction & slow assimilation of new information

Long term mean reversion - the value premium

- Many security selection strategies incorporate a value signal:
 - They look for stocks that trade at **low** prices relative to fundamentals
 - They bet that these will outperform stocks that trade at **high** prices rel to fundamentals
- Why do value strategies earn a positive payoff - the **normative view**:
 - Cheap stocks are systematically riskier than expensive stocks
 - Value strategies assume this risk and earn a risk premium
- Why do value strategies earn a positive payoff - the **behavioural view**:
 - The market is too pessimistic about cheap stocks & too optimistic about expensive stocks
 - Value strategies exploit this imprecise and biased pricing of cheap & expensive stocks

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Potential risks associated with quantitative strategies

- Data mining
- Manual override
- Excessive concentration
- Excessive diversification
- Lack of economic rationale
- Static or dynamic factor exposures?
- Different models for different stocks / markets / periods?
- Data errors / bid ask bounce / selection bias / survivorship bias / look ahead bias
- Incorrect model specification / non-linear relationships / non-stationary parameters

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Ideal environment for quantitative strategies

- Clean data
- High liquidity
- Low transaction costs
- Diverse and volatile market

Building effective quantitative strategies

- Spend time & effort collecting, cleaning, properly lagging, and verifying the data
- Consider in advance which factor exposures are likely to earn a premium and why
- Bet on a few factors that earn high payoff and have low volatility and low correlation
- Hedge a few factors that earn low payoff and have high volatility and high correlation
- Increase breadth by betting often and by spreading risk across as many bets as possible
- Examine relationship between signal and realised return - assume it's linear by default
- Test for consistency across different stocks, different markets, different time periods
- Test for statistical and economic significance, assuming realistic transaction costs

**“Then, to obtain a realistic estimate of future performance,
divide the return of the backtest by 2!”**

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Building effective quantitative strategies: a real world example

FTSE World Index Universe, Monthly Statistics Between 12/89 - 06/04

	Mean Ret (bp)	Std Dev (bp)	Inform Ratio	Success Rate (%)
Individual Signal Performance				
Valuation Signal	111	317	1.21	70.2
Momentum Signal	60	434	0.48	58.3
Combined Signal Performance				
Combined Signal (without neutralisation)	160	322	1.72	67.9
Combined Signal (with neutralisation)	102	112	3.16	82.7

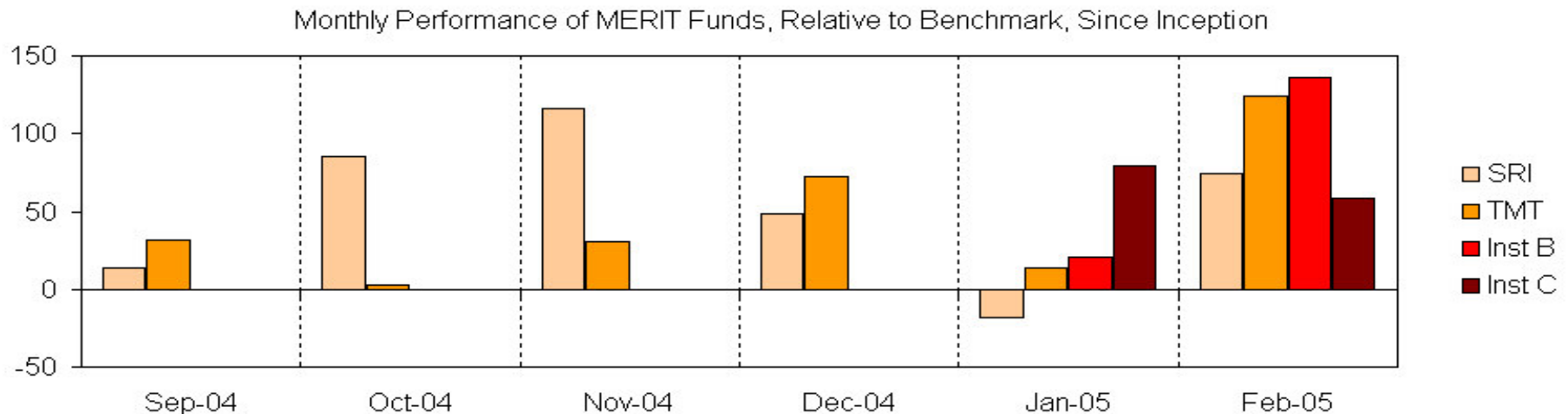
Mean return of long-short portfolio with 2std cross sectional exposure to the signal, gross of transaction costs

Source: Global Research Group HSBC Asset Management

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MERIT client list and portfolio performance since inception

Client	FUM	Mandate	Inception	Rel Perf*
HGIF Global Equity SRI Fund	\$12 m	Global	23/08/04	335 bp
HGIF Global Equity TMT Fund	\$10 m	Global	31/08/04	288 bp
European DB Pension Fund	\$33 m	S&P 500	31/12/04	154 bp
European Insurance Company	\$153 m	MSCI JP	31/12/04	138 bp
AMCA Global Equity TMT Fund	\$10 m	Global	28/02/05	NA
US University Endowment Fund	\$50 m	Global	30/04/05	NA



* Source: Factset performance analysis system, performance from inception to 28/2/05, gross of transaction costs & fees

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Points to remember & a final thought

- Shorting & gearing are mere portfolio construction tools
 - An effective strategy works equally well in a long only & long-short context
- Quantitative strategies are predominantly beta (not alpha) strategies
 - The key is to maintain exposure to **desirable bets** while hedging **undesirable risks**
- Bet on **few factors** and spread bets across **many stocks** - not the other way around!
 - Avoid concentrated bets - instead, use gearing to increase exposure (and return)
- Avoid mean variance optimisation in portfolio construction
 - Security return distributions are not stationary, especially after portfolio formation!
 - The relationship between signal and realised return should drive portfolio construction
- Beware of execution costs - use electronic trading, crossing, futures, ETF, no-trade regions
 - Fact from QF research: when market frictions are introduced, optimal strategy involves NTR

“Building effective quantitative strategies is not easy”

“If top traders and Nobel Prize winners can fail, hiring an intern for the job will not work!”

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Compliance approval reference FP04-0894

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