CREDIT SUISSE

Hedge Funds and Hedge Fund Derivatives

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Produced by : Angelo De Pol

Contents

Introduction

- Personal introduction
- Explain hedge funds & what makes them a unique investment class
- Describe market characteristics, investors and managers
- Review the most common hedge fund derivatives
- Explain how and why the credit crisis impacted the hedge fund industry
- Highlight the key risks of the industry / hedge fund portfolio
- Provide examples of how hedge fund risk is managed

What are Hedge Funds?

- Umbrella term for collective investment vehicles employing a huge range of different strategies
- Highly specialised…rely on specific expertise of manager
- Largely offered as **private investments**
- Typically structured as **limited partnerships**
- Generally set up in **tax havens**
- Narrow range of investors
- Use of **leverage and derivatives** is widespread
- Hedge Funds aim to i) **Preserve capital**, ii) **Reduce volatility and risk** and iii) **Deliver positive returns under all market conditions**

Comparison of Hedge Funds vs Traditional Funds

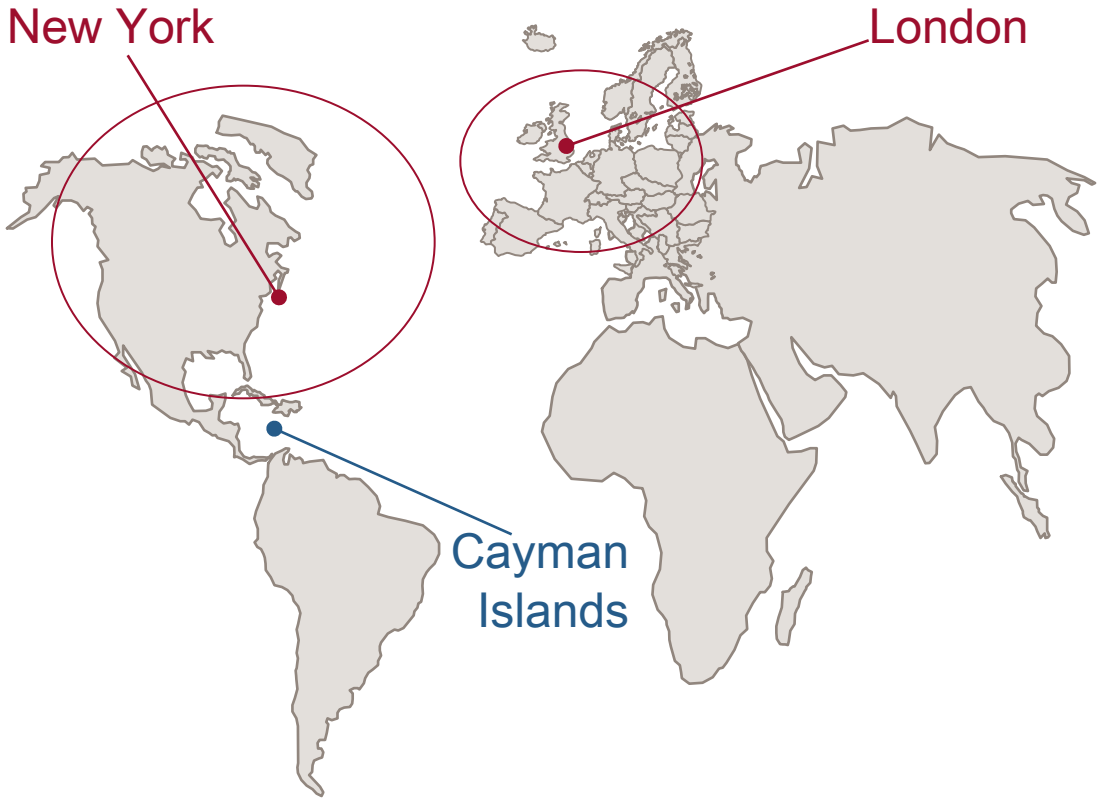
	Traditional Funds	Hedge Funds
Industry Size	$26 trillion	$2 trillion
Returns	Versus a benchmark	Absolute
Investment	Long Only	Long or Short
Strategy Complexity	Low	High
Correlation to Market	High	Lower
Leverage	No	Yes
Trading Presence	Lower Turnover	Higher Turnover
Fees	Low - Based on AUM	High - based on AUM and Performance
Liquidity	Relatively Liquid	Restrictions & Lock-ups
Transparency	Relatively High	Low
Minimum Investment	Relatively Small	Large

Who are the Managers?

- Ex bankers typically with investor contacts and trading expertise
- Vary considerably in size - Top 15% control 75% of Industry Assets
- Most managers based in New York, Connecticut and London
- But funds typically registered in tax havens like Cayman Islands

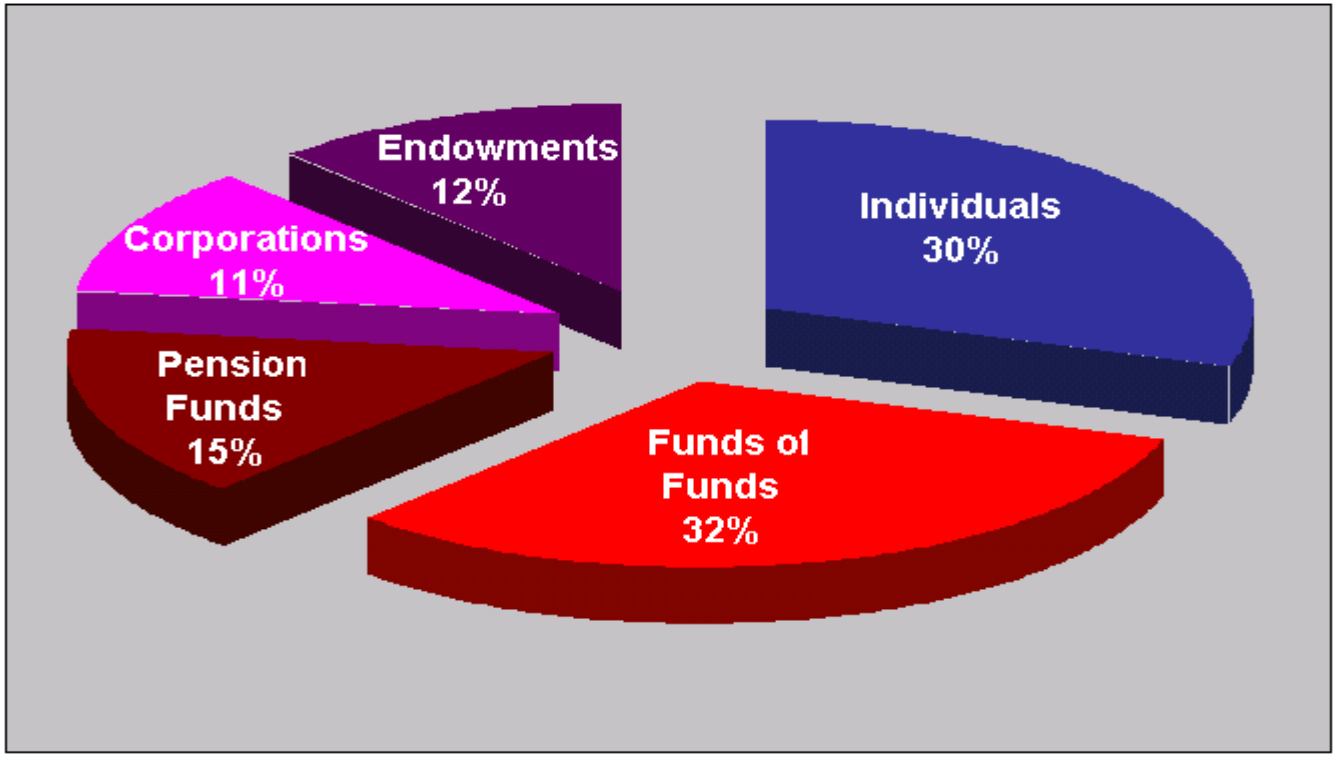
Manager	AUM ($b)
Bridgewater Assoc	41
JP Morgan AM/Highbridge	36
Paulson & Co	30
D.E. Shaw Group	28
Brevan Howard Asset Mgt	27
Man Group	26
Cerberus Capital Mgt	24
Soros Fund Mgt	24
Och-Ziff Capital Mgt	22
Goldman Sachs Asset Mgt	21

Source : Bloomberg Markets, Feb 2010

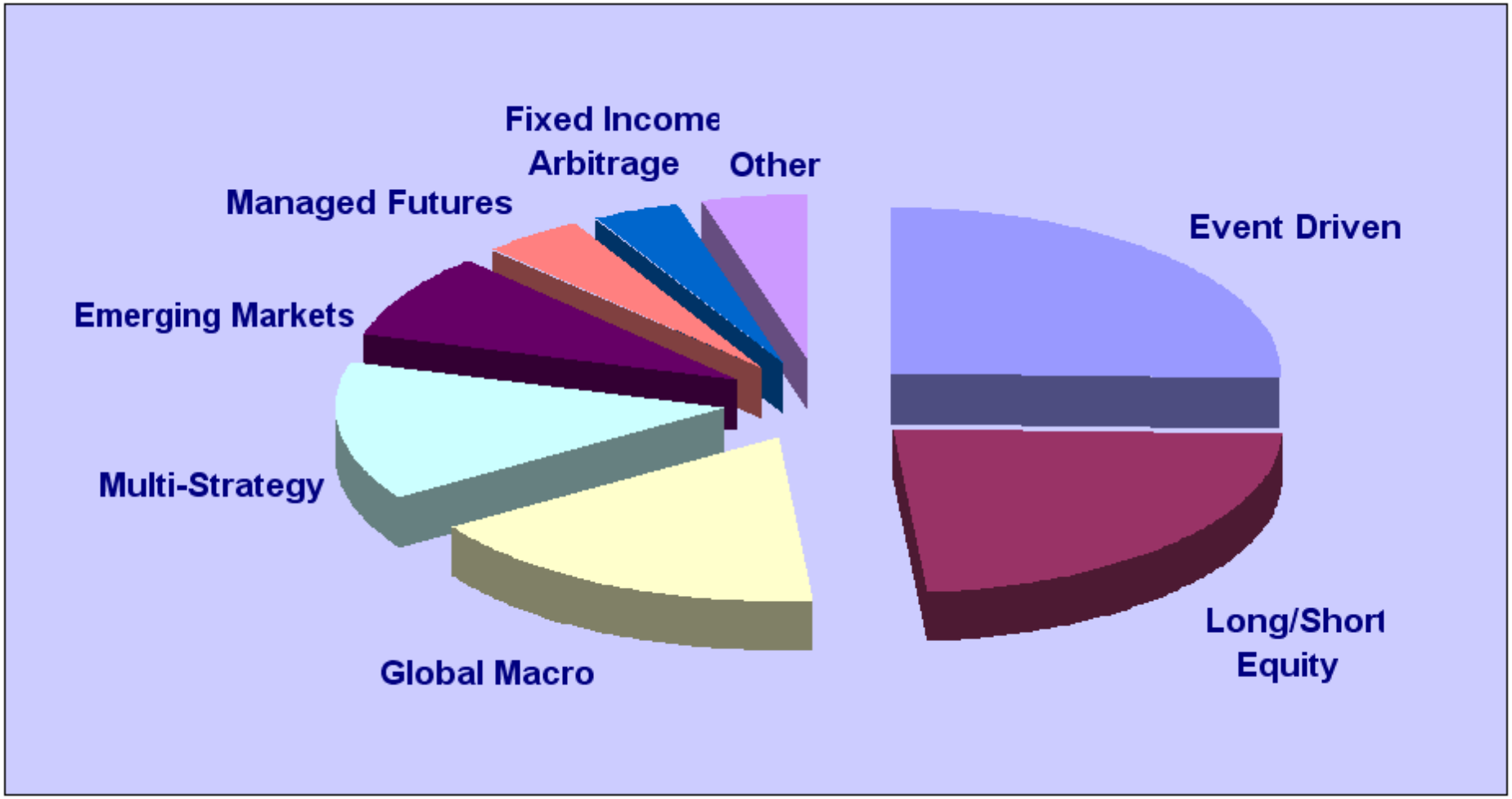


Who are the Investors?

- High Net Worth individuals, Funds of Fund Managers & Institutional investors
- Minimum Investment size is very high – usually at least $1million
- Acceptance has grown substantially…viable alternative to traditional markets
- Investors seek attractive, stable and non-market correlated returns



Hedge Fund Strategies…help represent the hedge fund universe



Breakdown as at end of 2009; Source : CS/Tremont

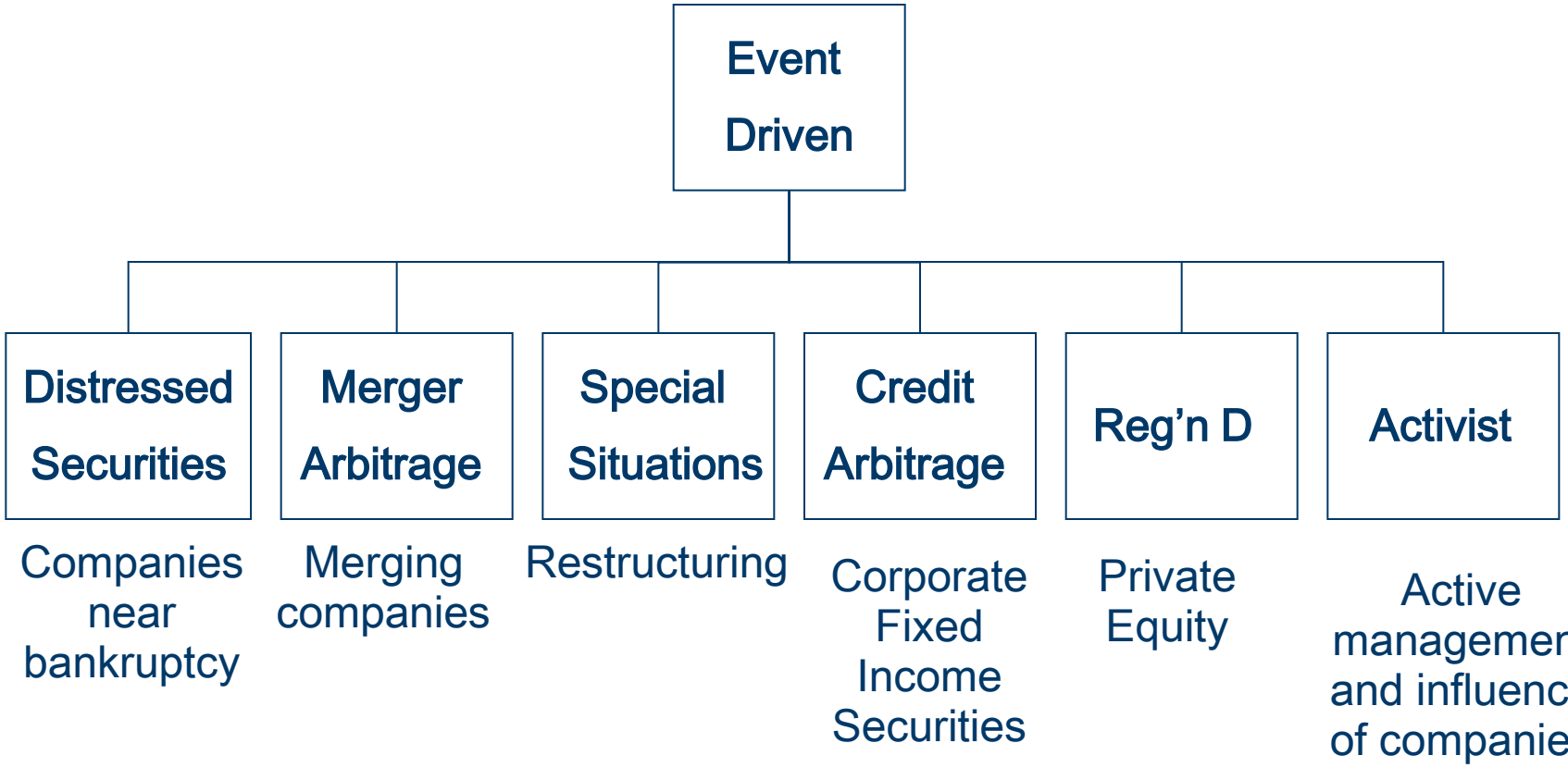
Hedge Fund Strategies

Statistics for 2009

Jan 09 - Dec 09	Sector Weights	Cumulative Return	Annualized Standard Deviation	Number of Positive Funds	Number of Negative Funds	Best Performing Fund	Worst Performing Fund
Broad Index	**100%**	**+19%**	**5%**	**395**	**82**	**267%**	**-80%**
Convertible Arbitrage	2%	+47%	7%	22	1	267%	-3%
Dedicated Short Bias	0%	-25%	16%	0	9	0%	-41%
Emerging Markets	9%	+30%	9%	69	10	195%	-26%
Equity Market Neutral	2%	+4%	8%	14	8	28%	-80%
Event Driven	26%	+20%	5%	61	8	130%	-26%
Fixed Income Arbitrage	4%	+27%	4%	25	2	132%	-7%
Global Macro	17%	+12%	5%	26	7	116%	-25%
Long/Short Equity	23%	+20%	7%	141	11	233%	-25%
Managed Futures	4%	-7%	10%	10	23	24%	-37%
Multi-Strategy	14%	+25%	5%	27	3	84%	-18%

Event Driven Strategy

Exploits pricing inefficiencies caused by anticipated corporate events. Many variations…



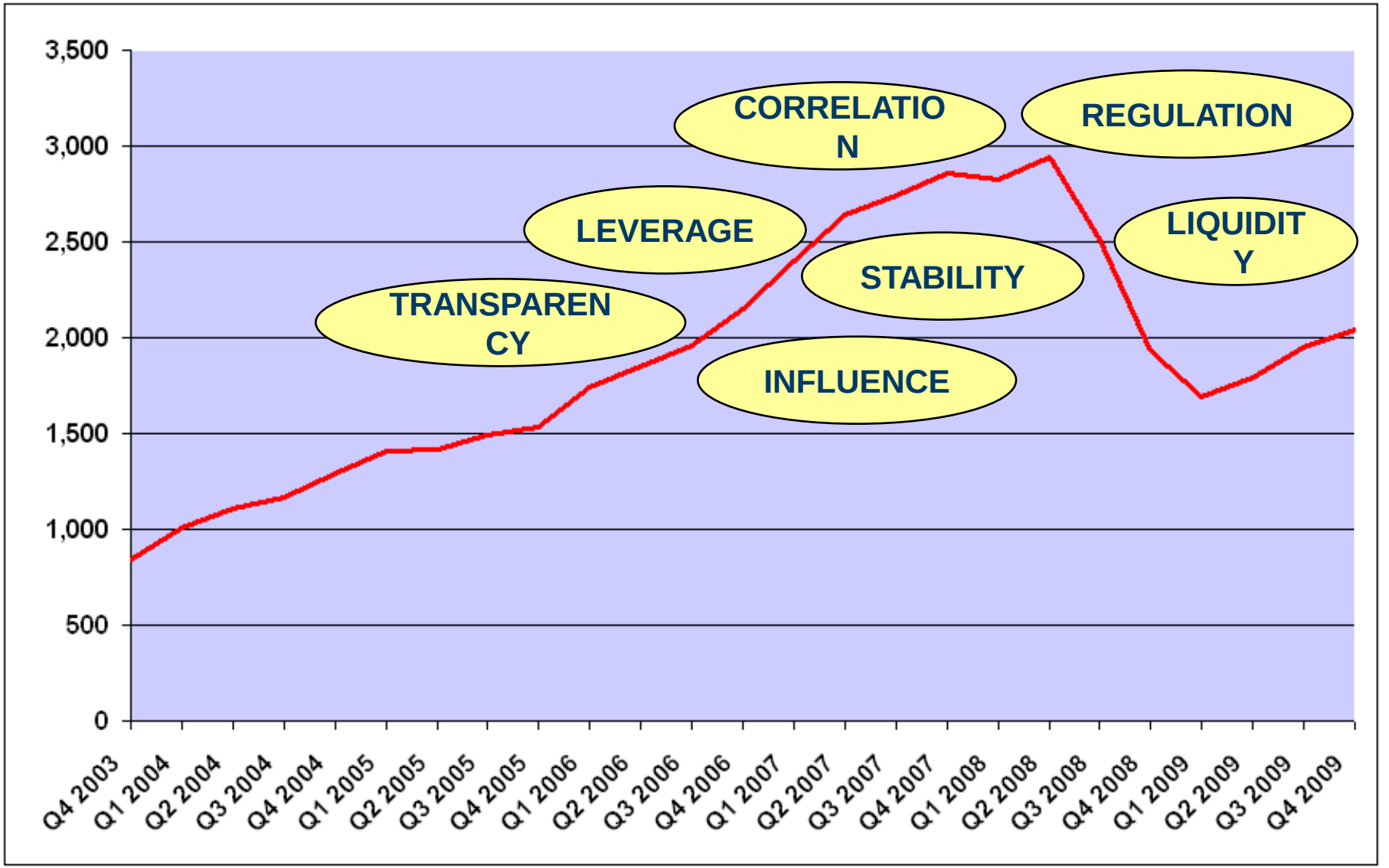
Managed Futures Strategy

- Also called Commodity Trading Advisors (“CTAs”)
- Systematic approach to investing in futures contracts in bond, equity, commodity and currency markets
- Highly quantitative model based trading
- No trader decisions – all model based
- Use mean reversion, trend and pattern recognition models
- Operate in highly liquid markets, providing flexibility
- Models can break down in very volatile markets

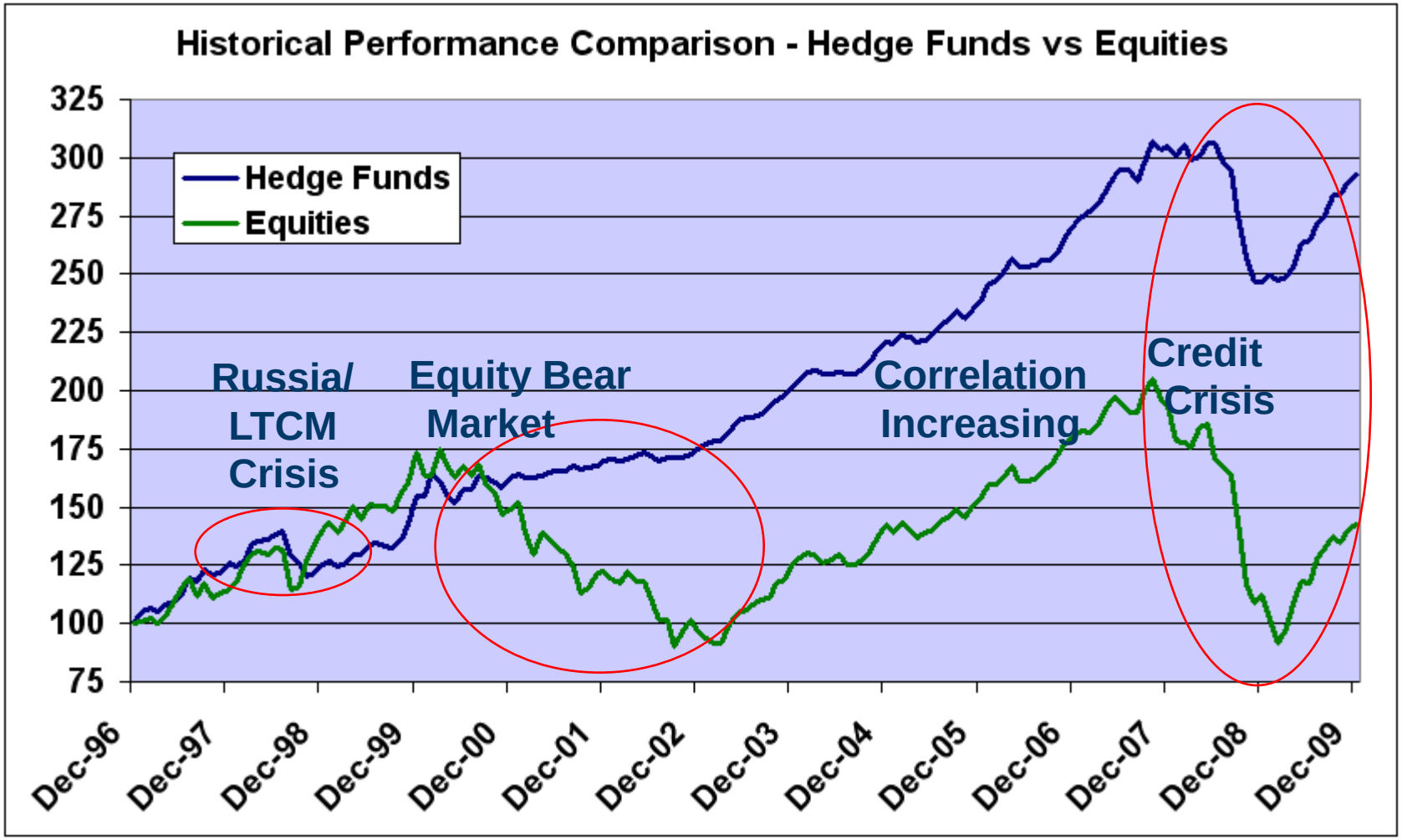
Funds of Hedge Funds

- Invest in other Hedge Funds
- Portfolio diversification main aim (strategy, manager and fund)
- Important and very influential in industry
- Have access to extensive resources and systems
- Regularly rebalance portfolio and perform due diligence
- But additional layer of fees and leverage
- Suffered major blow in crisis as diversification benefit muted

Growth of Hedge Fund Market (AUM in $ Billions)



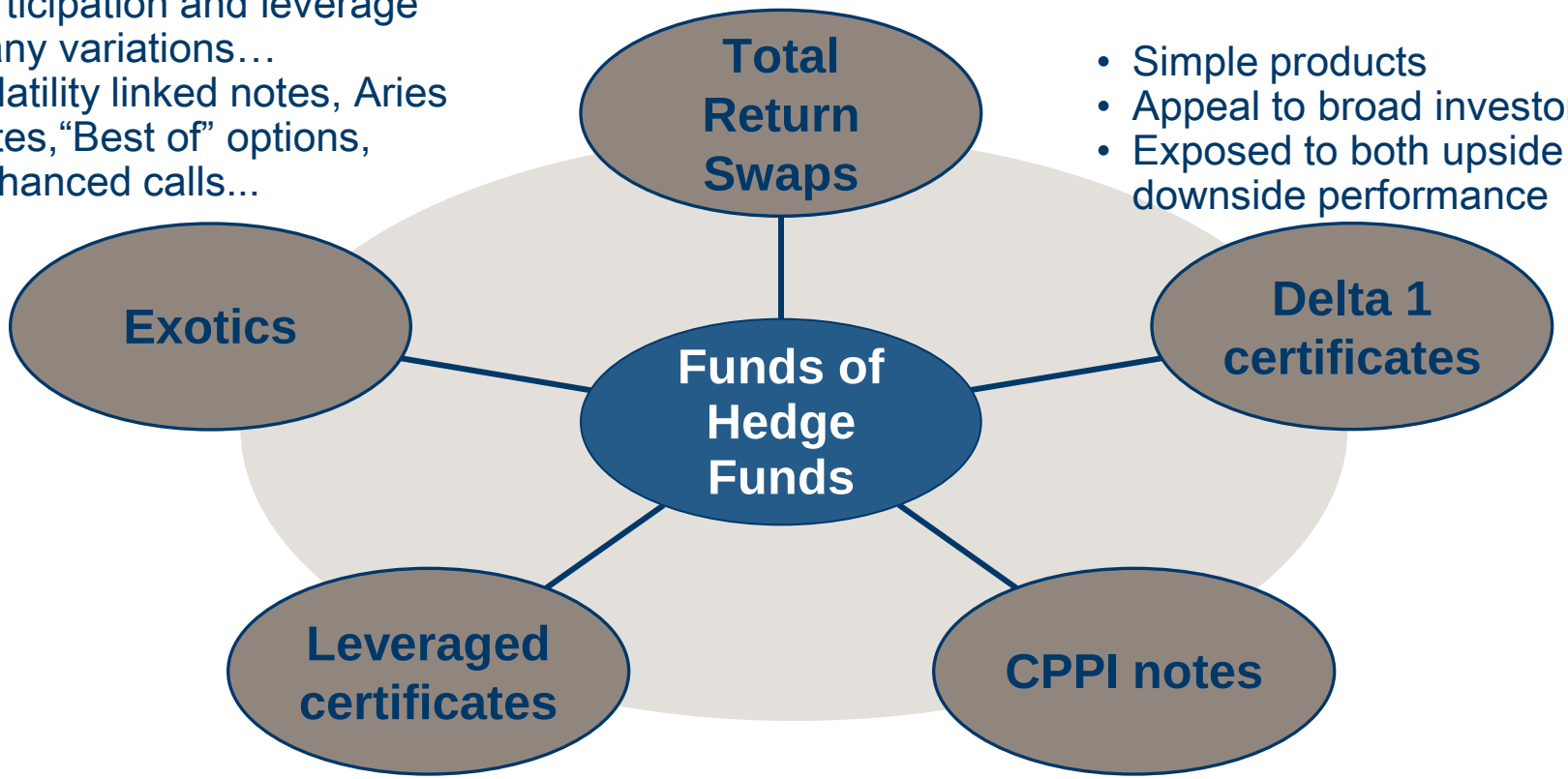
Hedge Fund Market Performance vs. Equities



Average Annualised Volatility - Hedge Funds : 6%, Equities : 15%

Hedge Fund Derivatives

- Demand for more participation and leverage
- Many variations…
- Volatility linked notes, Aries notes,"Best of" options, Enhanced calls...



- Seller gives return on hedge fund basket and gets LIBOR plus spread

- Simple products
- Appeal to broad investor base
- Exposed to both upside and downside performance

- Offer leverage of up to 300%
- Poor performance may result in investor losing entire investment

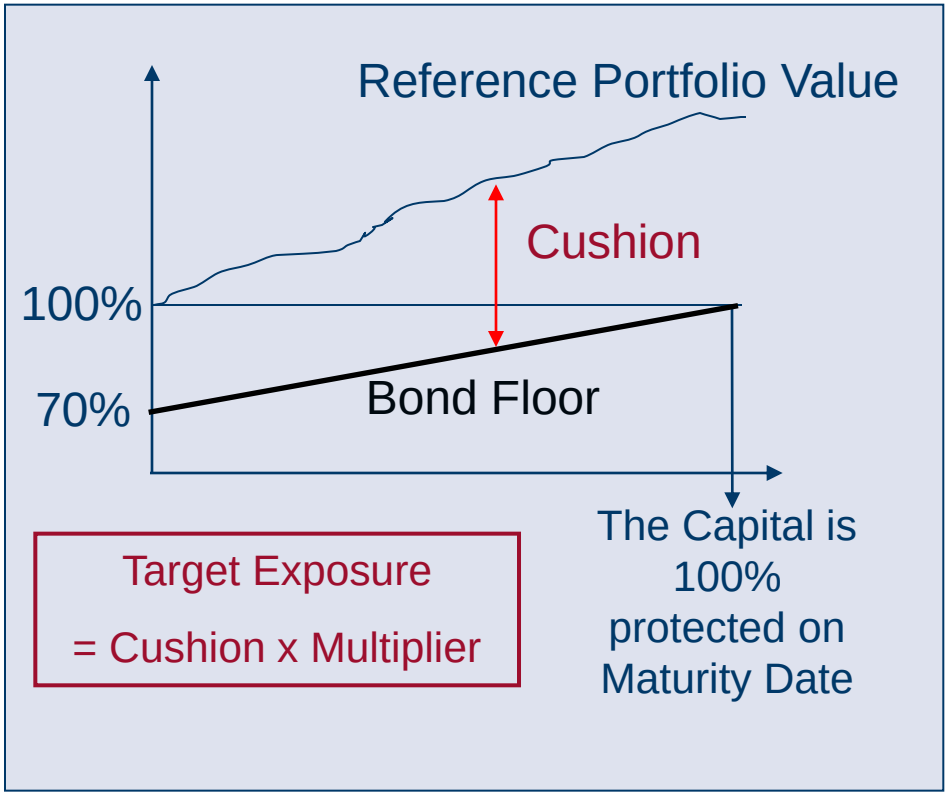
- Upside exposure to underlying fund
- Guaranteed principal (at maturity)
- Final return = combination of risky and non-risky asset

What is CPPI?

- **C**onstant **P**roportion **P**ortfolio **I**nsurance
- Helps ensure 100% of investor's capital is protected (at maturity)
- And investor also gets participation in underlying asset growth
- Simple formula based hedging mechanism with set minimum "cushion"
- Determines composition of investment between :
  1. Risky Asset (e.g. Hedge Fund of Funds) and
  2. Non- Risky Asset (Cash, Fixed Term Deposits)
- Poor Performance → **Deleverage** 
  - Sell Risky Asset to buy more Non- Risky Asset
  - Possibly end up with no Risky Asset exposure
- Good Performance → **Leverage up** Risky Asset exposure 

What is CPPI?

The following graph illustrates how Risky Asset exposure is determined by the CPPI mechanism

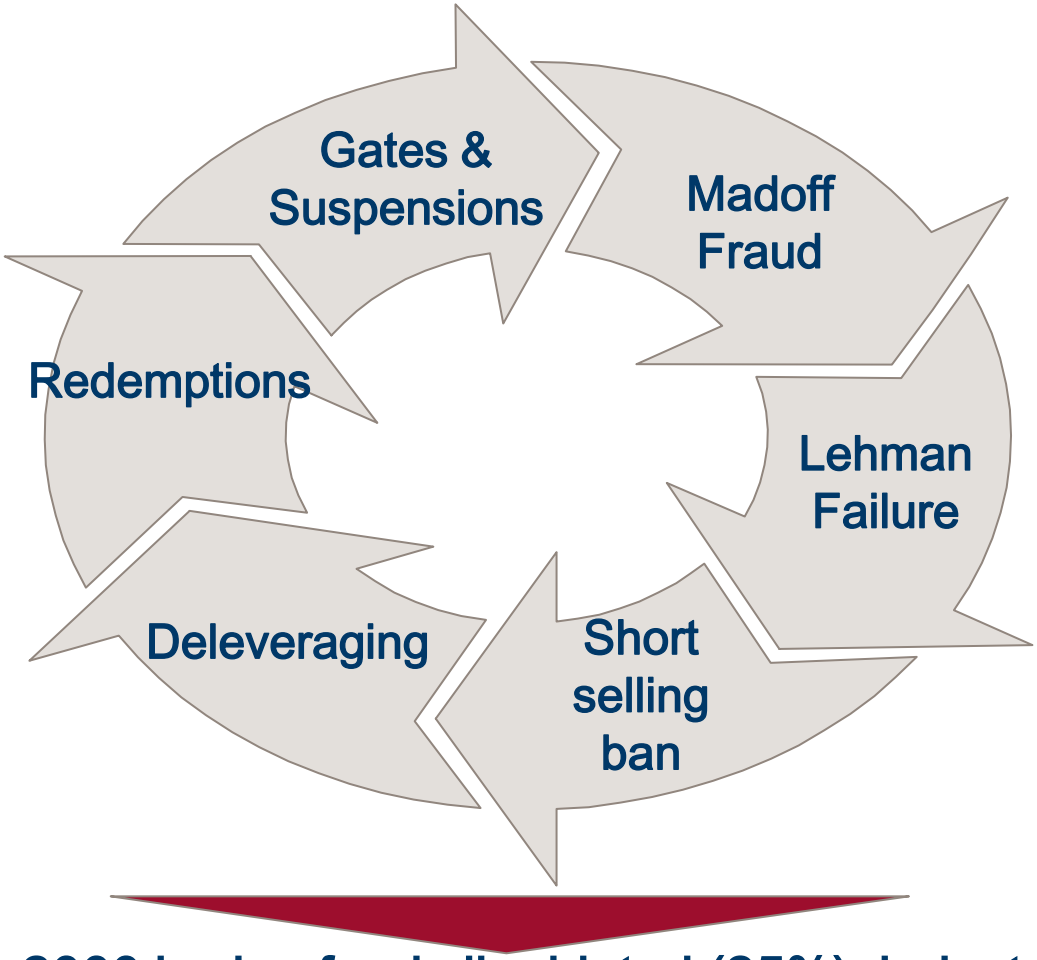


The Reference Portfolio's allocation to the Risky Asset is determined by applying a pre-determined Multiplier to the Cushion.

$$\text{Cushion}(t) = \frac{\text{Reference Portfolio Value}(t) - \text{Bond Floor}(t)}{\text{Reference Portfolio Value}(t)}$$

The Bond Floor is a fixed line starting at 70% (for example) and reaching the level of protection of 100% by the Maturity Date

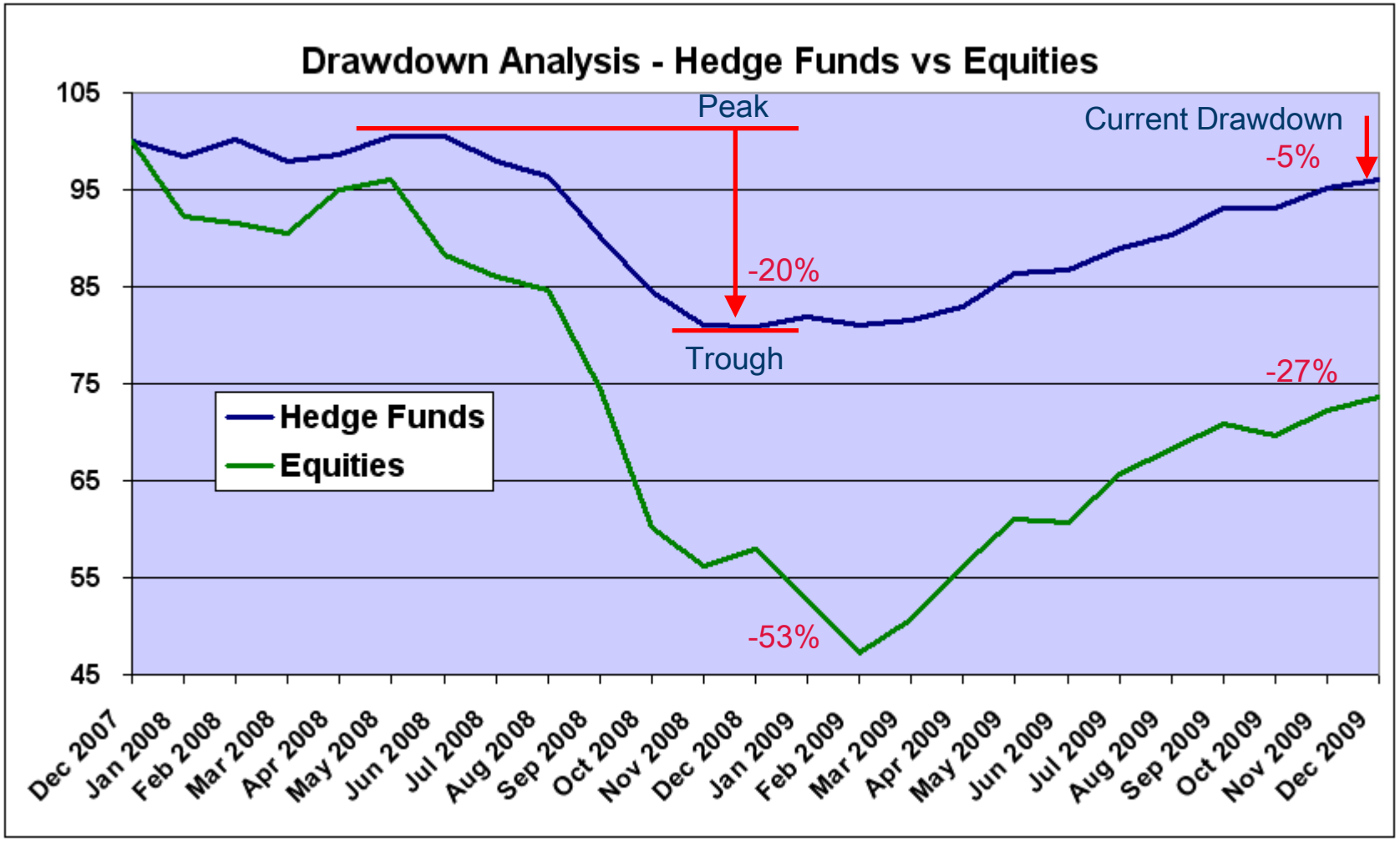
Impact of the Credit Crisis…the perfect storm



Strategy	Worst Month
Equity Market Neutral	-40%
Emerging Markets	-23%
S&P 500	**-20%**
MSCI World	**-17%**
Fixed Income Arbitrage	-14%
Convertible Arbitrage	-13%
Distressed	-12%
Event Driven	-12%
Global Macro	-12%
Multi-Strategy	-12%
Long/Short Equity	-11%
Dedicated Short Bias	-10%
Managed Futures	-9%
Broad HF Index	**-8%**
Multi-Strategy	-7%
Risk Arbitrage	-6%

- 2000 hedge funds liquidated (25%), industry benchmarks lost 20%
- Industry AUM down $1.2 trillion (42%), massive risk & leverage reduction
- Huge loss of investor confidence and lots of litigation

Impact of the Credit Crisis…Performance vs. Equities



Hedge Funds : Credit Suisse / Tremont Hedge Fund Index

Equities : MSCI World Index

Hedge Fund Industry Outlook

- **Growth starting to pick up again…**

  - Industry Assets Under Management (AUM) now $2 trillion
  - Before Credit Crisis Growth was around 20% per year
  - 2009 one of best performing years ever in industry

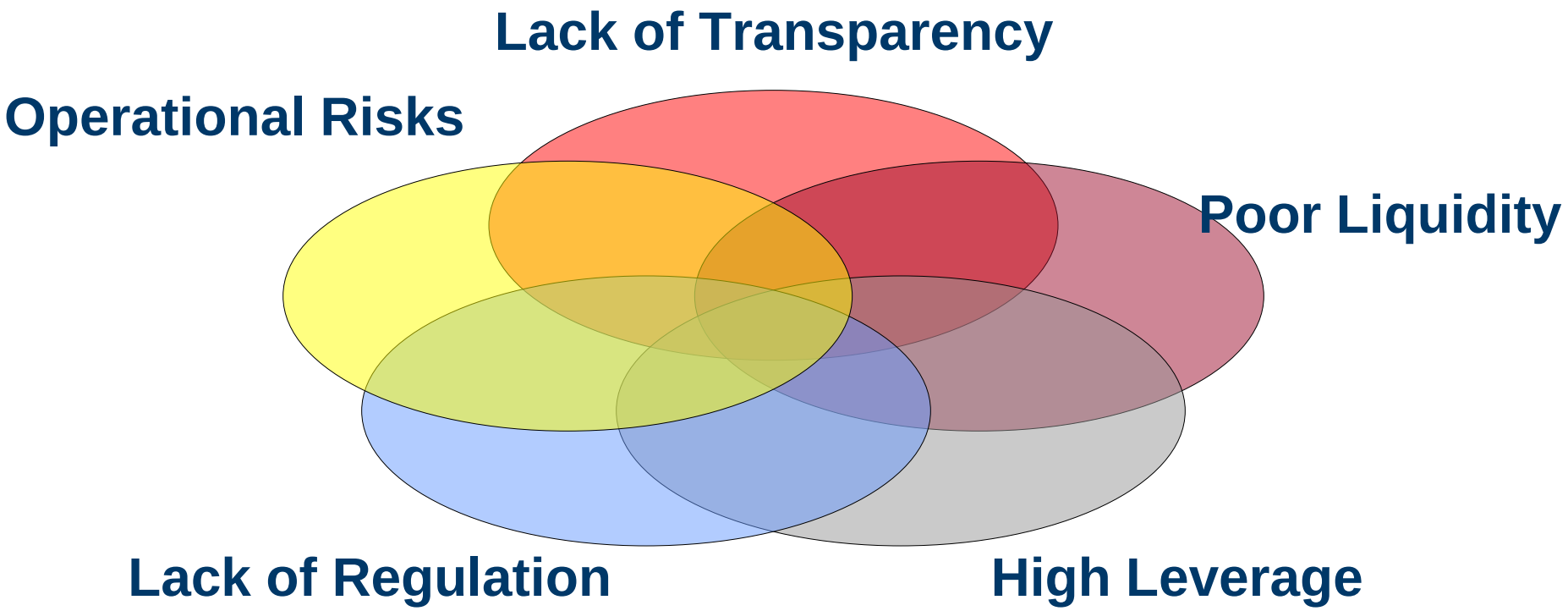
- **But Investors much more demanding now…**

  - More transparency and liquidity demanded
  - Also better controls, risk management and infrastructure
  - And of course lower fees

- **Industry consolidation…**

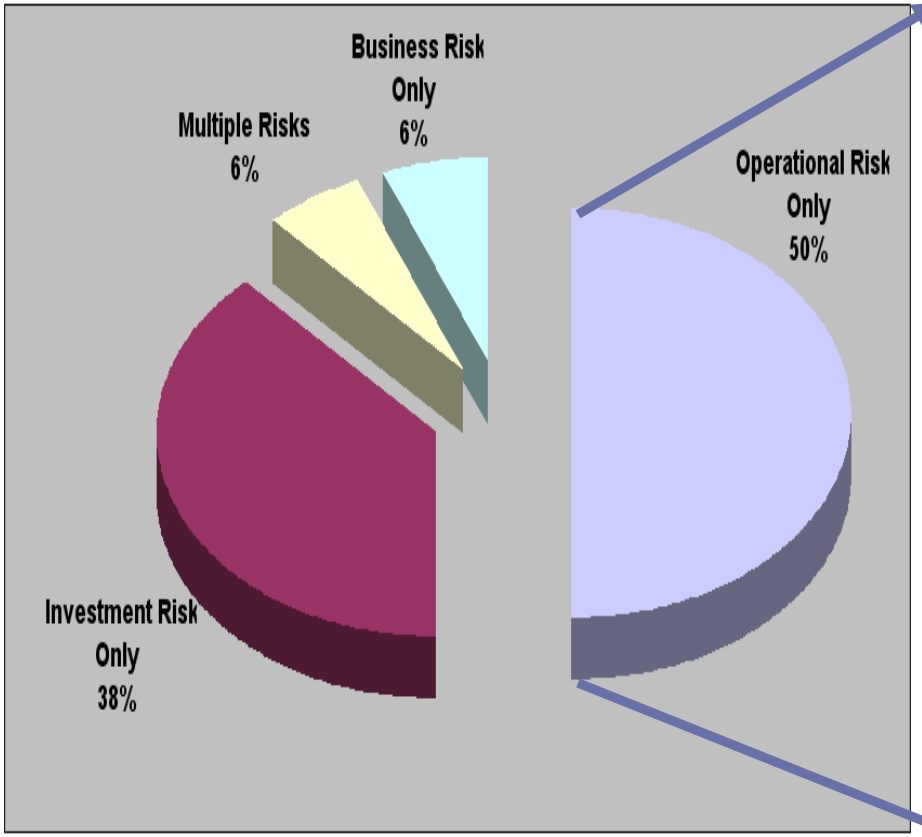
  - Largest managers getting bigger
  - Managers targeting more traditional institutional investors

Key Risks

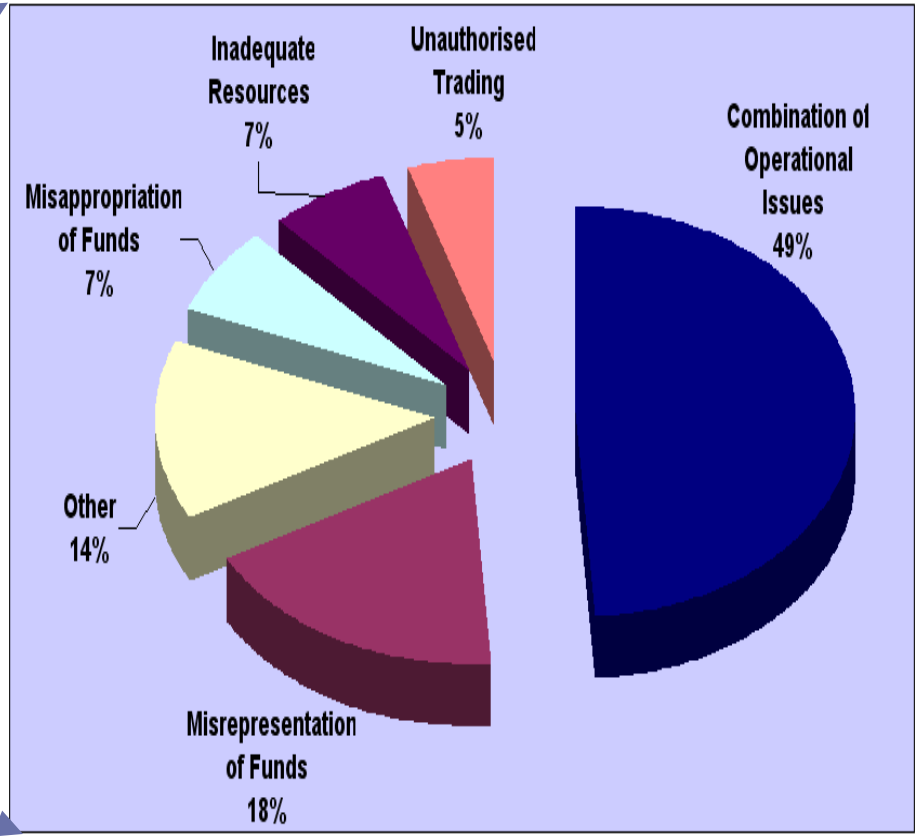

Lack of Transparency
Operational Risks
Poor Liquidity
Lack of Regulation
High Leverage

Key Risks - Operational Risk

Distribution of Reasons for Fund Failures



Breakdown of Operational Risk Failures



Source : Understanding and Mitigating Operational Risk in Hedge Fund Investments: A Capco White Paper

Key Risks - Hedge Fund Portfolio Risks

Gap Risk

- CPPI notes have built in rebalancing mechanism
- But in stressed markets this mechanism can fail…
- Bank would make-up shortfall
- Collateral has gap risk too

Liquidity Risk

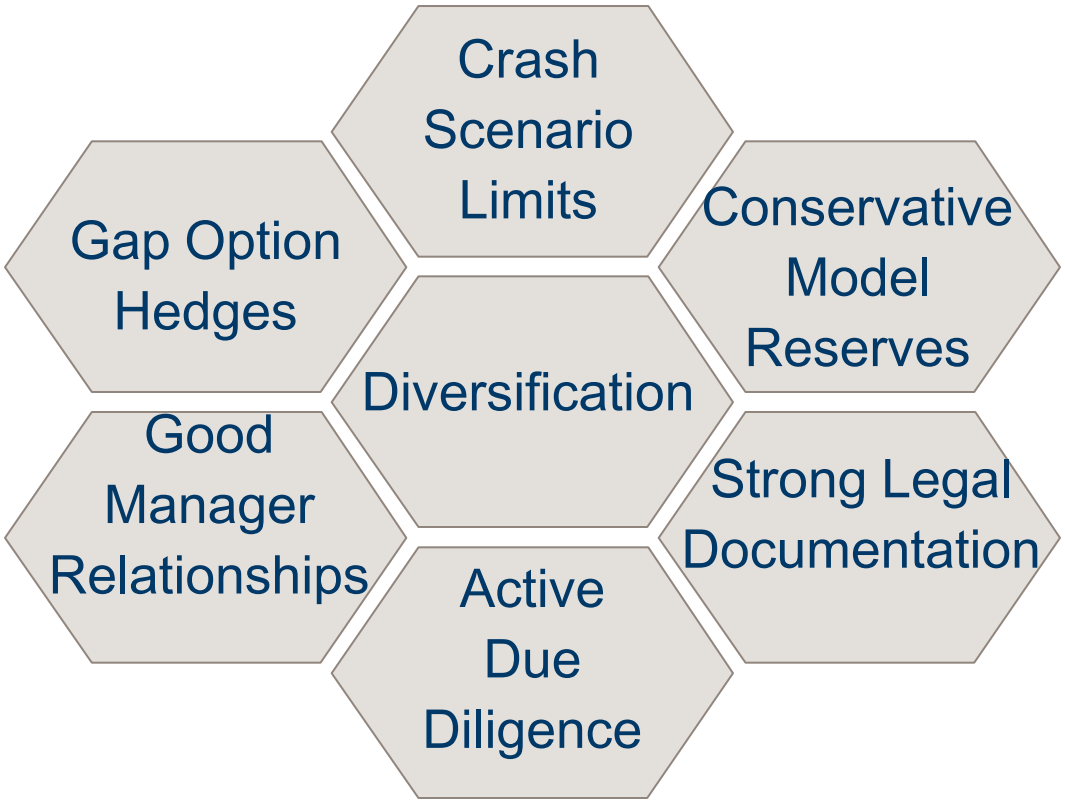
- Hedge Fund Liquidity is poor
- Hedging effectiveness is reduced
- In stressed markets actual liquidity may be worse

Concentration

- High levels of operational risk
- Poor transparency in industry
- Manager, fund and strategy diversification critical

Risk Management

- Active risk management at all levels is critical
- Market, Credit, Operational and Legal risk management overlap
- Successful risk management is dependent upon :



Risk Management - Crash Scenario Model

- Bespoke Scenario based model for risk management of hedge fund derivatives portfolio

- Captures :
  - Gap risk (important for CPPI products and hedge fund collateral)
  - Hedge Fund price risk
  - Strategy specific risk
  - Some concentration risks

- The level of fund and strategy diversification in the portfolio determines shock size (calculated using variances of the fund and strategy weights)

- The shock is somewhere between general and specific portfolio shock determined by a power function :

$$F(x) = \alpha x^p + \beta = (S - G)x^p + G$$

Where :

G = General Shock, S= Specific Shock

α and β are determined by solving $F(1) = S$ and $F(0) = G$

and the power p is determined by calibration

Risk Management - Crash Scenario Model

Weightings Input by Fund and Strategy							Total
Convertible Arb							0%
Dedicated Short							0%
Emerging Markets							0%
Equity Mkt Ntrl							0%
Event Driven							0%
Fixed Inc Arb							0%
Global Macro							0%
Long/Short	9%	9%	9%	9%	9%		45%
Managed Futures	9%	9%	9%	9%	9%	10%	55%
Multi Strategy							0%
Cash							0%
# Funds :	11		Variance Fund Wgts :		3.8%		100%
# Strategies :	2		Weighted Avg Fund Size :		9.1%		

Variances

Fund Diversification Measure

+

Strategy Diversification Measure

=

Total Portfolio Diversification Measure

Power Function

Strategy	General Shock	Specific Shock		Strategy Weights		General Shock	Specific Shock
Convertible Arb	30%	60%		6%		2%	3%
Dedicated Short	40%	60%		1%		0%	0%
Emerging Markets	55%	80%		4%		2%	3%
Equity Mkt Ntrl	25%	70%		4%		1%	3%
Event Driven	35%	71%	X	17%	=	6%	12%
Fixed Inc Arb	25%	60%		8%		2%	5%
Global Macro	25%	65%		18%		4%	12%
Long/Short	25%	70%		7%		2%	5%
Managed Futures	25%	70%		5%		1%	3%
Multi Strategy	25%	65%		24%		6%	16%
Cash	0%	0%		0%		0%	0%

Strategy Correlation Matrix

General Shock	Specific Shock
24%	56%

Portfolio Scenario Shock: 27%

Final Shock

Suggested Research Topics and Sources

- Non-traditional performance statistics more suitable for Hedge Funds (e.g. moving away from Sharpe ratios)
- Unbiased hedge fund industry benchmarks (industry replication via strategies, investable indices vs. non-investable indices)
- Hedge Fund portfolio risk management techniques and scenario development (to include operational risks, leverage, funding risk and liquidity)
- Implied leverage in the hedge fund industry based upon available performance, costs and strategy information

Sources

- www.hedgeindex.com
- www.hedgefundresearch.com
- Bloomberg Markets Magazine (Feb 2010)
- www.emagazine.credit-suisse.com (About Us / In Focus / Dossiers / Derivatives & Hedge Funds)
- www.credit-suisse.com
- www.hedgefundintelligence.com
- www.hedgefund.net
- www.greenwich.com