

Hedge Funds: Beyond volatility

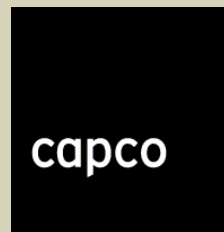
Fund Forum 2003 - Nice

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Assessing The Risks Involved In Hedge Fund Investments

Overcoming The Challenges Of Performing Effective Due Diligence

- **Measuring Risk & Performance Where There Is No Transparency**
- **Risks associated with hedge funds: myths or reality?**
- **Operational risks & their impact**
- **Effective due diligence process**
- **The use of transparency**

What is risk ?

- **What is the main objective of risk management ?**

To prevent a fund from suffering unacceptable loss

- **What is an unacceptable loss ?**

An unacceptable loss is one, which either causes a fund to fail or materially damages its competitive position

- **What is financial risk ?**

Financial risk can be defined as variability in earnings due to adverse changes in market values, credit events or any other factor impacting market value of the investment portfolio

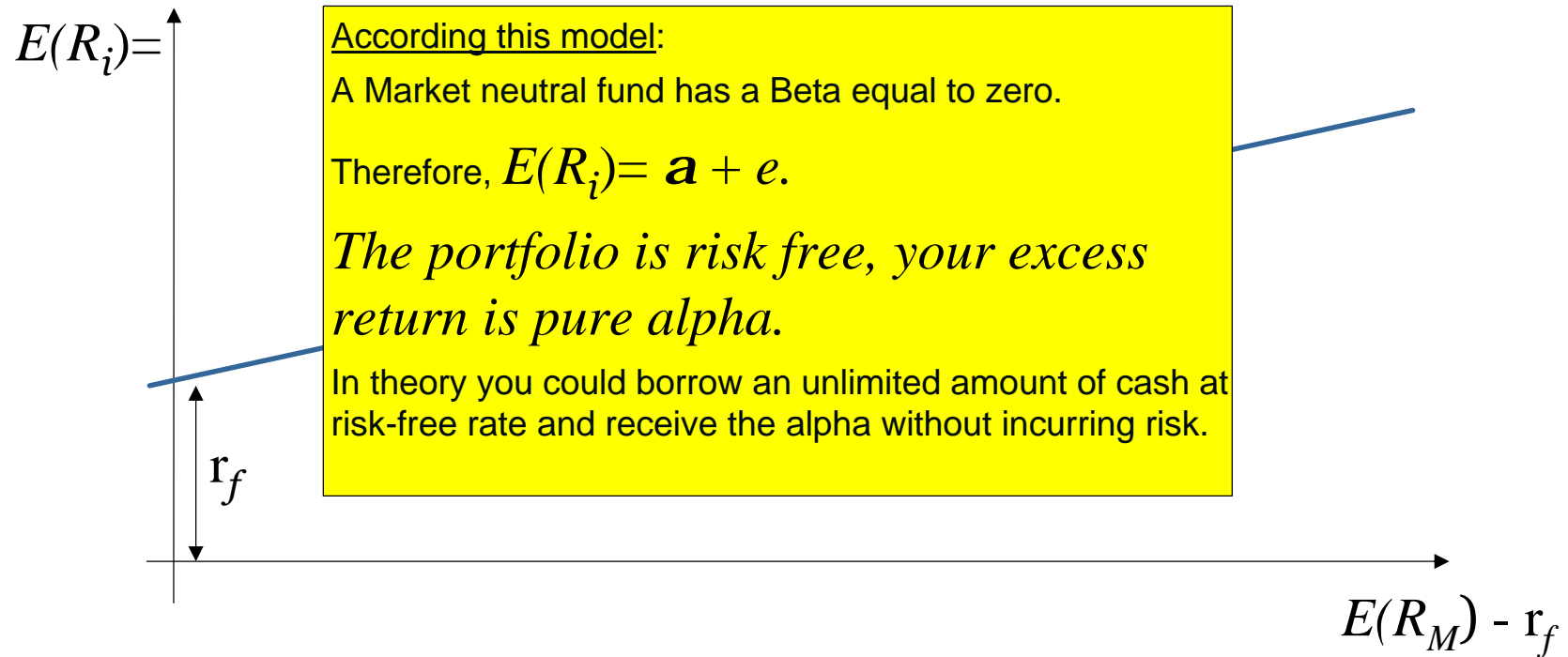
- **What is operational risk ?**

Operational risk can be defined as variability in earnings due to internal or external events impacting upon or related to the way the fund operates

Alpha or not alpha ?

Sharpe's CAPM attempted to explain the excess return of an asset ...

- Sharpe's CAPM: $E(R_i) = a + b_i[E(R_M) - r_f] + e$



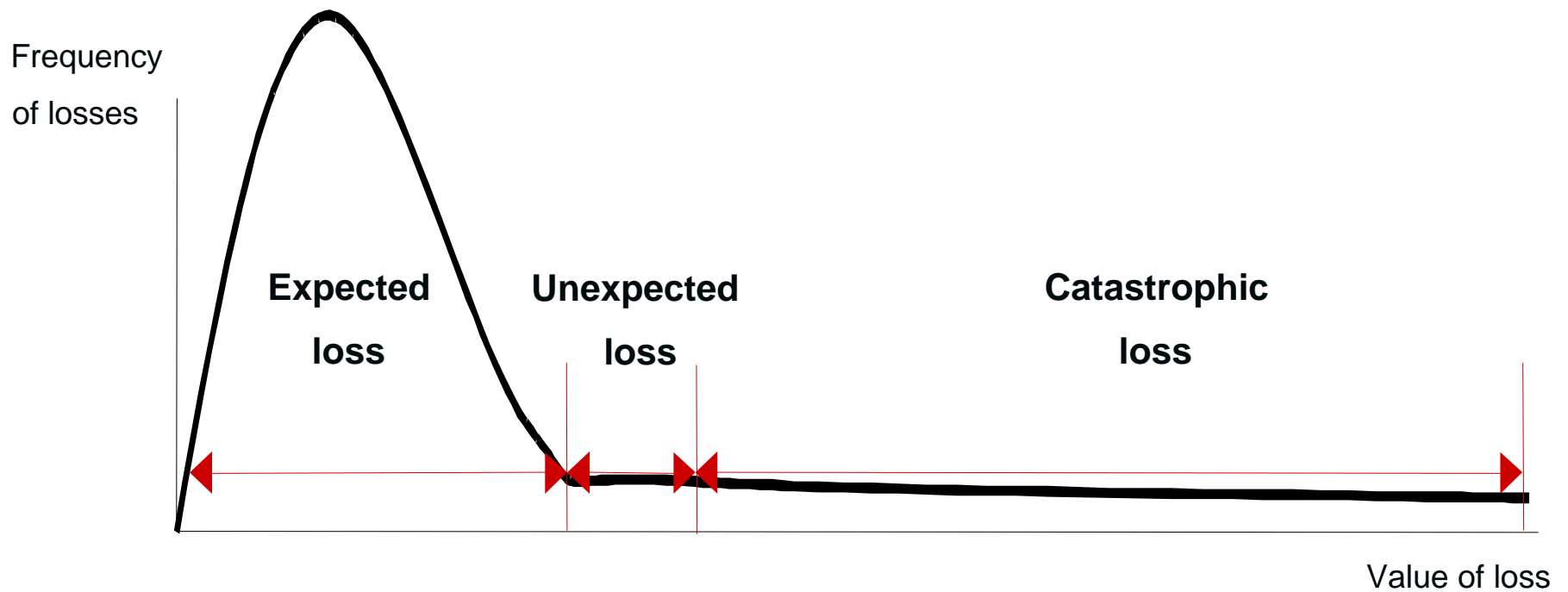
Alpha or not alpha ?

Sharpe's CAPM is however not strong to explain the reality of the excess return.

- **Modern portfolio theory and practice is based upon multi-factor models**
- **The excess return on an investment is**
$$R_t = a + b_1 F_{1t} + \dots + b_K F_{Kt} + e$$
 - F_{kt} is factor k at date t ($k = 1, \dots, K$)
 - b_i measures the sensitivity of R to factor k , ($k = 1, \dots, K$)
- **Generalization with respect to CAPM is two-fold**
 - No unique factor
 - Market portfolio may not be a factor

The dimensions of risk

Risks of different levels should be clearly segregated - illustration



Traditional risks exist but are amplified

The use of extensive leverage amplifies the potential effect of any event occurring on the portfolio

■ Risks related to the investment strategy

- Credit risk
- Market risk
- Liquidity risk
- Volatility risk

■ Risks related to the specific nature and organisation of hedge funds

- Operational risk
- Counterparty risk
- Financing risk
- Asset-Liability mismatch risk
- Model risk

What are the risks with Hedge Funds

Hedge Funds of Funds have also to consider a series of other risks

■ Management specific risks:

- Style drift (deviation from stated rules, disciplines and process)
- Excessive leverage, reducing efficient market access
- Poor risk management disciplines particularly in volatile markets
- Managers distracted from day-to-day running of trading activity
- Uncontrolled asset growth
- Main strategy becomes less variable
- Decrease transparency of processes

■ Portfolio specific risks:

- Insufficient diversification
- Poor security allocation
- Hidden macro biases

Best Practice in Risk management

Market Risk

- Market risk is resulting from adverse movements of factors affecting the valuation of assets held in the Hedge Fund portfolio (stock prices, interest rates, volatility, spreads ...)
- Market Risk is widely used as the single measure for risk, hence its use in risk-adjusted performance in order to market 'risk-free' strategies.
- The computation of a consistent measure of the level of market risk is therefore the norm with methodologies such as Value at Risk
 - => Value at Risk concept : estimation of the potential loss of a given portfolio over a given period of time (day, week, month) with a given confidence interval (95% or 99%) and market conditions similar to the ones observed in the past.
- Importance of taking into consideration the specificities of Hedge Funds
 - => Non linearity (optional VaR)
 - => Fat tails
 - => No coverage of non systematic risks (political ...)

Best Practice in Risk management

Market Risk

■ Historical data sample:

What is the optimal period ? The hypothesis of stationarity of the various risk factors, supporting the assumption that the VaR methodology is more accurate with long term historical data, has not proven to be valid. At the contrary, a short period of historical data can not be considered representative of future possible adverse movements. Research is currently being carried around processes with conditional volatility variables.

■ Stress test :

VaR does not provide information regarding the potential losses in case of extremely unlikely events. Stress Testing allows to complement VaR by estimating the potential losses in such unlikely scenarios, highlighting the impact of extreme market conditions. (1998 Emerging market crisis, 09/11 event ...). These tests will cover return distribution unasymetry, fat tail related events.

Analysis of losses beyond VaR. Some Hedge Funds compute an average loss conditional to losses beyond VaR (BVaR) based on a probability (Pareto-Levy). This measure covers the inconsistencies related to the fact that VaR is not a sub-additive mesure.

Best Practice in Risk management

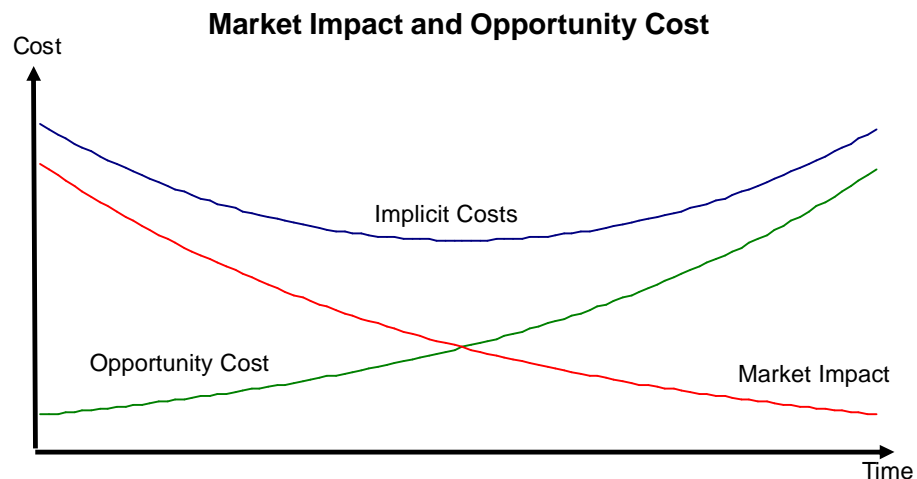
Credit Risk

- **No consensus.**
- **Major Credit Risk analysis frameworks:**
 - CreditMetrics / JP Morgan,
 - CreditMonitor / KMV, now Moody's,
 - CreditRisk+ / Crédit Suisse Financial Products,
 - CreditPortfolioView / McKinsey
- **Even if the conceptual basis (application / extension of Merton work) remain in place, the conditions of implementation and empirical tests result in credit risk measures highly dependant on the hypothesis.**
- **Interdependency with Liquidity Risk**
- **Financial view of credit risk (ratings) remains backward-looking**

Best Practice in Risk management

Liquidity Risk

- Before you enter, know when and how you want to exit ...
- Need to differentiate the liquidity risk related to invested assets from the liquidity of the fund (ie ability to accept redemption because of adverse market conditions). 30-40% difference in prices for illiquid positions (Capital Market Risk advisors, 2001)
- Liquidity risk is highly related to Credit risk (especially in regards to OTC trades where liquidity depends on the counterparty)
- No concensus on how to neasure liquidity risk consistently (in theory, number of days required to liquidate, or potential loss related to a forced liquidation). The valuation of the fund should however take the liquidity risk in consideration (level of liquidity weighed by maturity).



Best Practice in Risk management

Leverage Risk

- Leverage is widely used to benefit from strategies offering tiny margins.
- Leverage is not a risk indicator but indirectly impacts upon the behaviour of the fund in case of worst scenario.
- Need to follow net and gross exposures. A large gross exposure may be less risky than a low net exposure. The analysis needs to be carried for each strategy bucket in the portfolio.
- The analysis of leverage should be performed in light of market, credit and liquidity risks
- The net exposure should be maintained smaller or equal to the capital with sufficient cash or cash equivalent to cover unexpected events and redemptions.
- Use of Return on Assets (ROA) rather than Return on Equity (ROE), the difference is financial leverage

Operational risk is the least monitored of all risks ...

■ Investment Risk

- Market and related risks associated with the overall fund or a specific position

■ Business Risk

- Risks associated with a fund that are not directly related to market movements, such as failure to reach a base level of assets under management or a change in management of the fund.

■ Operational Risk

- Risks associated with supporting the operating environment of the fund. The operating environment includes middle and back office functions such as processing, accounting, administration, valuation and reporting.

Operational Risk results from:

- People/Operations - fraud; misrepresentation; processing errors; poorly trained/insufficient staff; inadequate policies and procedures; lack of board/management oversight
- Technology – lack of automation; system limitations; insufficient scalability; viruses; disasters
- Data/Information - poor data sources; unreliable information; timeliness, accessibility of data

... this is confirmed by the perception of the industry ...

Only 50% of European Asset Management firms do consider their funds are exposed to operational risk¹

Country	France	Germany	United Kingdom	Others	Total Europe
Top 3	Information system failure	Information system failure	Poor management of transactions and operations	Poor management of transactions and operations	Poor management of transactions and operations
	Unforeseen interruption in operations as a result of natural causes or acts of malicious intent	Human error when executing tasks	Inadequate internal control system	Inadequate internal control system	Information system failure
	Risks in settlement /delivery	Risks in settlement /delivery	Information system failure	Human error when executing tasks	Human error when executing tasks

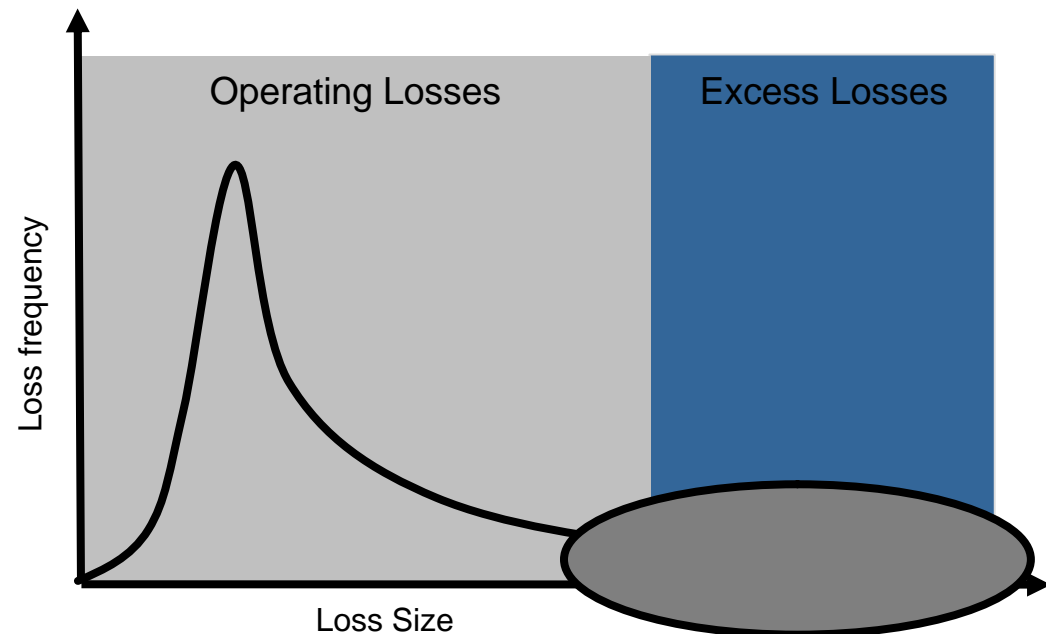
(1) Source Edhec European Asset Management Best Practice survey 2002

... despite numerous examples of publicly disclosed debacles

Company	Losses in US\$ mn	Causes
Sumitomo	2,600	Unauthorized trading activities
Long Term Capital Mgmt	2,500	Excessive leverage
Barings	1,460	Unauthorized futures trading
Metallgesellschaft	1,340	Improper positions on NYMEX
Askin Capital Management	600	Inaccurate valuations
Deutsche Morgan Grenfell	500+	Unauthorized trading activity
UBS	444	Weak internal management controls
Lehman Brothers	300	Fraud, weak internal management controls
Nat West Markets	112	Mis-pricing of interest rate options

Operational risks includes extreme risks and, as such, represent a conceptual challenge ...

- Operating losses can be measured with adequate loss event frequency and size collection. Losses related to operating the fund can be assimilated to 'cost of operating' and should be measured and managed to increase the levels of risk-adjusted returns
- Excess losses can not be measured for a given fund as events are unlikely to be present in the fund's history
- Moreover, the tail of the distribution can not accurately be represented in mean-variance models as they, by construction, do not focus on extreme values
- Assessing the probability of suffering an extreme loss is a challenging task that may not be sufficient to prevent it to happen

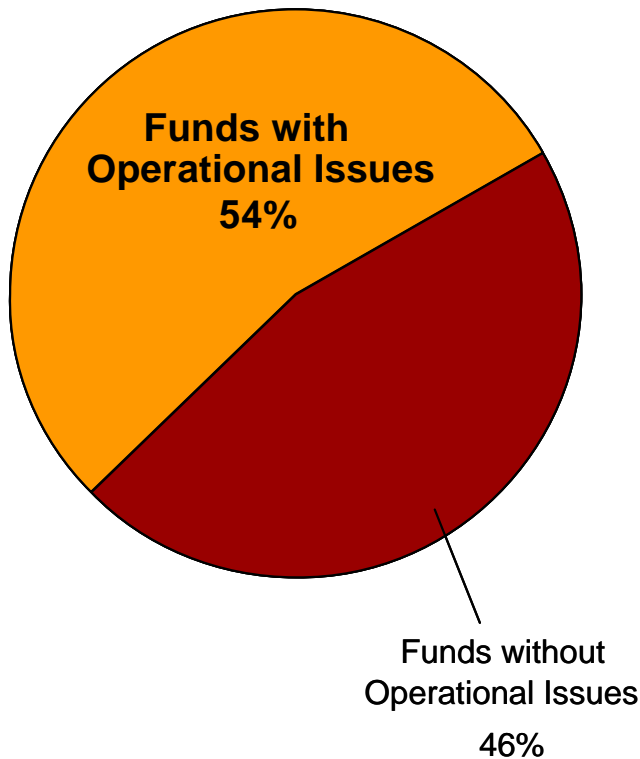


However, extreme losses represent one of the most important source of underperformance

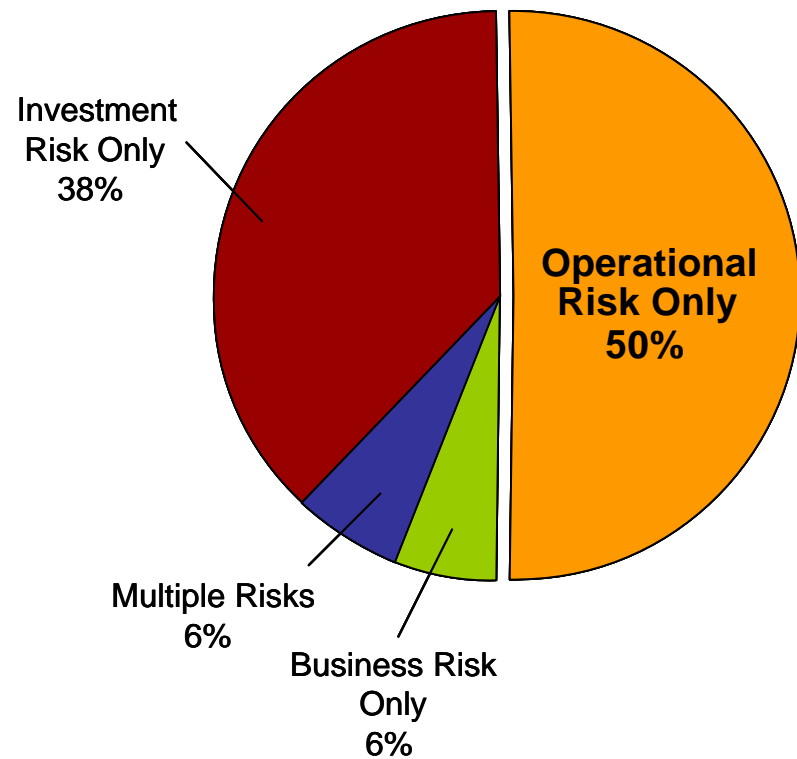
- **Hedge Fund investors mitigate financial risk through appropriate diversification:**
 - Style and strategy diversification across the various Hedge Fund strategies
 - Financial diversification through multiple managers
- **Hedge Funds of Funds are building their success on their limited financial risk despite investing in un-hedged vehicles**
- **It is widely accepted that optimal diversification is achieved with 20-30 hedge funds**
- **Loss of investment in one single fund would therefore result in a 3% to 5% net loss that would compromise the possibility of producing alpha out of a portfolio of Hedge Funds**

A detailed analysis of historical data does generate concern as many hedge funds failures are related to operational issues ...

Distribution of Failed Funds with Operational Issues



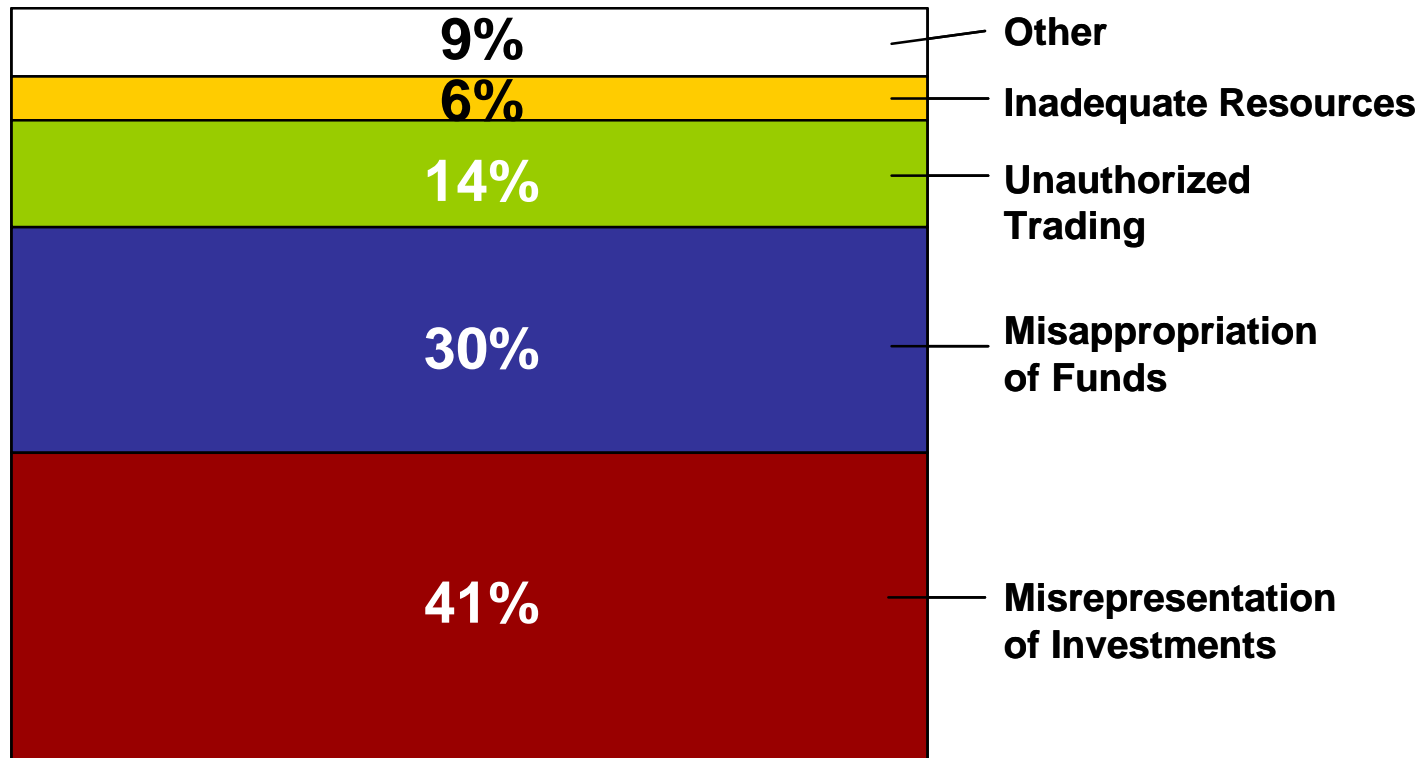
Distribution of Fund Failures



Source: Capco Research and Working Paper, "Understanding and Mitigating Operational Risk in Hedge Fund Investments"

Break out of operating risk incidents: most lied, many stole and some were just incompetent

Breakdown of Operational Issues



Source: Capco Research and Working Paper, "Understanding and Mitigating Operational Risk in Hedge Fund Investments"

Lessons from past failures – Long Term Capital Management

Did Genius really fail ?

■ Lack of Transparency

- At LTCM, secrecy was king, resulting in the absence of visibility for the overall liabilities of the funds. As a consequence, haircut required by counterparties for entering a Repo contract was close to nil, i.e. LTCM was seen as not carrying any default risk

■ Uncontrolled leverage

- LTCM strategy required the fund to be leveraged **25** times. A first loss reduced the capital from **\$4.7b to \$4b**, resulting in an increase of the leverage from **28** to **31**. Following the default of the Russian debt, the fund ended the year with a **55%** loss in equity, leaving the leverage ratio at **55** times the capital

■ Model bias

- LTCM aimed at being market neutral. This was achieved using the same VaR model for portfolio optimisation and risk management purposes (same time horizon, level of confidence and historical data). This approach resulted in the absence of control on extreme events (sovereign default) and other potential risks (operational, liquidity ...) amplified by the extreme leverage.

Source: Jorion, Philippe. Risk Management Lessons from Long-Term Capital Management. University of California Irvine, (January 2000).

Full transparency, the ultimate solution ?

- **Traditional motivation for push-back**
 - Investor/broker front-running the funds
 - Does not prevent fraud, incorrect marks ...
- **Operational implications for the Hedge Funds**
 - Cost, operational impact of marking the portfolio daily
 - Focus on operations rather than management
- **Operational implications for the Hedge Fund of Fund**
 - Consistency of data
 - Capacity and skill to analyse the overall portfolio
 - Complexity of decomposing the strategies
 - Effectiveness of the reaction in case of insufficient liquidity

Full transparency, the ultimate solution ?

A few thoughts


- Is the HFoF manager hired to control the content of the funds or to allocate to the right fund (i.e. Asset Allocation, Style Allocation, Manager Selection) ?
- What is expected from a HF manager is to stick to the strategy defined in the OM, controls need to be in place to ensure that this remain the case;
- The HFoF may take decisions based upon the detailed position on a global level, discounting the trading strategy at the portfolio level (i.e. concentration in a given stock, net short position on a single security);

- **The most important HFoF take whatever information is provided by the fund but focus on:**
 - Internal controls that ensure compliance with OM guidelines
 - The ability to access the information when needed to ensure the controls are effective

Does an equity investor have a daily view on the company's P&L ?

Questions ...?

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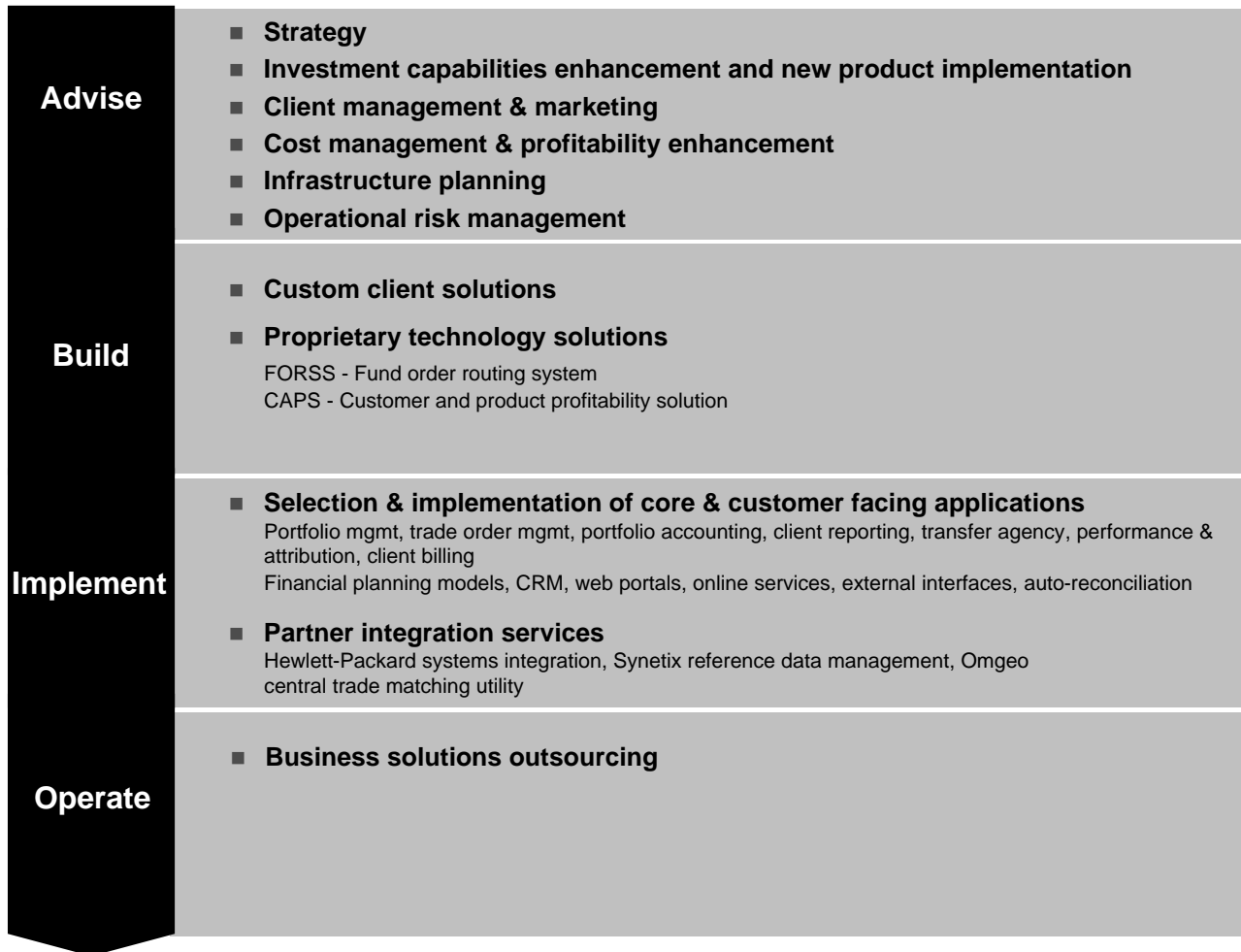
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Capco serves all major sectors of the global securities & investments industry:

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Some of our experience

■ Market-facing operations and technology

- Global Asset Manager -- evaluated and assisted with selection and implementation of trade order management, trade crossing, and analytical technology.
- A large middle-eastern investment manager -- redesigned complete investment and transaction processing infrastructure and implemented new straight-thru-processing environment.
- A large institution beginning an alternative investment program -- evaluated and recommended improvements in operations and technology infrastructure for new hedge funds and funds-of-funds business of a large, traditional, long-only asset manager.
- A consortium of institutions active in the securities lending market -- developed and evaluated business case for an alternative trading system looking to match borrowers and lenders in the equity finance and fixed income securities lending markets.

■ Operations and technology improvement

- Global Asset Manager - reviewed all investment management operations globally for efficiency, effectiveness, capacity and scalability. Made specific recommendations market-by-market and product-by-product for improvement. Assisted in implementation of recommendations.
- A mid sized fixed income and convertible arbitrage hedge fund manager-conducted assessment of operations, technology and controls, making recommendations for improvements with a focus on staffing levels and control points.
- Top-tier US institutional investment manager - led implementation of Portia portfolio accounting, and related redesign of operational process & controls.
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