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Hedge Funds' Operational Risks Beyond Naïve Diversification

Jean-René Giraud,

C.E.O. Edhec Risk Advisory

Research Associate, EDHEC Risk and Asset Management Research Centre

jrg@edhec-risk.com

Agenda

- Managing the operational risk of hedge fund investments
- The forests behind the trees
- The diversification of operational risks
- Mitigation through operational due diligence
- Benefits and limits of managed account platforms

Operational Risks: the forest behind the trees

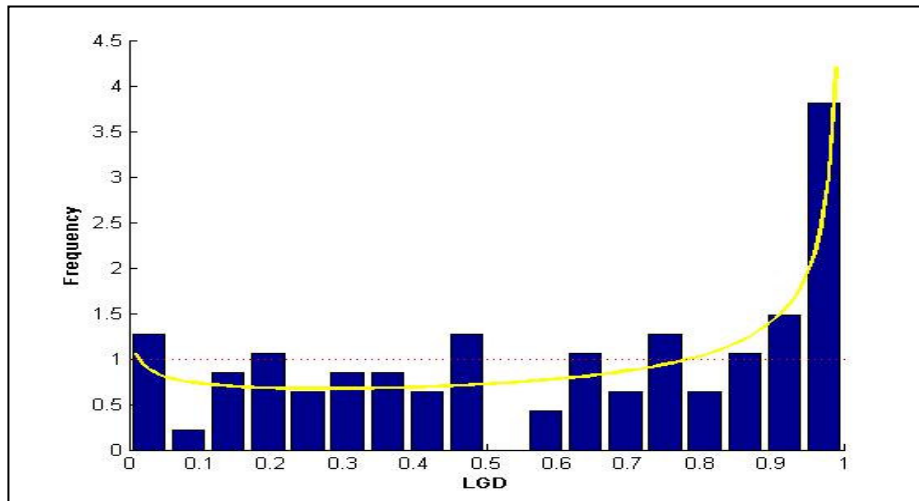
Operational risks represent one of the most significant extreme risks incurred by hedge fund investors, extreme by the financial consequences of hedge fund failures as well because of reputation concerns

- Like any form of investment such as direct investment in shares, private equity or even bonds, investors are not totally immune against the risk of monies being swept away in a troubled fund.
- Hedge fund defaults do happen at a pace that cannot be considered negligible, with 15 publicly disclosed hedge fund failures every year out of a universe comprising between 7,000 and 10,000 funds, the rate of default is far from nil.
- More important is the fact that more than 60% of hedge fund failures can be directly related to operational issues that have nothing to do with the financial performances and risks of the investment.
- With two-thirds of these operational failures being directly related to different forms of fraud (misappropriation, misrepresentation, trading outside of the mandate guidelines), the risks carried by the investor affects more than the direct financial exposure only by taking a significant reputation aspect.
- Hedge fund failures should not be mingled with hedge fund attrition as a significant number of funds cease to operate very legitimately because of inadequate performance or prospects.

Operational Risks: the forest behind the trees

The reality of hedge fund defaults (loss > 20% followed by litigation with investors) has to be considered at the time of investment

- The growing number of active funds is accompanied by an increasing number of defaults made publicly available.
- The likelihood of a hedge fund defaulting within a year is 0.30%, which means that the likelihood of a fund defaulting in a portfolio of 30 hedge funds is once every eleven years.



Source: Christory, Daul, Giraud, « Hedge Funds Operational Risks », 2006

	Number of defaults	Number of Hedge Funds at end of year	Frequency of yearly default
1994	3	751	0.40%
1995	2	972	0.21%
1996	3	1250	0.24%
1997	4	1560	0.26%
1998	10	1917	0.52%
1999	2	2430	0.08%
2000	13	2969	0.44%
2001	18	3635	0.50%
2002	13	4381	0.30%
2003	12	5068	0.24%
2004	12	5563	0.22%

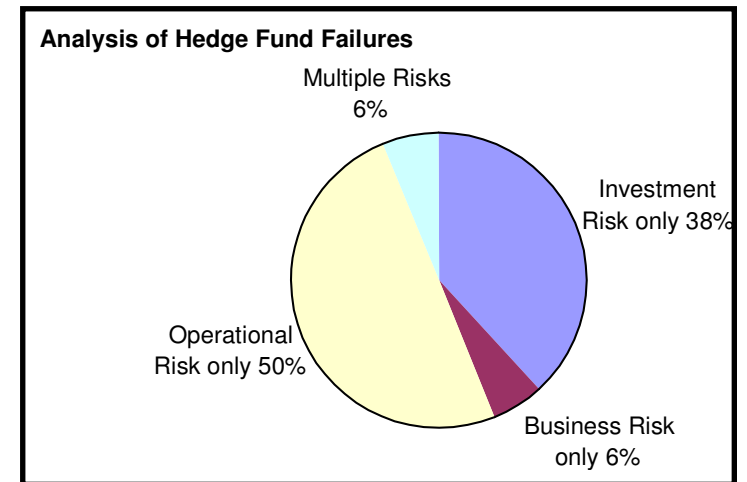
Source: Christory, Daul, Giraud, « Hedge Funds Operational Risks », 2006

- Interestingly, loss frequencies have not increased significantly over the last 10 years despite more and more funds being established.
- But more importantly, the Loss Given Default distribution exhibits a significant skew towards large losses.

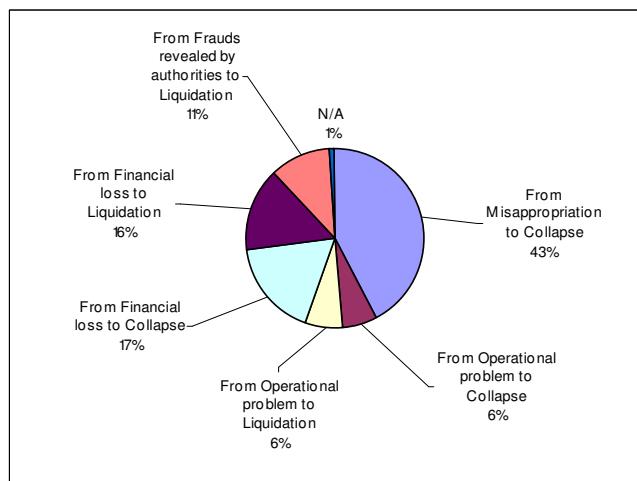
Operational Risks: the forest behind the trees

The reasons behind hedge fund failures have been extensively documented over the last three years

- Liquidations related to investment failure only represent 38% of the cases analyzed by Capco.
- Operational and business risk only explains 56% of hedge fund failures.
- In 6% of the cases, multiple risks were involved in the failure of hedge funds.



Source: Capco 2003



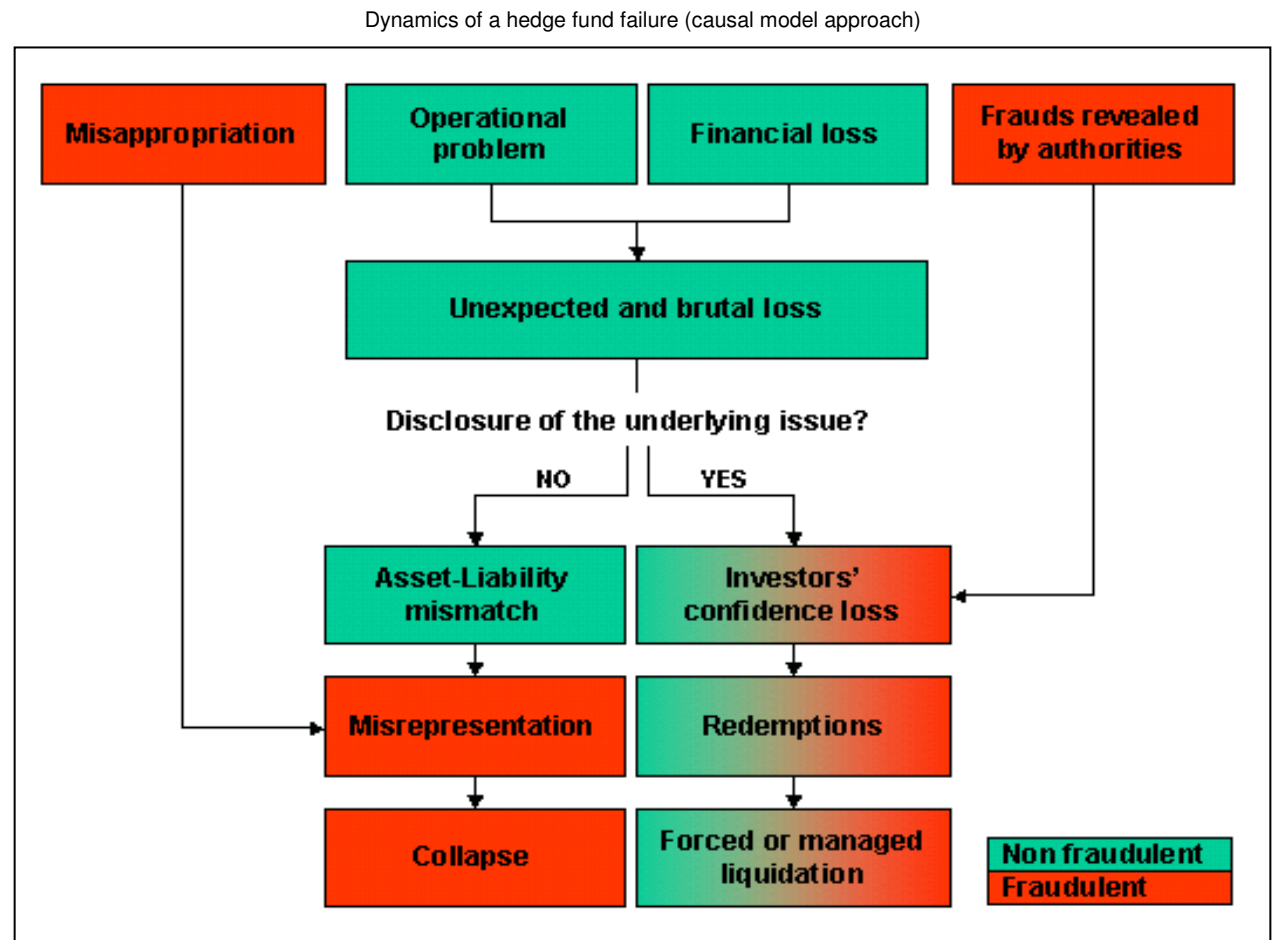
Source: Christory, Daul, Giraud, « Hedge Funds Operational Risks », 2006

- A recent analysis of failures documented between 1985 and 2005 confirms that:
 - 54% of cases are fraudulent from inception
 - 33% are failures consecutive to a financial loss
 - 12% are purely operational failures
- It is obvious from this analysis that hedge funds' non-financial risks ought to be actively managed.

Operational Risks: the forest behind the trees

Understanding what leads a fund to bankruptcy is the first step required to actively diversify non-financial risks

- The dynamics of a hedge fund bankruptcy are triggered by three types of events:
 - Deliberate initial fraud
 - Operational failure
 - Financial loss
- These events force the fund to enter into a chain of events where losses accumulate and may lead to new situations:
 - Asset-Liability mismatch followed by 'secondary' fraud
 - Liquidity race leading to managed or forced liquidation

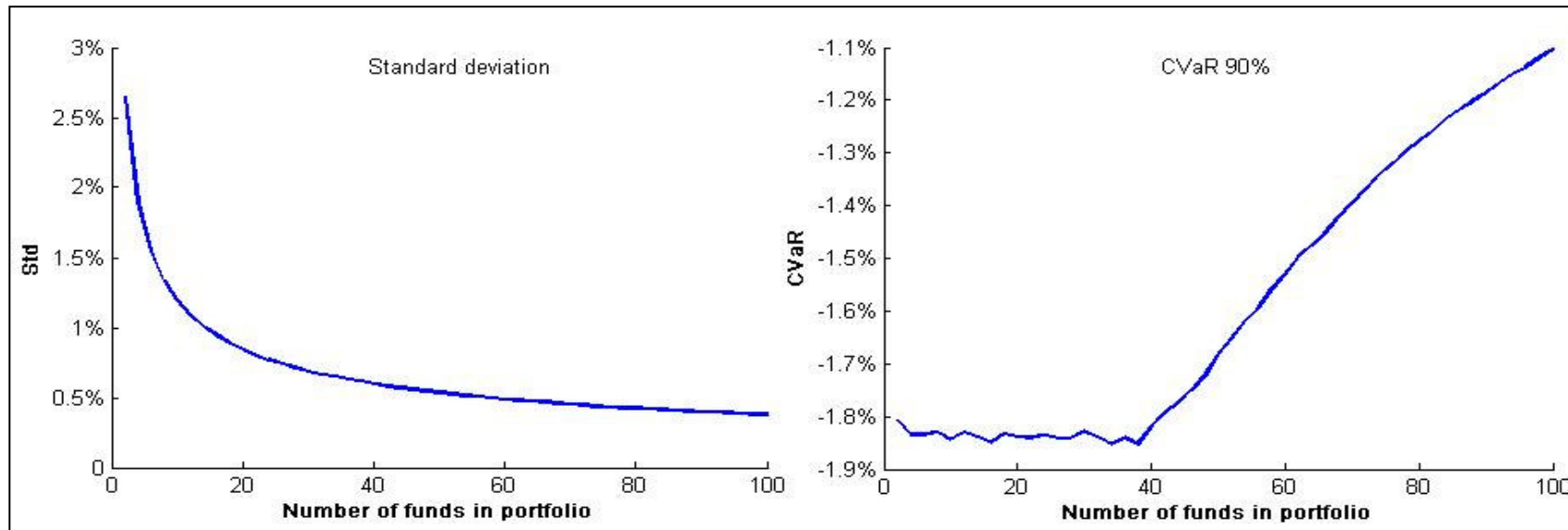


Source: Christory, Daul, Giraud, "Hedge Funds Operational Risks", 2006

Diversifying operational risks

Because non-financial risks are extreme risks, an appropriate measure through the CVaR confirms the risk is not easily diversifiable under the assumption that events are independent

- A naïve approach to mitigating operational risk is to construct a portfolio of more than 30 or 40 investments. Increasing the number of funds does indeed diminish proportionally the loss related to a single event, but symmetrically and proportionally increases the likelihood of being invested in a fund that goes bankrupt.
- Intuitively, such behaviour even results in the overall risk being increased since a larger number of funds implies
 - Potentially less thorough due diligence
 - Exposure to second class funds



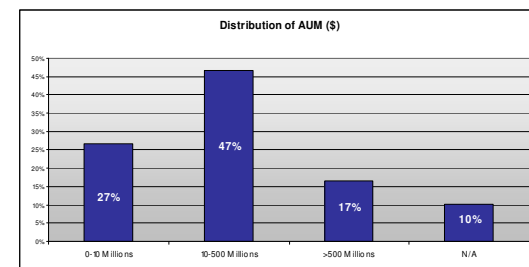
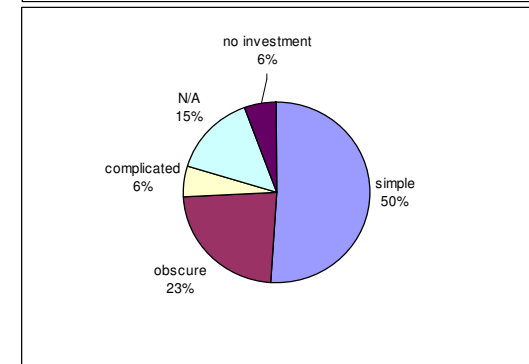
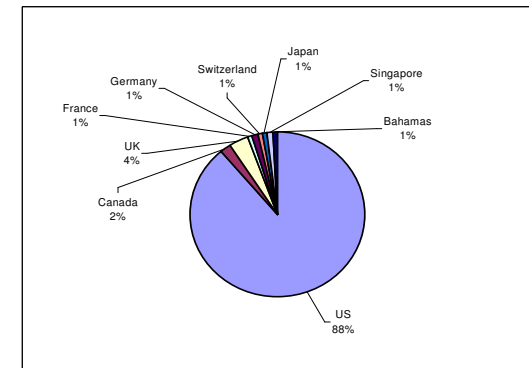
Source: Christory, Daul, Giraud, "Hedge Funds Operational Risks", 2006

Diversifying operational risks

Mitigating non-financial risks requires understanding of the main risk factors, which remain difficult to assess ex-post because of the relative lack of transparency of the industry

- Candidates for potential risk factors are numerous and are related to different dimensions of the fund:

- Age & Size of the organization
 - Number of years of operations
 - Number of staff
 - Growth rate
 - % of assets owned by the manager
- Strategies and instruments involved
 - Strategy of the fund
 - Focus of the fund
 - Instrument complexity
 - Leverage and sources of financing
- Commercial conditions
 - Nature of performance fees & watermarks
 - Lock-in periods / liquidity provided
- Operational conditions
 - Location of registration
 - Location of management
 - Nature of administration (self administered or not)
 - Nature of relationship with brokers / prime brokers
 - Number of counterparties
 - Usage & nature of managed accounts



- **These factors are difficult to assess ex-post for analysis**

Source: Christory, Daul, Giraud, "Hedge Funds Operational Risks", 2006

Diversifying operational risks

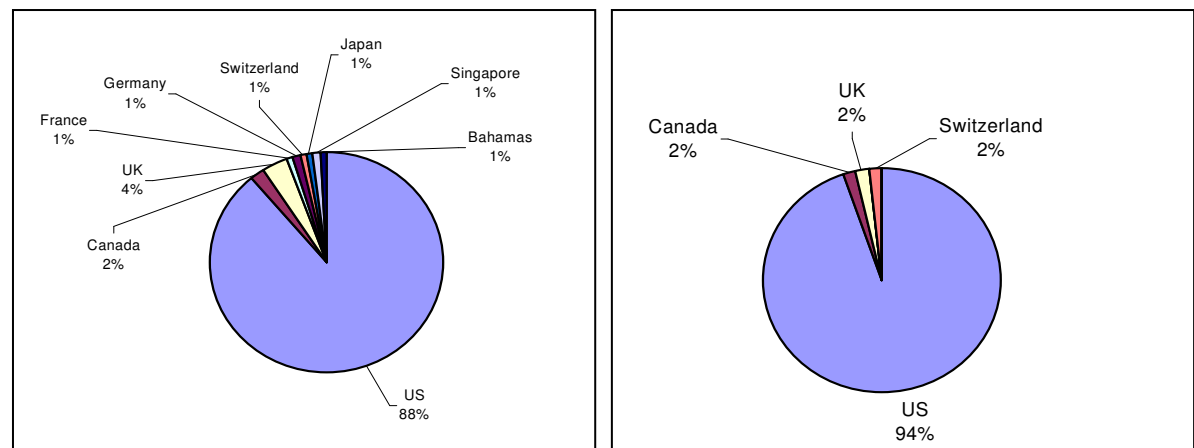
Understanding the conditional default probabilities will allow the actual risk factors to be better taken into consideration during the portfolio construction phase

- A good understanding of the conditional probabilities of default will allow the investor to minimize the risk of default in a portfolio and include qualitative risk factors within the portfolio construction phase.
- The main difficulty of this approach remains to establish the conditional likelihood of default based on the suggested risk factors.
- Establishing an absolute probability of default is the next step that will require an in-depth analysis of the entire universe of funds, or at least a representative sample.

Global default probability: 0.30%		Probability (Default/Risk Factor)
Location of management company	US	0.41%
	Non US	0.09%
Complexity of instruments	Simple	0.37%
	Obscure	0.68%
	Complex	0.05%

Probability (Default/(US et obscure))=0.76%

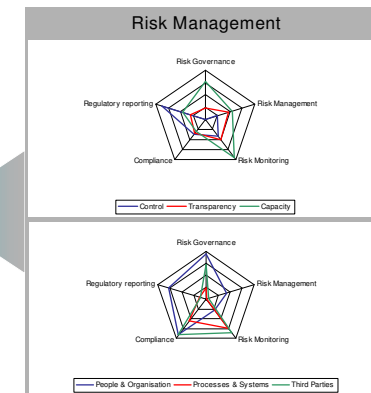
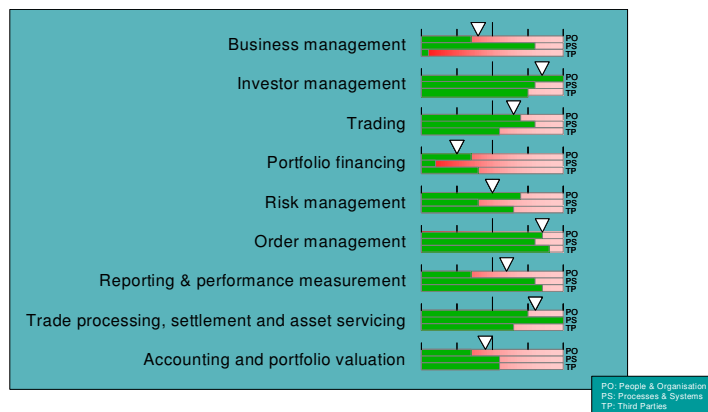
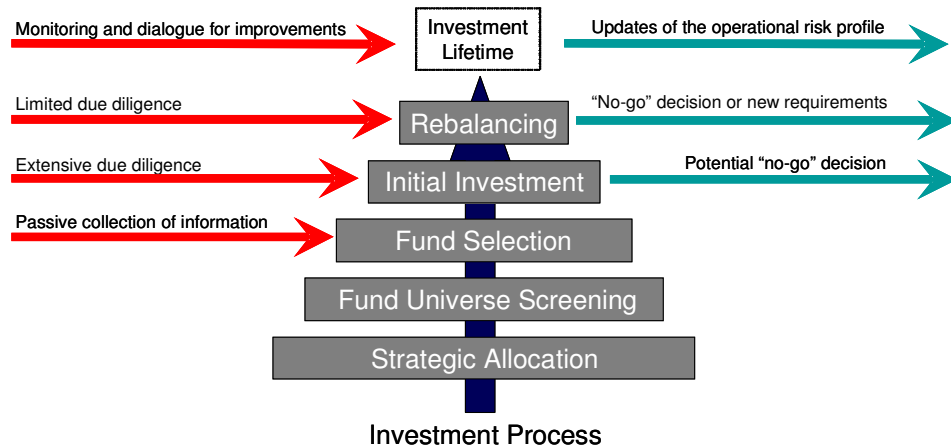
Absolute and conditional probabilities to default: location risk factor



Source: Christory, Daul, Giraud, "Hedge Funds Operational Risks", 2006

Mitigation through operational due-diligence

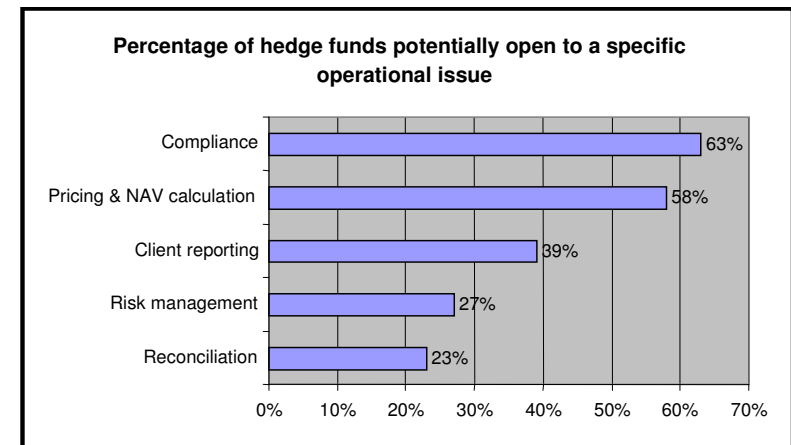
Operational due-diligence has often been cited as the panacea for mitigating operational risks.



Mitigation through operational due-diligence

Operational due-diligence has often been cited as the panacea for mitigating operational risks.

- Operational due diligence comes at a cost that remains significant for most funds of hedge funds or institutional investors that construct portfolios smaller than \$250mn.
- These costs are unlikely to be recovered through management fees and remain considerable compared to the possible loss of a correctly diversified portfolio
- Systematic and comprehensive due diligence is therefore only affordable for large funds of hedge funds or organizations investing significant capital in hedge funds.
- In addition, conducting efficient operational due diligence remains extremely difficult for several reasons:
 - Lack of adequate personnel
 - Significant bias during the interview/investigation process
 - Ex-ante analysis does not take into consideration actions the manager may take at difficult times when independent review is not permanent
 - Due diligence costs are likely to be the first ones cut during cost restriction periods as it is unlikely to immediately influence investor's confidence.

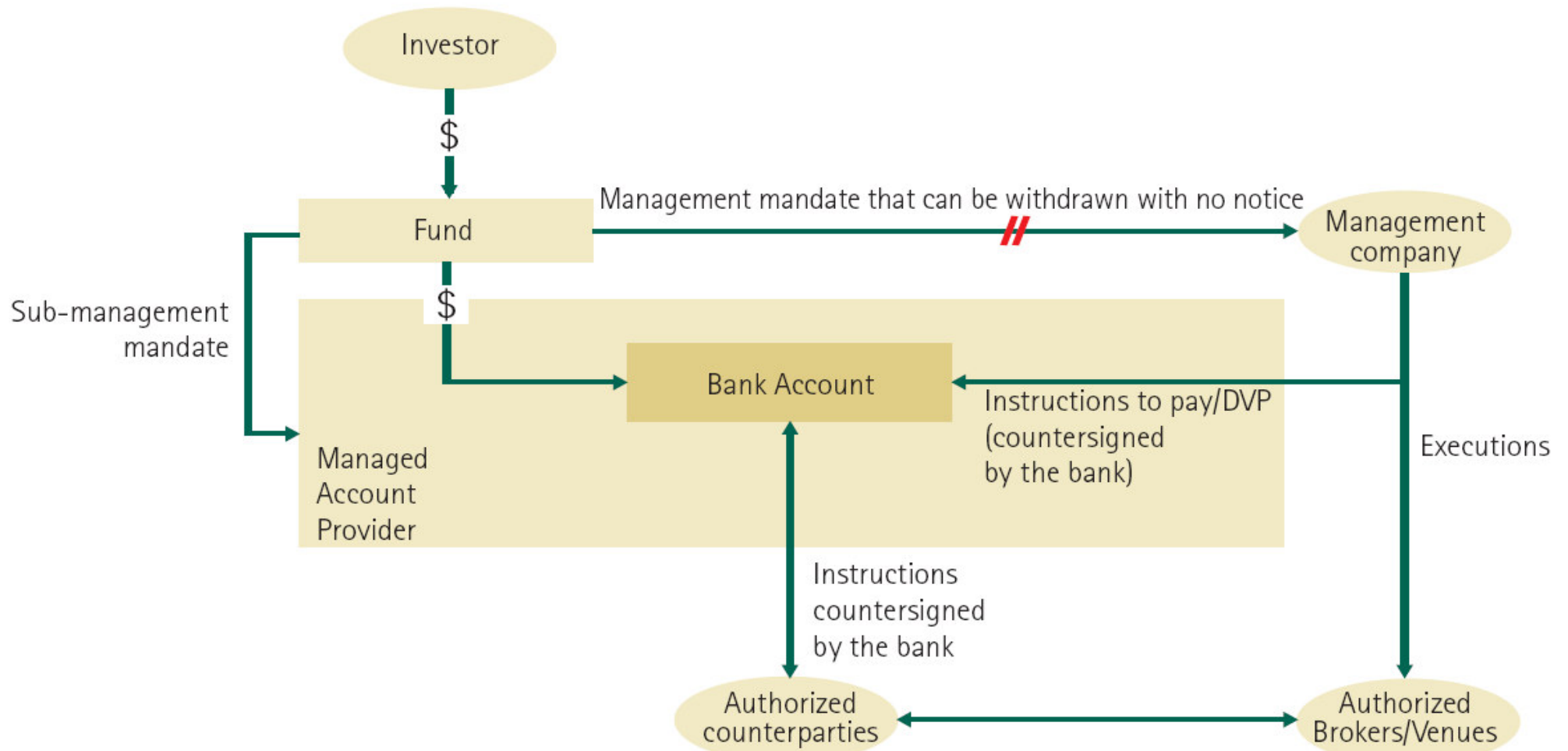


Fund Size	Cost of due diligence in bpts
\$50mn	120 bpts
\$100mn	60bpts
\$250mn	24 bpts
\$600mn	10 bpts
\$1bn	6 bpts

Source: "Managing Operational Risks", Jean-René Giraud 2004

Benefits and limits of managed account platforms

Managed accounts offer a compelling way to mitigate non financial risks thanks to a wide range of specific features

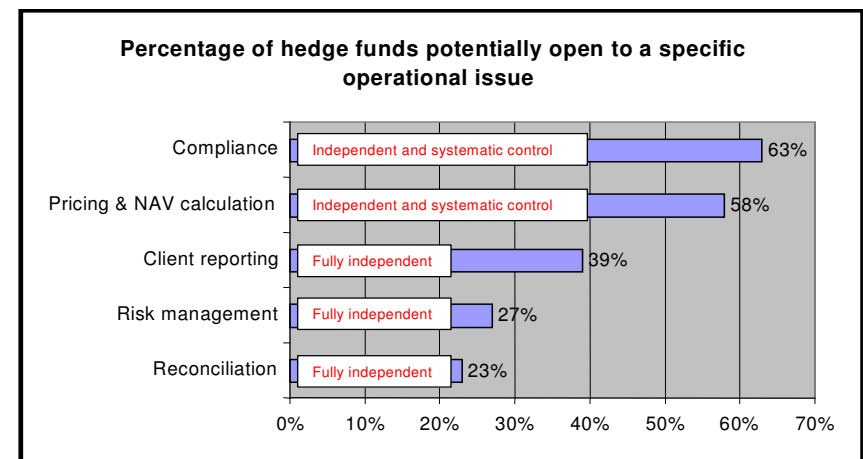


Source: "Operational Risk and Managed Accounts", Jean-René Giraud 2005

Benefits and limits of managed account platforms

Understanding the functioning of an advanced managed accounts platform allows its benefits and direct limitations to be understood

- The concept of ‘managed accounts’ has been derived in numerous forms that offer different features:
 - Standard custodial arrangements: assets are held in the name of the fund in a dedicated account operated by the manager of the hedge fund;
 - Prime brokerage custody: assets are held in the name of the fund in a dedicated account operated by the manager, the bank can act as an independent provider of controls on behalf of the board of directors;
 - Basic managed accounts: assets are held in the name of the investor within the books of a custodian bank and the manager receives the right as part of his management mandate to operate the account. The bank has no duty of control on the assets held, nor on the investment decisions, but reporting independent from the manager can be issued by the bank directly to the investor;
 - Managed account platforms: assets are held in the name of the investors in a segregated account and the bank operates back office and risk control functions on behalf of the board of directors of the hedge fund.



Source: "Operational Risk and Managed Accounts", Jean-René Giraud 2005

Benefits and limits of managed account platforms

But there is nothing more different from a managed account than another managed account and advanced infrastructure come at a cost

- It is essential for the investor to properly understand the real level of protection and independence he will gain from the managed account provider as these come in very different flavours.
- Managed accounts, when accompanied by appropriate risk monitoring and adequate structuring of the relationship with the hedge fund manager today represent a very efficient approach to mitigating operational risks, especially when the size of the investments does not allow for a dedicated operational due diligence and risk monitoring team to be set up.
- By clearly containing the most important operational risks hedge fund investors may face, managed account platforms offer a level of protection that significantly reduces the selection risk involved in direct investments in hedge funds, allowing the fund of hedge fund manager, or the final investor, to focus investments and efforts on the asset allocation and manager selection phases of the investment process.
- It becomes the investor's responsibility to carefully analyse the cost benefits of managed accounts in light of a complete analysis of the expenses related to implementing an infrastructure and investment environment offering similar levels of protection.

Range of services related to managed accounts

	Traditional private partnership	Standard custodial account	Prime-brokerage custody	Basic managed account	Advanced managed account
Segregation of assets			✓	✓	✓
Privileged redemption conditions				✓	✓
Elimination of misrepresentation risk		✓ ^[1]		✓	✓
Elimination of misappropriation risk			✓ ^[2]		✓ ^[3]
Elimination of mispricing risk					✓
Mitigation of other operational risks					✓ ^[4]

^[1] Only when independent reporting of assets is performed by the custodian bank directly to the investor

^[2] Only when cash instructions are countersigned by the prime broker

^[3] Only when the manager mandate can be withdrawn at any time

^[4] Only when back office services are provided as part of the platform

Source: Christory, Daul, Giraud, « Hedge Funds Operational Risks », 2006