

Università Commerciale
Luigi Bocconi

What Do We Know About Hedge Funds?

Prof. Massimo Guidolin

Fall 2018

Plan of the Talk

- Generalities and Motivation
- Types of hedge funds
- Are hedge and mutual funds really that different?
- How do hedge funds generate performance? Do they hedge?
- Is mean-variance allocation applicable to hedge funds?
- Do hedge funds trade liquidity?
- Do hedge funds simply sell financial disaster insurance?
- Are hedge funds a separate asset class?
- Are hedge fund managers skilled?
- The cross-section of hedge funds? What are the best funds like and how do they behave?

Plan of the Talk

- Small or Big hedge funds? The smart money effect
- Hedge funds' gambling bias
- The systemic, aggregate effects of hedge funds
- Opaqueness of data sets and willingness to report
- Managed Futures Programs and their distinctiveness
- Hedge funds in trouble?

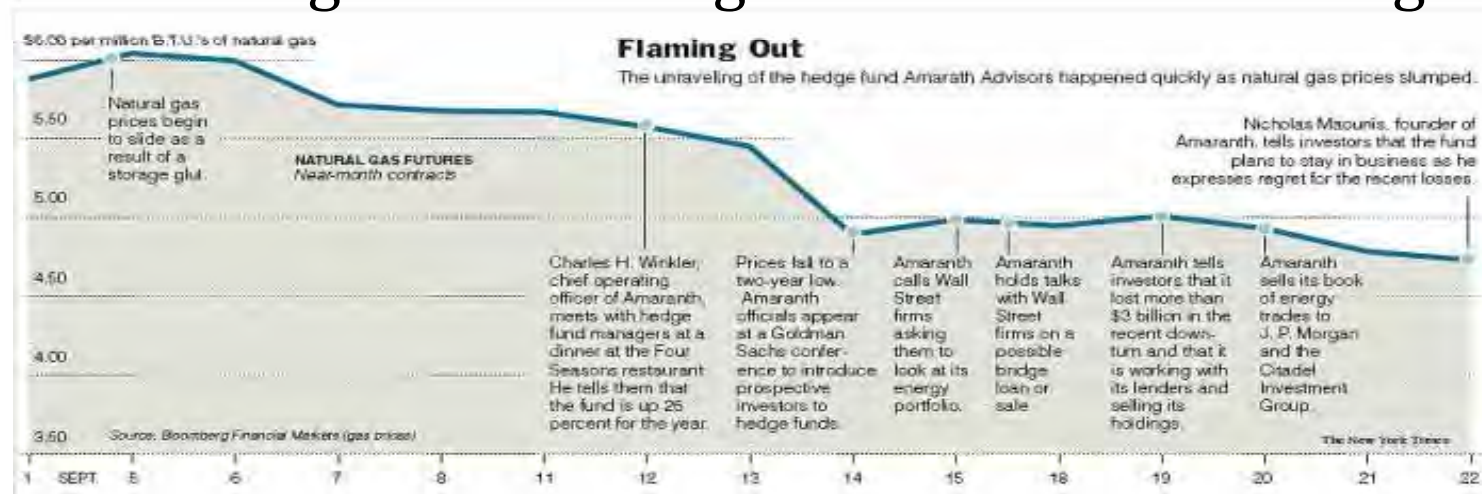
Generalities and Motivation

- The term “hedge fund” was first used in 1949 by Alfred Winslow Jones to describe an investment partnership whereby he “hedged” risk by purchasing undervalued and shorting overvalued stocks
 - Only precursor Karsten Statistical Lab, in 1930
- With the speculative attack by George Soros on the British pound in 1992 and the LTCM collapse in 1998, HF received a lot of coverage
- In 2007, John Paulson made “the greatest trade ever” (2009) by betting against mortgages
- His HF made \$15 billion on the move, of which Paulson personally took home \$3.7 billion
- HFs can lose big: LTCM collapsed when its credit bets went sour after Russia defaulted; LTCM had begun 1998 with \$5 billion in assets and borrowings of \$125 billion (a leverage ratio of 25:1)



Generalities and Motivation

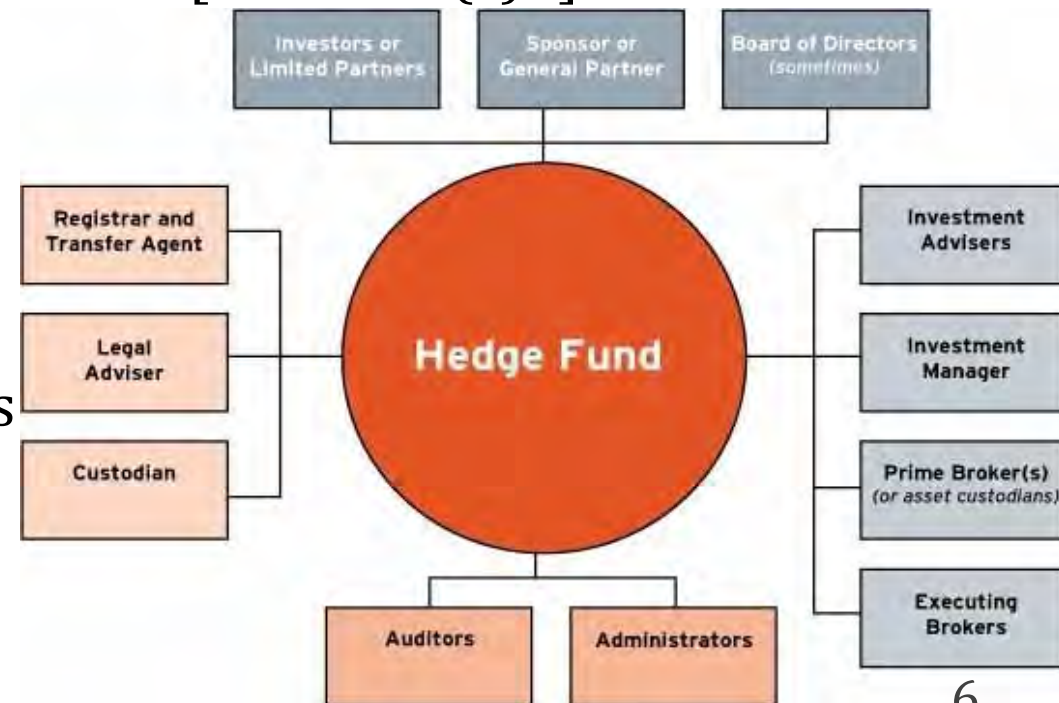
- By Sept. 21, assets had dropped < \$1 billion and leverage > 100:1
- The largest loss incurred by a HF to date is Amaranth Advisors in September 2006: Amaranth lost \$6 billion, or close to 65%, thanks to a lot of leverage and a wrongheaded bet on natural gas futures



- Participation in hedge funds is restricted to high net-worth individuals and to institutional investors such as foundations, life insurance companies, endowments and investment banks
 - A fund of hedge funds (a basket of hedge funds) is not as restrictive
- Unlike other traditional investments such as mutual funds, hedge funds are not currently regulated by the Securities Act of 1933 and are not required to disclose their positions

Generalities and Motivation

- By the 1940 Investment Advisers and the Securities Exchange Act of 1934, private investment pools such as HF are restricted to a max of 499 investors and cannot issue public securities
 - Many HF, however, form offshore funds as a mirror image of their onshore funds to attract additional investors
 - Investment companies do not have to register with the SEC if they have 100 or fewer investors [Section 3(c)1 of the Investment Company Act of 1940] or if the investor base is greater than 100 but less than 500 “**qualified purchasers**” [Section 3(c)7]
 - To qualify for the exemption, HFs cannot be offered for sale to the general public; they can only be sold via private placement
 - Regulation D of the Securities Act of 1933 requires that HFs be offered solely to “**accredited investors**” (large ones, above 1 milion)



Generalities and Motivation

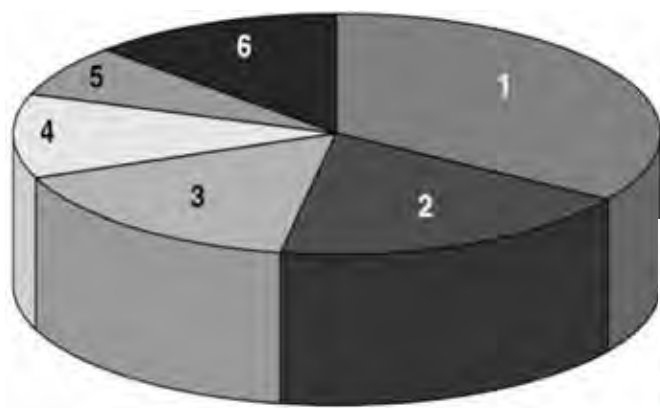
- The surprising fact is that, despite sustained media/regulatory attention, the term “hedge fund” still has no precise legal definition
 - The industry has expanded to include indiscriminately pooled investment funds with strategies departing from long positions in bonds, equities or money markets, or a mix of these
 - This has led to the misleading situation in which the term ‘hedge fund’ no longer implies a systematic hedging attitude.

Here is a series of definitions of the term “hedge fund”:

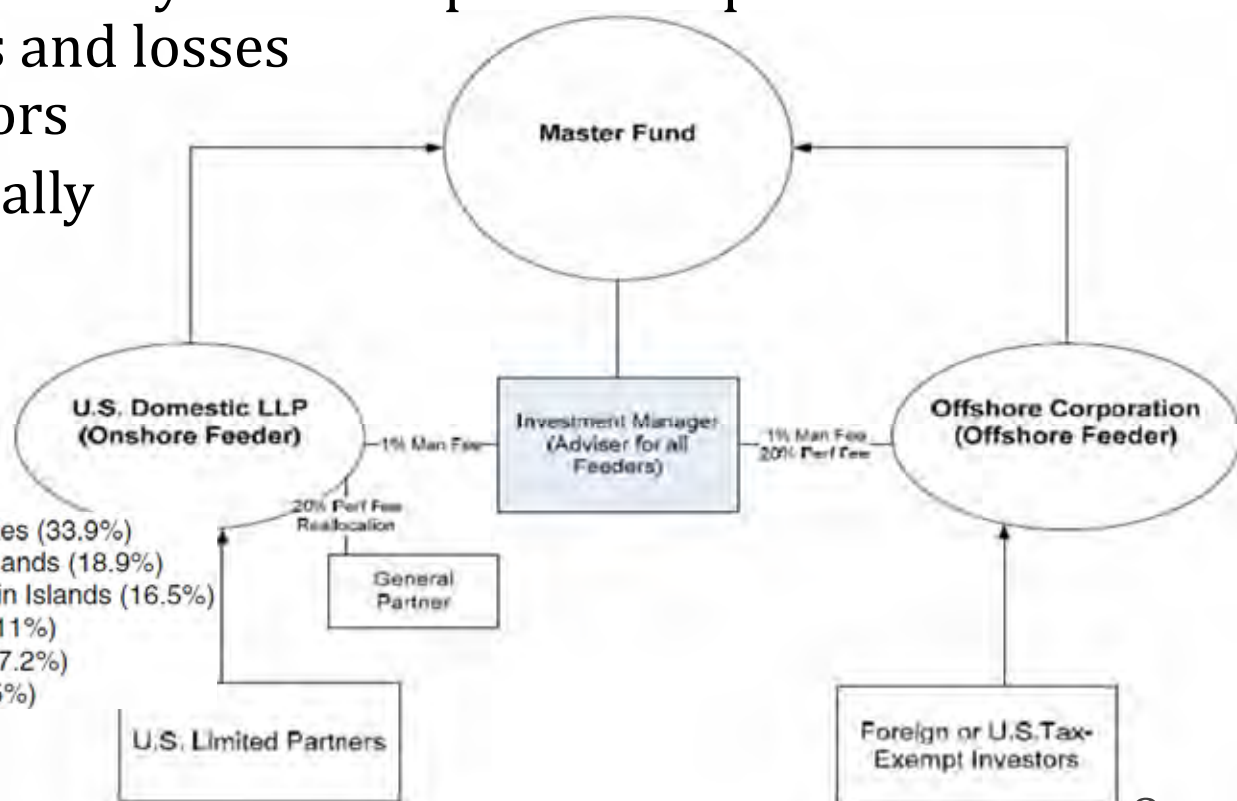
- “A risky investment pool, generally open only to well-heeled investors, that seeks very high returns by taking very great risks.” (Money Central Investor)
- “A hedge fund is a private investment portfolio, usually structured as a limited partnership, open to accredited investors, charging an incentive-based fee, and managed by a general partner with every financial tool imaginable at his disposal.” (Sierra Capital Planning Inc.)
- “An aggressively managed portfolio taking positions on speculative opportunities.” (Investopedia.com)
- “A multitude of skill-based investment strategies with a broad range of risk and return objectives. A common element is the use of investment and risk management skills to seek positive returns regardless of market direction.” (Goldman Sachs & Co.)
- “A loosely regulated private pooled investment vehicle that can invest in both cash and derivative markets on a leveraged basis for the benefit of its investors.” (Thomas Schneeweis, University of Massachusetts)

Generalities and Motivation

- A HF is typically a collection of funds managed by the HF manager through a separate company, the management company
- It is a collection of funds because the tax status of investors differs and each fund is designed to optimize taxes for investors
 - A typical HF with a U.S.-based management company will have an offshore fund for foreigners and an onshore fund for U.S. investors
 - The onshore fund is generally a limited partnership if investors are taxed, so that gains and losses flow through to investors
 - Offshore funds are usually based in a tax haven



1. United States (33.9%)
2. Cayman Islands (18.9%)
3. British Virgin Islands (16.5%)
4. Bermuda (11%)
5. Bahamas (7.2%)
6. Other (12.5%)



Generalities and Motivation

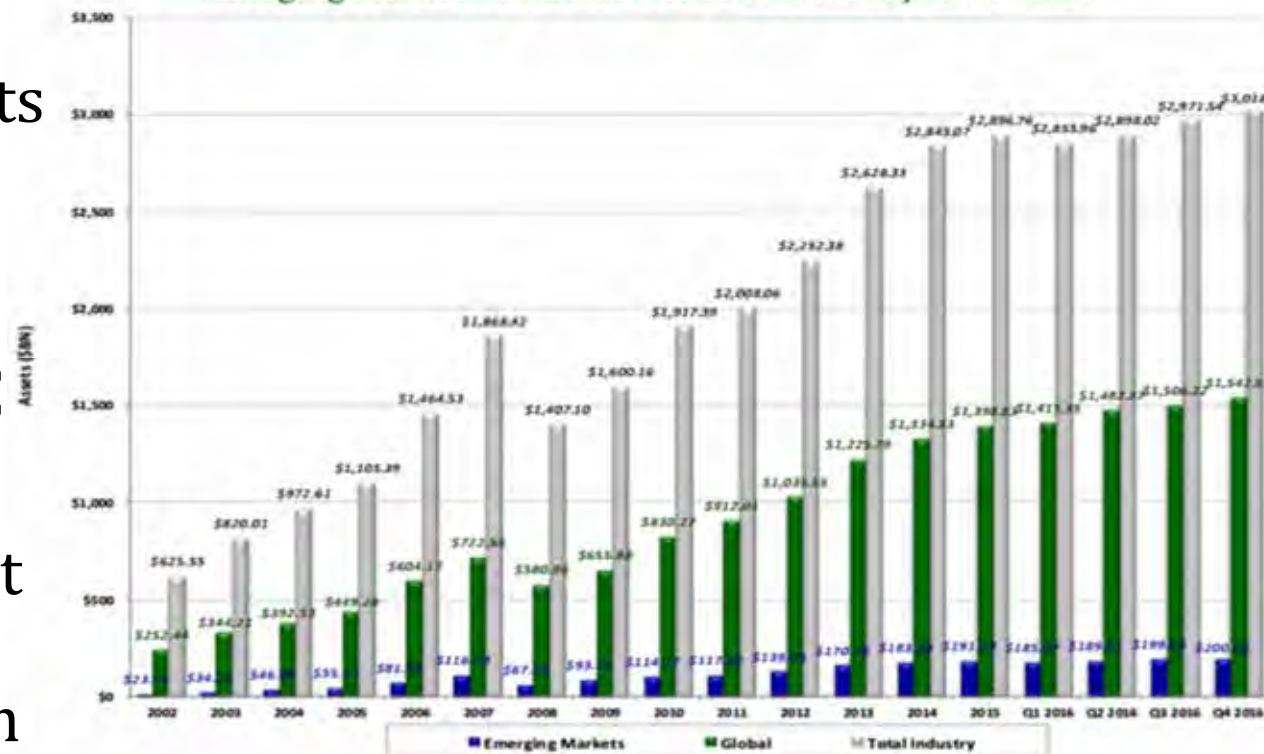
- Under the Private Fund Investment Advisers Registration Act of 2010 in Title IV of the Dodd-Frank Act, effective March 30, 2012, HFs with assets > \$150 million are required to register and report information on assets, certain trades, their brokers, leverage, counterparty exposures, and how they value illiquid assets
 - On Oct. 26, 2011, the SEC voted Rule 204(b)-1 which implements Sections 404 and 406 of the Dodd-Frank Act and requires SEC registered investment advisers to make periodic filings on Form PF
- They must make disclosures only to the Securities and Exchange Commission (SEC), not to the limited partner asset owners
- If a HF belongs to a HF family run by a large asset management firm with > \$100 million in assets, then the overall firm has to report security holdings every quarter (13(f) filings) but not holdings for a single HF
- Short positions are not covered under 13(f) reports



Generalities and Motivation

- A common structure is to have the onshore fund and the offshore fund invest in a so-called master fund, while the onshore and offshore funds are then called feeder funds
- The management company in the case of a HF fund has few clients — only the funds it manages \Rightarrow the mgmt company does not have to register with the SEC
- HFR estimates that the total assets under mgmt (AUM) of the HF industry increased from \$39 billion in 1990 to more than \$3 trillion as of the end of 2016, with global macro funds growing the most

Estimated Growth of Hedge Fund Assets by Regional Investment Focus
Emerging Markets vs. Global vs. Total Industry 2002 – 2016



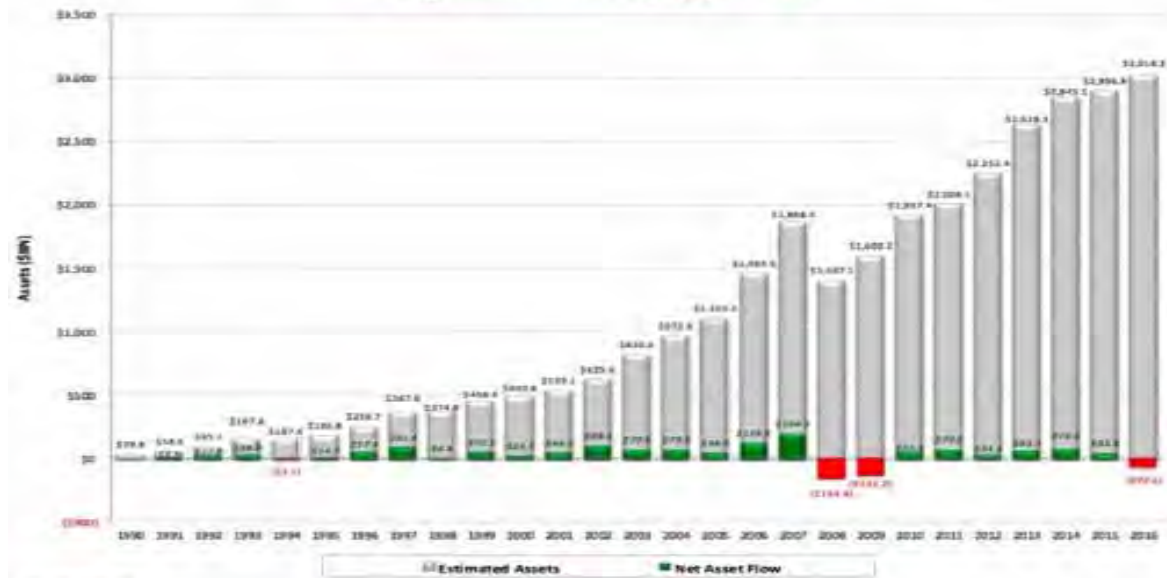
HFR

Hedge Fund Research, Inc. © 2017
10 N. Riverside Plaza, Suite 200 Chicago, IL 60606

SOURCE AS: HFR

Generalities and Motivation

Estimated Annual Growth of Assets / Net Asset Flow
Hedge Fund Industry 1990 – 2016



HFR

Hedge Fund Research, Inc. © 2017
10 S. Riverside Plaza, Suite 700, Chicago, IL 60606
www.hedgefundresearch.com PH: 312 858 0885

SOURCE AS: HFR®

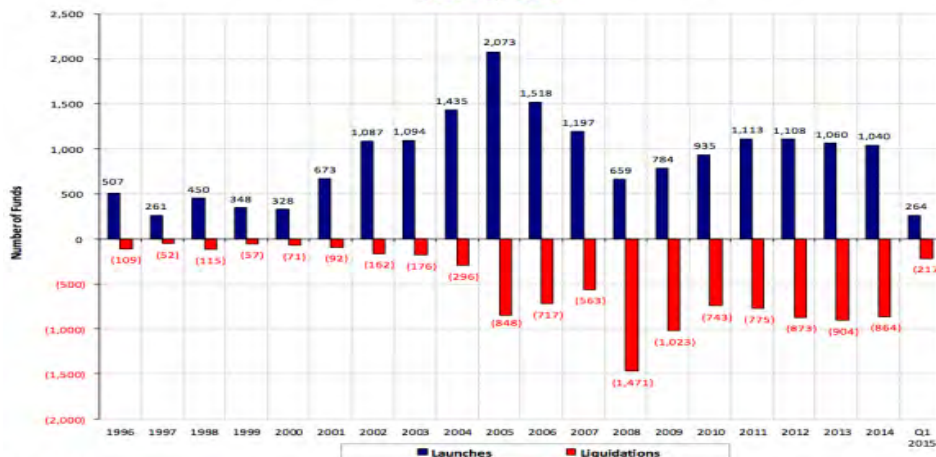
• FOR NON-COMMERCIAL USE ONLY

• DO NOT REDISTRIBUTE

22

- During the same period, the total number of active HFs rose from 610 to over 8,000

Estimated Number of Funds Launched/Liquidated
1996 – Q1 2015



HFR

Hedge Fund Research, Inc. © 2015
10 S. Riverside Plaza, Suite 700, Chicago, IL 60606
www.hedgefundresearch.com PH: 312 858 0885

SOURCE AS: HFR®

• FOR NON-COMMERCIAL USE ONLY

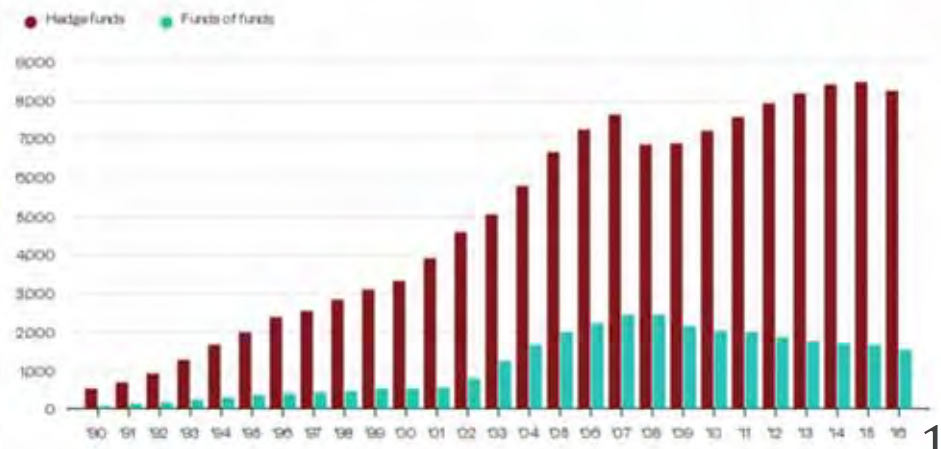
• DO NOT REDISTRIBUTE

27

Source: HFR

Golden Years

The number of hedge funds skyrocketed from 2001 to 2007



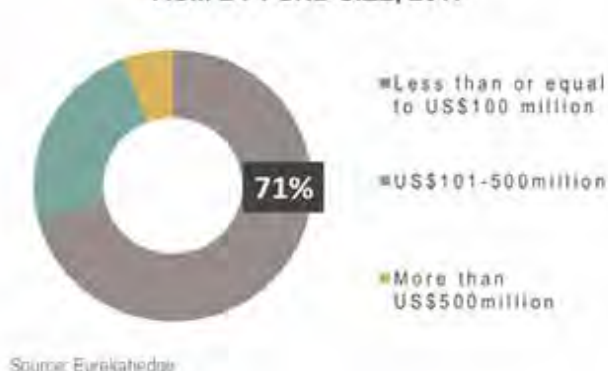
11

Bloomberg

Generalities and Motivation

- The success in attracting investors is not evenly spread, and statistics such as the average or median size hide a wide disparity
- At one end of the spectrum, a large number of small niche players each manage less than \$10 million of assets and claim to be the talents of the future; at the other end, a few huge established funds each manage more than \$1 billion of assets
 - 5 largest HFs in the USA together have more than \$150 billion of AUM
- These large players tend to be better organized, have longer track records, use multiple managers and decision makers, and rely on improved risk management systems
- Not surprisingly, they are the ones often cited in the media, but they are not necessarily representative of the industry

AUM BY FUND SIZE, 2017



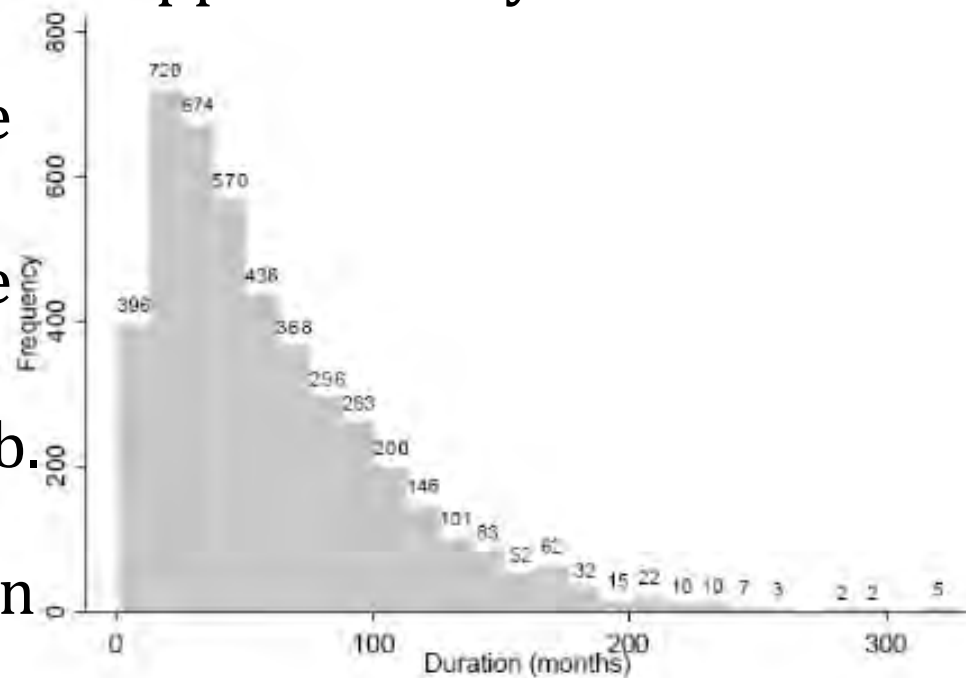
HEAD OFFICE LOCATIONS, 2017



Europe is on the rise

Generalities and Motivation

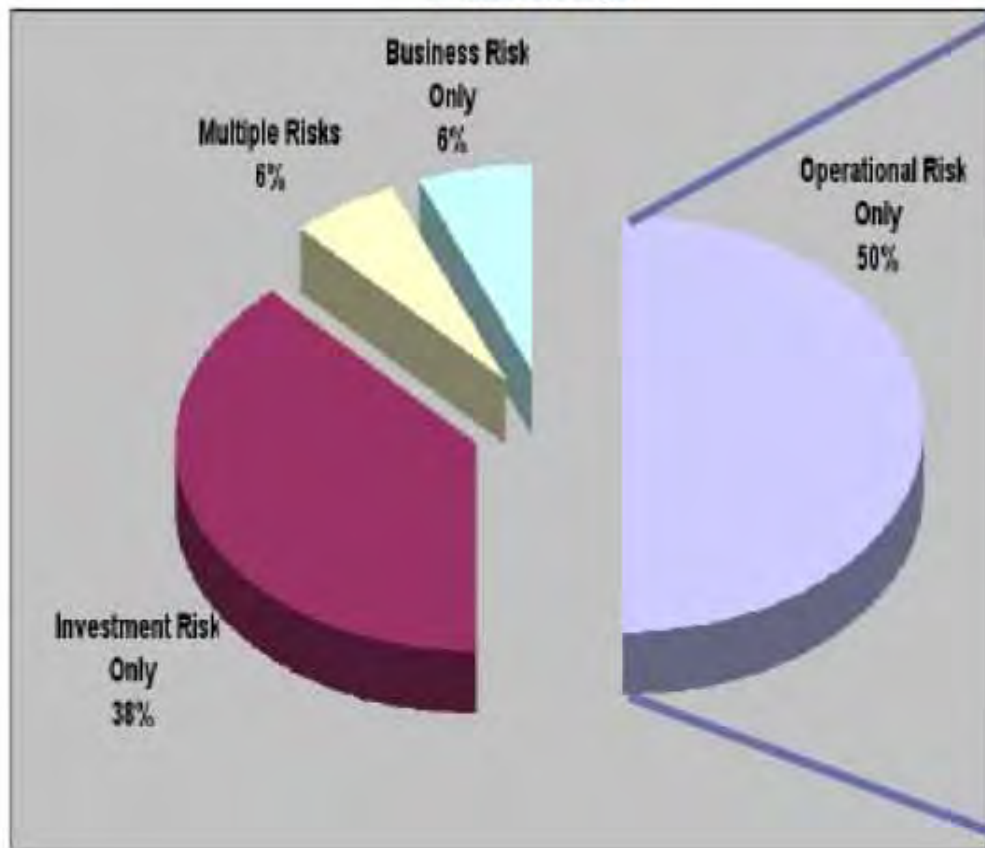
- HFs are also characterized by massive attrition (mortality) rates
- Liang (2000, JFQA) finds that the annual hedge-fund attrition rate is 8.3% for the 1994–1998 sample period using Lipper TASS data, and Horst and Verbeek (2007) find a slightly higher rate of 8.6% for the 1994–2000 sample period
- Brown, Goetzmann, and Park (2001, JF) find that the half-life of typical Lipper TASS HFs is 30 months
- Brooks and Kat (2002) estimate that approximately 30% of new HFs do not make it past 36 months due to poor performance
- Amin and Kat (2003) find that 40% of their sample do not make it to the 5th year
- Howell (2001) finds that the prob. of HFs failing in their 1st year is 7.4%, only to increase to 20.3% in their 2nd year



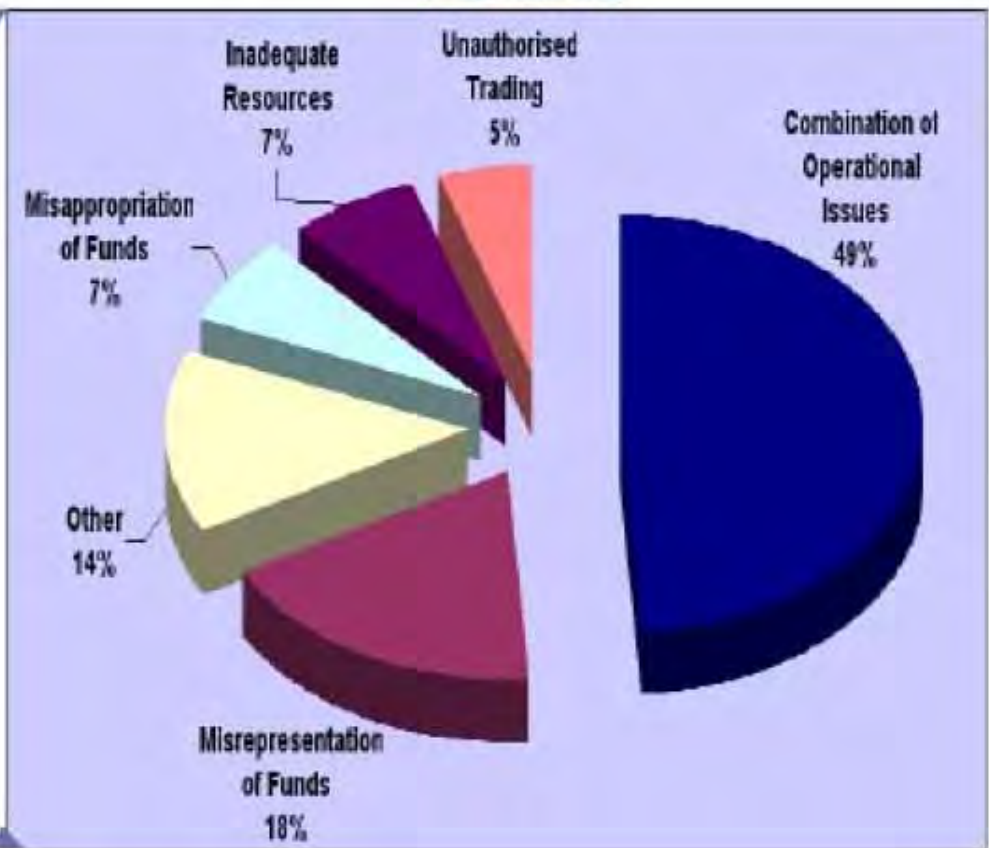
Generalities and Motivation

- Valuation problems are a concern in a large number of HF failure cases and are caused by (i) fraud/ misrepresentation, such as an attempt to inflate the value of a fund, (ii) mistakes or adjustments, either for illiquid securities or for large blocks, and (iii) process, systems or procedural problems, particularly for OTC instruments

Distribution of Reasons for Fund Failures

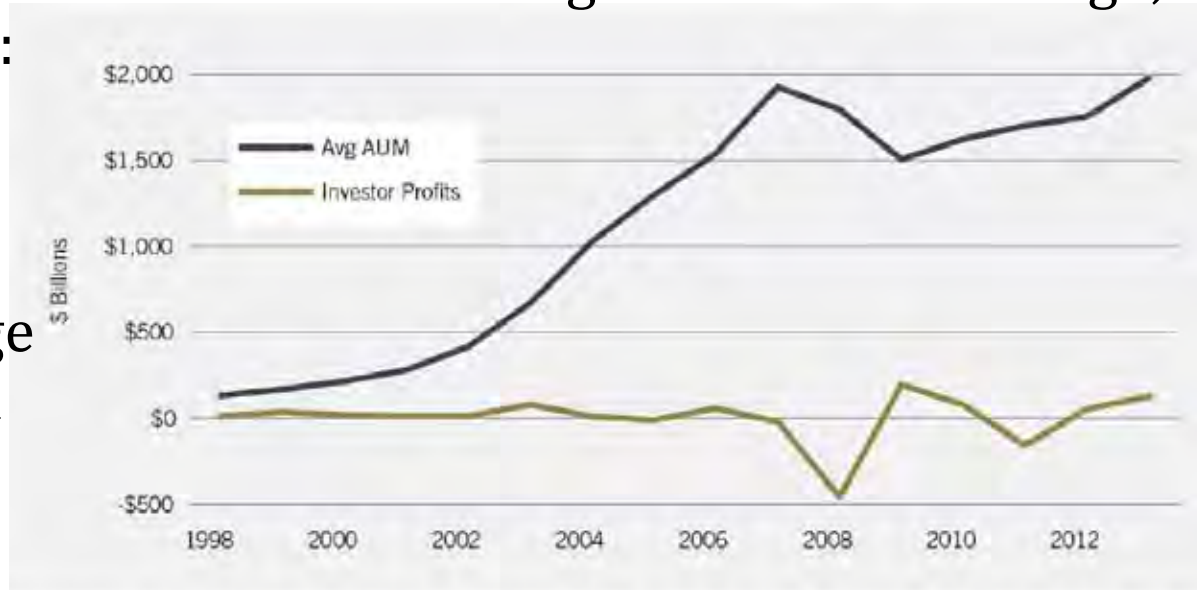


Breakdown of Operational Risk Failures



Generalities and Motivation

- A few parties have voiced serious perplexities on the AUM success of HFs and their ability to generate risk-adjusted performance
 - Ang (2014) writes “Many investors are drawn to HFs by the record of returns (sketchy as it is), which was produced largely when the industry was nascent and many HFs were small. Risks in the early years were high, but early investors prospered (...). The HF industry has since matured, and true outperformers are harder to find. Often the best HFs are small. But many asset owners are reluctant to select small, unproven HFs. They gravitate instead toward large HFs with long track records (...) The returns on these large funds aren’t as high, on average, as small ones: they’re less risky.”
 - Lack (2012) writes “If all the money that’s ever been invested in hedge funds had been put in T-bills instead, the results would have been twice as good.”



Source: Simon Lack presentation “The Fallacy of Hedge Funds: The Hedge Fund Mirage, The Illusion of Big Money and Why It’s Too Good To Be True.” May 2014



Generalities and Motivation

- HF also hold an increasingly large percentage of the stock market: a recent study by Cao, Liang, Lo, and Petrasek (2014) finds that average holding of HFs in publicly traded stocks has risen over time from 3% during 2000-2003 to 9% in 2008-2012

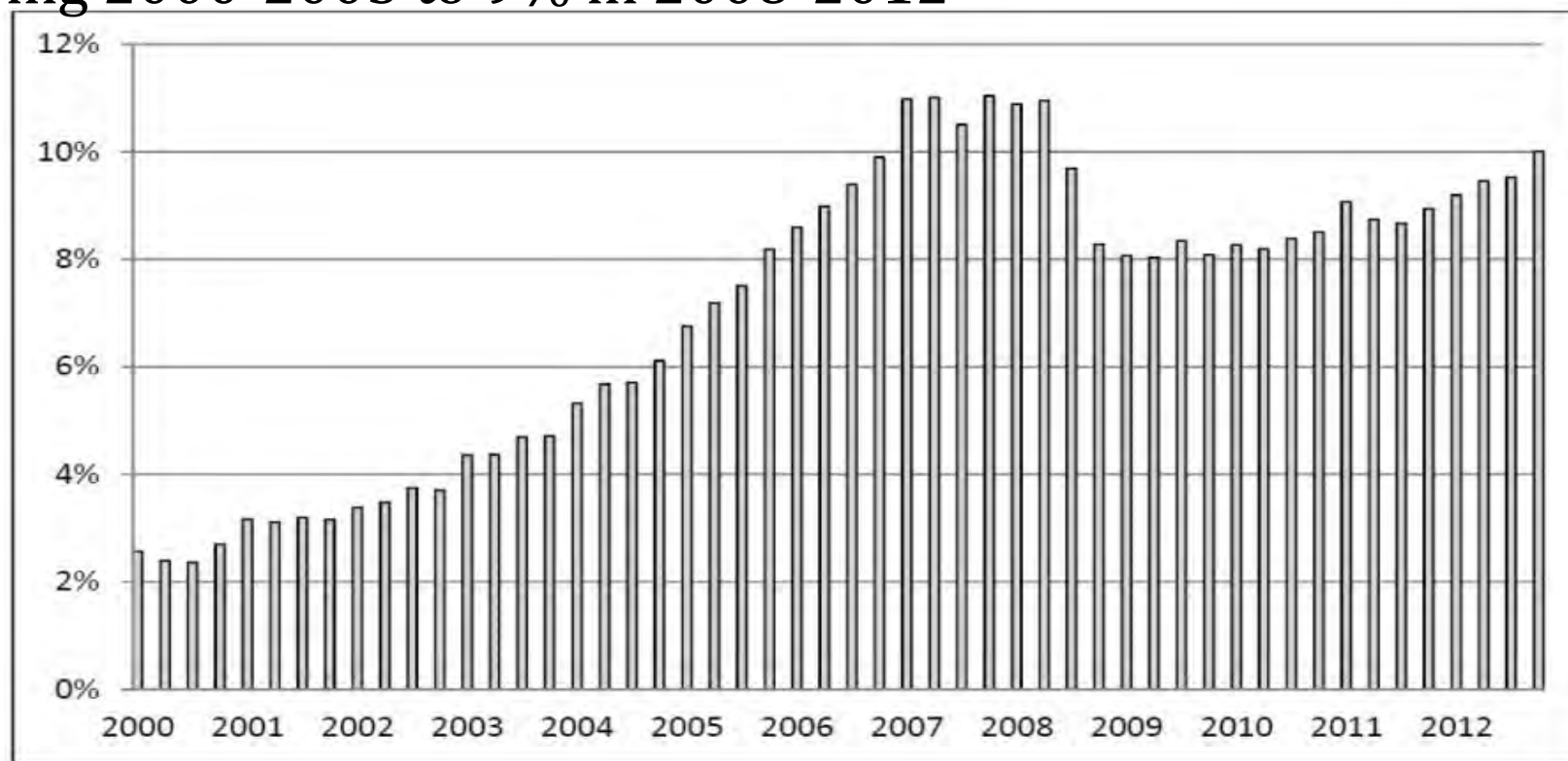


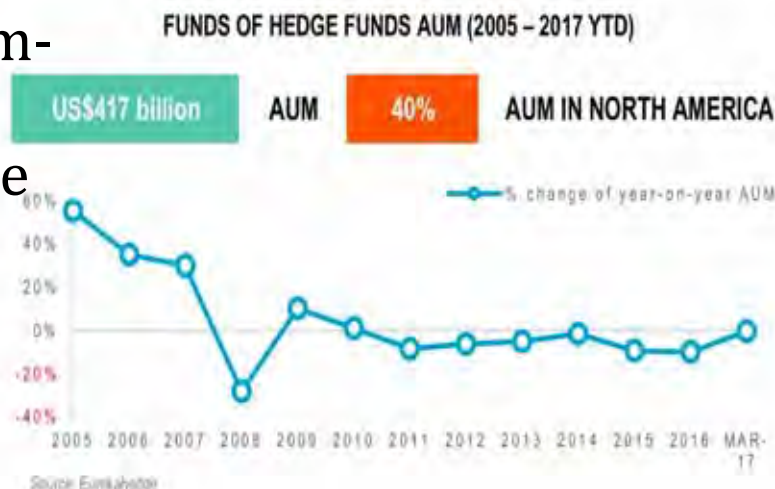
Fig. 1. Percentage of shares held by hedge funds

This figure plots the average percentage of shares held by hedge funds for the sample stocks over the 2000:Q1–2012:Q4 period. Sample stocks are listed on NYSE, AMEX, or NASDAQ. Institutional ownership data come from 13F reports. We classify 1,594 filers of 13F reports as hedge management firms based on information from hedge fund databases and SEC Form ADV.

Generalities and Motivation

- **Funds of HFs** combine hedge fund managers having various strategies so as to provide more consistent performance
- One study suggests that 15 – 25 hedge fund managers may provide sufficient diversification, while another purports that 5 – 10 managers may be sufficient
- Institutional investors and pension funds stress the importance of on-site visits to examine back offices of HF on a bi-monthly basis, to ensure they are adhering to their investment strategies
- In 2005, the SEC attempted to change this interpretation by making the HF investors the “clients” of the management company, but the courts struck down this interpretation

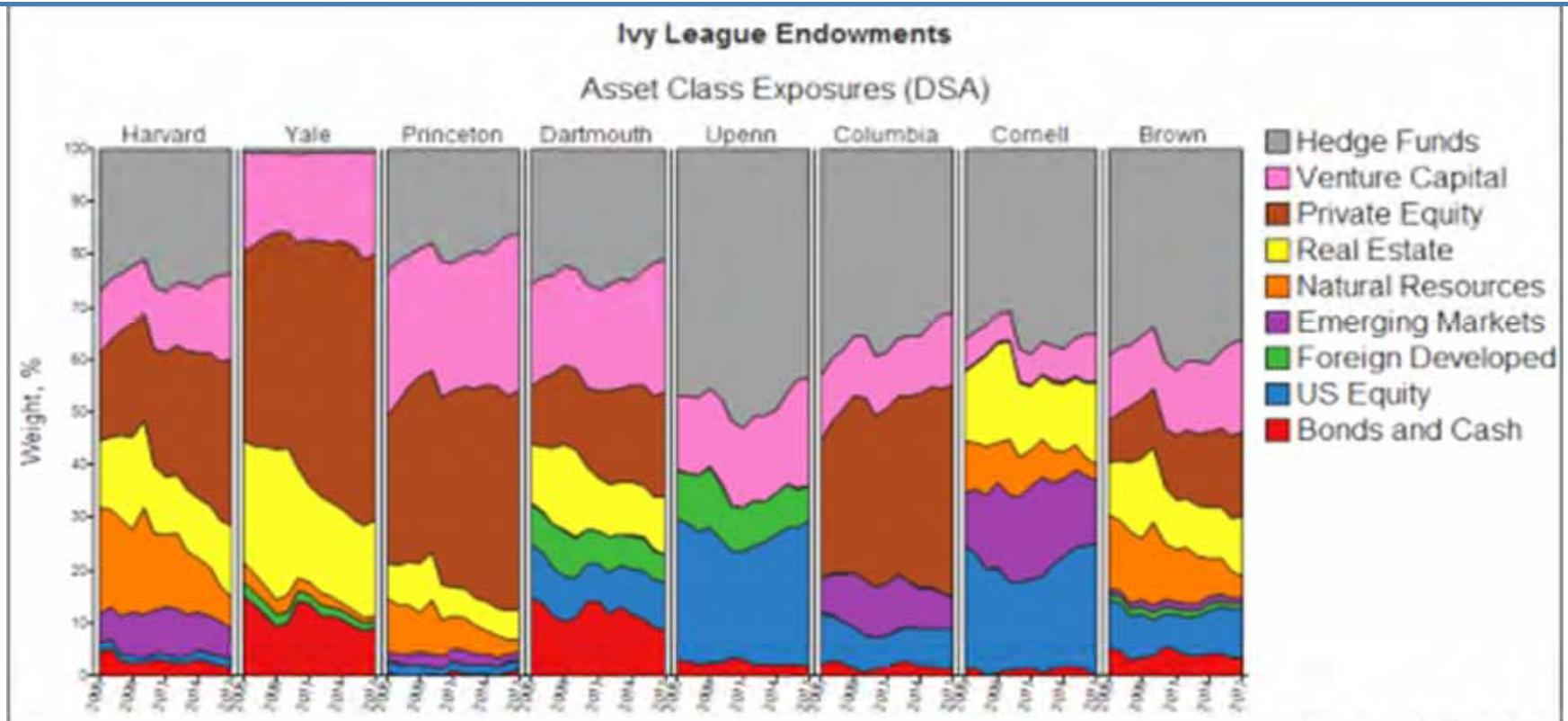
- Many mgmt companies register anyway, because they believe that registration gives them credibility



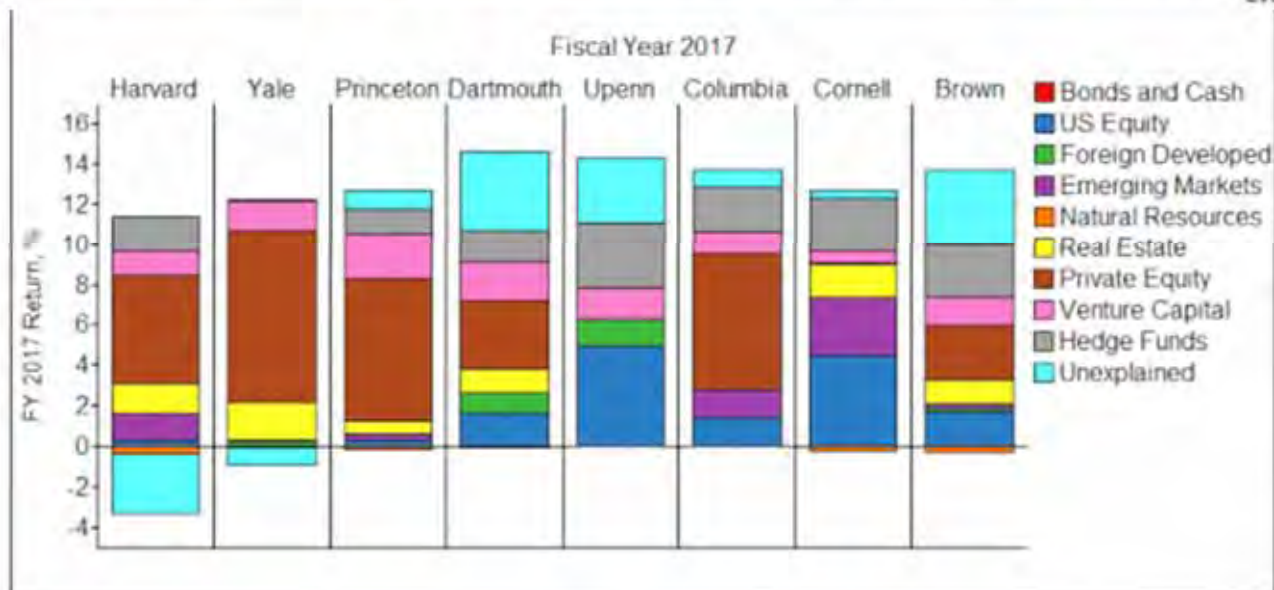
Generalities and Motivation

- HFs in which U.S. pension funds invest must register as mgmt comp
- Funds of HFs have become a strong force in the industry, accounting for more than 22% of all funds in the HF universe
- They provide greater stability of returns, lower volatility and higher survival times than most hedge fund classifications
- Rather than comparing themselves to a benchmark, hedge funds typically focus on **absolute returns** in all market conditions
- Numerous large pension funds are beginning to accept hedge fund allocations of 5 – 20 per cent within their portfolios.
- Endowment funds and institutional investors have also welcomed alternative investments with more eagerness than pension funds
- HF typically charge a management fee of 2 per cent and a performance fee of 20 per cent on capital appreciation
- FoHF charge a mgmt fee of 1–2% and a performance fee of 10%
- A serious problem facing HF investors is the high degree of fund-specific risk and an industry-wide lack of transparency

Generalities and Motivation



Created with MPI Analytics



Generalities and Motivation

THE 10 WEALTHIEST HEDGE FUND MANAGERS

RANK	NAME	FUND	WEALTH 2011	WEALTH 2010	(+/-)
1=	Robert Miller	Sail Advisors	£1,000m	£950m	+£50m
1=	Nat Rothschild	Attara	£1,000m	£330m	+£670m
3	Alan Howard	Brevan Howard	£975m	£875m	+£100m
4	Michael Hintze	CQS	£550m	£300m	+£250m
5	Michael Platt	Man Group	£525m	£375m	+£150m
6	Crispin Odey and Nichola Pease	Odey Asset Management	£453m	£297m	+£156m
7	David Harding	Winton Capital	£410m	£430m	-£20m
8	Sir John and Peter Beckwith	Thames River Capital	£350m	£330m	+£20m
9	Pierre Lagrange	Man Group	£331m	£207m	+£124m
10	Stephen Butt	Silchester Partners	£325m	£300m	+£25m

THE TOP LARGEST HEDGE FUNDS ON THE PLANET

March 2015

Bridgewater Associates (\$87.1bln)

JP Morgan Asset Management (\$59bln)

Brevan Howard Asset Management (\$40bln)

Och-Ziff Capital Management (\$36.1bln)

Blue Crest Capital Management (\$32.6bln)

BlackRock (\$31.2bln)

AQR Capital Management (\$29.9bln)

- FOFs resolve these issues by carrying out initial due diligence on potential fund managers, providing professional oversight of operations, and diversifying across different HF strategies
- FOFs typically hold shares in HFs otherwise closed to new investment, allowing smaller investors to access most sought-after fund
- However, early studies of FOFs find that their benefits are offset or even outweighed by the second layer of fees they charge, see, e.g., Liang (2004, JIM), and Agarwal and Kale (2007, JIM)

Generalities and Motivation

The Table presents the number of prime brokers of hedge funds with at least a fund of funds investor, and the hedge funds without fund of funds investors. The number of fund in each category are in brackets and categories with less than 10 observations are excluded.

Strategy type	FOF-owned HF's		Non-FOF-owned HF's	Difference	p-value
Managed Futures	1.24 [102]	>	1.05 [146]	0.19	0.00
Equity market-neutral	1.04 [57]	<	1.06 [153]	-0.02	0.53
Multistrategy	1.14 [98]	<	2.05 [201]	0.09	0.07
Fixed income arbitrage	1.00 [49]	<	1.05 [79]	-0.05	0.11
Dedicated short	1.00 [6]		1.00 [10]	0.00	1.00
Global Macro	1.13 [62]	>	1.09 [93]	0.04	0.51
Convertible arbitrage	1.14 [50]	<	1.21 [58]	-0.07	0.56
Event driven	1.15 [91]	>	1.10 [190]	0.05	0.36
Emerging markets	1.04 [76]	<	1.06 [121]	-0.02	0.63
Equity long-short	1.08 [504]	>	1.03 [909]	0.05	0.00

Cao, Y., Ogden, J. P., & Tiu, C. I. (2011). Who benefits from funds of hedge funds? A critique of alternative organizational structures in the hedge fund industry. *Business Excellence and Management*, 1(1), 19-36.

Generalities and Motivation

Net Returns of Fund of Funds as a Function of Underlying Managers' Investment Returns

	Manager B Return														
	-15%	-10%	-5%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	
Manager A Return	-15%	-18.00%	-15.50%	-13.00%	-10.50%	-8.50%	-6.50%	-4.50%	-2.50%	-0.50%	1.35%	3.15%	4.95%	6.75%	8.55%
	-10%	-15.50%	-13.00%	-10.50%	-8.00%	-6.00%	-4.00%	-2.00%	0.00%	1.80%	3.60%	5.40%	7.20%	9.00%	10.80%
	-5%	-13.00%	-10.50%	-8.00%	-5.50%	-3.50%	-1.50%	0.45%	2.25%	4.05%	5.85%	7.65%	9.45%	11.25%	13.05%
	0%	-10.50%	-8.00%	-5.50%	-3.00%	-1.00%	0.90%	2.70%	4.50%	6.30%	8.10%	9.90%	11.70%	13.50%	15.30%
	5%	-8.50%	-6.00%	-3.50%	-1.00%	0.90%	2.70%	4.50%	6.30%	8.10%	9.90%	11.70%	13.50%	15.30%	17.10%
	10%	-6.50%	-4.00%	-1.50%	0.90%	2.70%	4.50%	6.30%	8.10%	9.90%	11.70%	13.50%	15.30%	17.10%	18.90%
	15%	-4.50%	-2.00%	0.45%	2.70%	4.50%	6.30%	8.10%	9.90%	11.70%	13.50%	15.30%	17.10%	18.90%	20.70%
	20%	-2.50%	0.00%	2.25%	4.50%	6.30%	8.10%	9.90%	11.70%	13.50%	15.30%	17.10%	18.90%	20.70%	22.50%
	25%	-0.50%	1.80%	4.05%	6.30%	8.10%	9.90%	11.70%	13.50%	15.30%	17.10%	18.90%	20.70%	22.50%	24.30%
	30%	1.35%	3.60%	5.85%	8.10%	9.90%	11.70%	13.50%	15.30%	17.10%	18.90%	20.70%	22.50%	24.30%	26.10%
	35%	3.15%	5.40%	7.65%	9.90%	11.70%	13.50%	15.30%	17.10%	18.90%	20.70%	22.50%	24.30%	26.10%	27.90%
	40%	4.95%	7.20%	9.45%	11.70%	13.50%	15.30%	17.10%	18.90%	20.70%	22.50%	24.30%	26.10%	27.90%	29.70%
	45%	6.75%	9.00%	11.25%	13.50%	15.30%	17.10%	18.90%	20.70%	22.50%	24.30%	26.10%	27.90%	29.70%	31.50%
	50%	8.55%	10.80%	13.05%	15.30%	17.10%	18.90%	20.70%	22.50%	24.30%	26.10%	27.90%	29.70%	31.50%	33.30%

Fees as a Percentage of Net Profits of Underlying Investments

		Manager B Return													
		-15%	-10%	-5%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Manager A Return	-15%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	200.00%	110.00%	82.00%	68.50%	60.40%	55.00%	51.14%
	-10%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	180.00%	100.00%	76.00%	64.00%	56.80%	52.00%	48.57%	46.00%
	-5%	#N/A	#N/A	#N/A	#N/A	#N/A	160.00%	91.00%	70.00%	59.50%	53.20%	49.00%	46.00%	43.75%	42.00%
	0%	#N/A	#N/A	#N/A	#N/A	140.00%	82.00%	64.00%	55.00%	49.60%	46.00%	43.43%	41.50%	40.00%	38.80%
	5%	#N/A	#N/A	#N/A	140.00%	82.00%	64.00%	55.00%	49.60%	46.00%	43.43%	41.50%	40.00%	38.80%	37.82%
	10%	#N/A	#N/A	160.00%	82.00%	64.00%	55.00%	49.60%	46.00%	43.43%	41.50%	40.00%	38.80%	37.82%	37.00%
	15%	#N/A	180.00%	91.00%	64.00%	55.00%	49.60%	46.00%	43.43%	41.50%	40.00%	38.80%	37.82%	37.00%	36.31%
	20%	200.00%	100.00%	70.00%	55.00%	49.60%	46.00%	43.43%	41.50%	40.00%	38.80%	37.82%	37.00%	36.31%	35.71%
	25%	110.00%	76.00%	59.50%	49.60%	46.00%	43.43%	41.50%	40.00%	38.80%	37.82%	37.00%	36.31%	35.71%	35.20%
	30%	82.00%	64.00%	53.20%	46.00%	43.43%	41.50%	40.00%	38.80%	37.82%	37.00%	36.31%	35.71%	35.20%	34.75%
	35%	68.50%	56.80%	49.00%	43.43%	41.50%	40.00%	38.80%	37.82%	37.00%	36.31%	35.71%	35.20%	34.75%	34.35%
	40%	60.40%	52.00%	46.00%	41.50%	40.00%	38.80%	37.82%	37.00%	36.31%	35.71%	35.20%	34.75%	34.35%	34.00%
	45%	55.00%	48.57%	43.75%	40.00%	38.80%	37.82%	37.00%	36.31%	35.71%	35.20%	34.75%	34.35%	34.00%	33.68%
	50%	51.14%	46.00%	42.00%	38.80%	37.82%	37.00%	36.31%	35.71%	35.20%	34.75%	34.35%	34.00%	33.68%	33.40%

Table 1: Net-of-fee returns for a hypothetical fund of funds charging a 1% fixed fee and a 10% incentive fee and investing an equal amount of capital in two funds, A and B, with both funds charging a 2% fixed fee and a 20% incentive fee, for various realized annual gross-of-fee returns for A and B. Net-of-fee returns are reported as a percent of assets under management (top panel). The bottom panel reports fees as a percentage of net profits of the total gross investment returns generated by A and B. No high-water mark or clawback provisions are assumed.

Generalities and Motivation

- Agarwal, Nanda, and Ray (2013) examine institutional investment in HFs and find that large institutions' direct investments in HFs outperformed those made indirectly through FOFs
- Brown, Fraser, and Liang (2008, JIM) find differential ability among FoHFs based on their ability to absorb the high fixed costs associated with operational due diligence
- Larger FoHFs effectively earn alpha by ex-ante excluding poor-quality and risky managers; moreover even when they don't select superior funds, FoHFs do fire underperforming managers

WORLD'S MOST-PROFITABLE HEDGE FUNDS

	Fund, Manager(s)	Management Firm, Location	PROFIT, IN MILLIONS*
1	Viking Global Equities, Team managed	Viking Global Investors, U.S.	\$573.3
2	Millennium International, Israel Englander	Millennium Mgmt., U.S.	389.5
3	Citadel Wellington, Team managed	Citadel Advisors, U.S.	376.1
4	Pershing Square International, Bill Ackman	Pershing Square Capital Mgmt., U.S.	362.3
5	D. E. Shaw Composite, Team managed	D. E. Shaw Group, U.S.	248.4
6	Tiger Global, Feroz Dewan	Tiger Global Mgmt., U.S.	240.8
7	BZC Investment Partners, Denys Grossmann	BlueZone Capital Mgmt., Bahamas	201.1
8	Glenview Capital Partners, Larry Robbins	Glenview Capital Mgmt., U.S.	192.3
9	The Children's Investment, Christopher Hohn	The Children's Invst. Fund Mgmt., U.K.	180.3
10	Triax Partners, Nelson Peltz, Peter May, Ed Garden	Triax Fund Mgmt., U.S.	165.6
11	Winton Futures, David Harding	Winton Capital Mgmt., U.K.	161.1
12	Citadel Global Equities, Team managed	Citadel Advisors, U.S.	159.9
13	King Street Capital, Francis Blandl, Brian Higgins	King Street Capital Mgmt., U.S.	153.0
14	Elliott Associates, Paul Singer, Jon Pollock	Elliott Mgmt., U.S.	146.9
15	Stratus, Team managed	Capital Fund Mgmt., France	139.5
16	AHL Evolution, Tim Wong, Matthew Sargison	AHL Partners, U.K.	133.4
17	Lansdowne Developed Markets, Peter Davies, Stuart Roden	Lansdowne Partners, U.K.	127.3
18	Goldman Sachs Invst. Partners Offshore, Raanan Agus, Kenneth Eberts	Goldman Sachs Asset Mgmt., U.S.	126.5
19	Dymon Asia Macro, Danny Yong	Dymon Asia Capital, Singapore	124.0
20	Two Sigma Spectrum Cayman, Team managed	Two Sigma Investments, U.S.	120.2

*Based on returns for the 10 months ended on Oct. 31.
Sources: Bloomberg, hedge-fund firms and databases, investors

Generalities and Motivation

- Most funds specify a '**high water mark**' on their performance fees, assuring that in the event of poor performance, the fee will not be charged until prior losses are recuperated (== just on new profits)
- Several funds include a **proportional adjustment clause** that states that if a fund loses money and some investors consequently withdraw their assets, the fund is allowed to reduce proportionally the loss he has to recover by the % of the assets that are removed
 - A manager who lost \$20 out of \$100 would have to recover the \$20 before charging performance fees; but if investors withdraw \$40 out of the remaining \$80, the loss carried forward is reduced to \$10
- Some funds have even gone one step further by introducing a **clawback clause** and a **loss recovery account**
- The clawback clause stipulates that a portion of the incentive fee will be retained every year in a clawback account, usually until the account reaches a certain percentage of the assets
- If future performance turns out to be negative, the clawback account is then debited to the client's credit

Generalities and Motivation

- Several HFs in the US are using deferred incentive compensation for their offshore funds, i.e., they elect to defer for up to 10 years payment of all or portion of the management or performance fee
- Many managers habitually have money invested in their own funds, ensuring that their interests and those of their clients are better aligned
- The SEC restricts advertising by HF; neither are they required to submit their returns to database vendors
- Data on hedge funds are scant and not always reliable: it is often claimed that over 50 per cent of hedge funds refrain from submitting monthly performance figures to database vendors
- This poses a problem for researchers, analysts, and academics who must understand the sources of bias in the data such as: (1) **Selection bias** is present when returns are not an accurate representation of the hedge fund universe
- (2) **Instant history bias** is present when vendors backfill monthly returns of new funds entering the database

Generalities and Motivation

- (3) **Survivorship bias** occurs if poor performing funds are discarded from the database
- (4) **Termination bias** exists when funds shut down or voluntarily cease from reporting their returns
- (5) **Self-selection bias** frequently occurs when good performing HF stop reporting to database vendors in order not to attract additional capital that may actually hamper performance
- Kouwenberg (2003) lists 4 reasons funds may drop out of a database: (1) no further requirement to attract new capital, (2) poor performance, (3) assets returned to investors and 4) bankruptcy
- Research has documented that 50 per cent of HF managers disappear within 30 months, while only 4 per cent had been in business for ten years
- An average of 8-15 per cent of funds vanish each year (13 per cent in 1998 alone)

Generalities and Motivation

- Current (often, long-standing) research questions concerning hedge funds:
 - ① Can HF produce abnormal (i.e., risk-adjusted) performance?
 - ② Is such performance persistent and preditable? Does it related to size?
 - ③ Are the HF types that are supposed to hedge market risk, really hedging? Do they do that equally well in alternative regimes?
 - ④ How pervasive are non-normalities in HF returns and how far off the optimum can MV strategies be as a result?
 - ⑤ What are the limitiations of focussing on HF indices and are they best constructed?
 - ⑥ Is the fact tha managers invest in their own HF giving it a higher survival time?
 - ⑦ Do HF managers display market timing and security selection skills? Are these characterizations time-varying? Are two skills positively correlated?

Types of Hedge Funds

- There are many types of HFs and in fact not all of them are «hedged»; at least loosely speaking, HFs can be classified as follows:
- **Equity market neutral**: attempt to identify overvalued and undervalued equity securities while neutralizing the portfolio's exposure to market risk by combining long and short positions
- **Convertible arbitrage**: exploit anomalies in the prices of convertible bonds, warrants, and convertible preferred stock
- **Fixed-income arbitrage**: identify overvalued and undervalued bonds on the basis of expectations of changes in the term structure of interest rates or credit quality of various issues or sectors
- **Distressed securities**: ptf. of distressed securities are invested in the debt and equity of companies that are in or near bankruptcy
 - Most investors are unprepared for the legal difficulties and negotiations with creditors and other claimants that are common with distressed companies
 - Traditional investors prefer to transfer those risks to others

Types of Hedge Funds

- Furthermore, many investors are prevented by charter from holding securities that are in default or at risk of default
- Because of the relative illiquidity of distressed debt and equity, short sales are difficult, so most funds are long
- **Merger (“deal”) arbitrage**: seeks to capture the price spread between current market prices of corporate securities and their value upon successful completion of a takeover, merger, spin-off, or similar transaction involving more than one company
- **Hedged equity**: attempt to identify overvalued and undervalued equities; ptf s are typically not structured to be market, industry, sector, and dollar neutral, and they may be highly concentrated
 - The value of short positions may be only a fraction of the value of long positions and ptf may have a net long exposure to the market
 - Hedged equity is largest of the various HF strategies in terms of AUM
- **Global macro**: attempt to take advantage of major systematic moves in major financial and nonfinancial markets through trading in currencies, futures, and option contracts

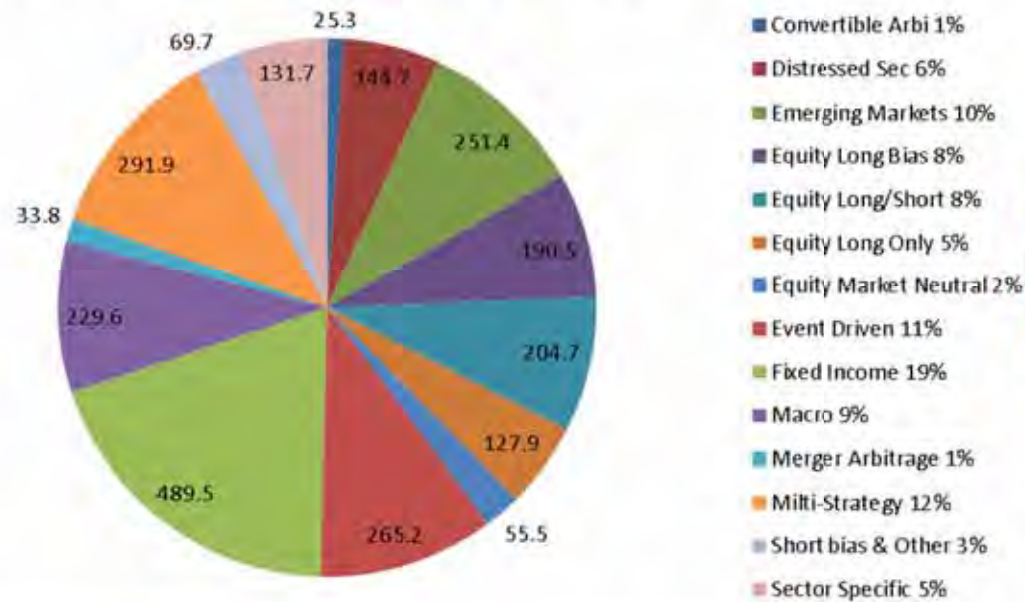
Types of Hedge Funds

Strategy or Index	Annual Return (%)	Annual Standard Deviation (%)	Sharpe Ratio	Minimum Monthly Return (%)	Correlation w/S&P 500	Correlation w/Lehman Gov./Corp.
HFCI	13.46	5.71	1.61	-6.92	0.59	0.17
Event driven	13.46	5.59	1.64	-9.37	0.59	0.07
Equity hedge	15.90	9.34	1.24	-9.70	0.64	0.10
Equity market neutral	9.24	2.50	1.98	-1.07	0.09	0.24
Merger/risk arbitrage	9.07	4.86	0.99	-8.78	0.48	0.10
Distressed securities	15.28	6.07	1.81	-9.71	0.42	0.04
Fixed-income arbitrage	7.62	3.61	0.92	-6.61	0.06	-0.06
Convertible arbitrage	10.23	3.96	1.50	-3.42	0.19	0.13
Global macro	16.98	8.38	1.51	-5.41	0.26	0.34
Short selling	-0.61	19.39	-0.25	-14.62	-0.76	-0.01
S&P 500	10.94	14.65	0.45	-14.46	1.00	0.13
Lehman Gov./Corp.	7.77	4.46	0.78	-4.19	0.13	1.00
MSCI World	7.08	14.62	0.19	-13.32	0.86	0.09
Lehman Global	8.09	5.23	0.73	-3.66	0.11	0.74

- **Emerging markets**, because short selling is not permitted in most emerging markets, these funds tend to be long.
- Fund of funds, a typical FOF invests in 10–30 hedge funds
 - Investors have to pay two layers of fees
 - FOFs usually do not impose lock-up periods and permit investor exits
 - FOF managers hold a cash buffer that may reduce expected returns

Types of Hedge Funds

Q3 2015 HF AUM \$ Billions by Strategies



Breakdown of Active Fund Searches Issued by Investor Type



Source: Preqin Hedge Fund Investor Profiles

FIGURE 4: HF Performance – Excess Returns (III / III)

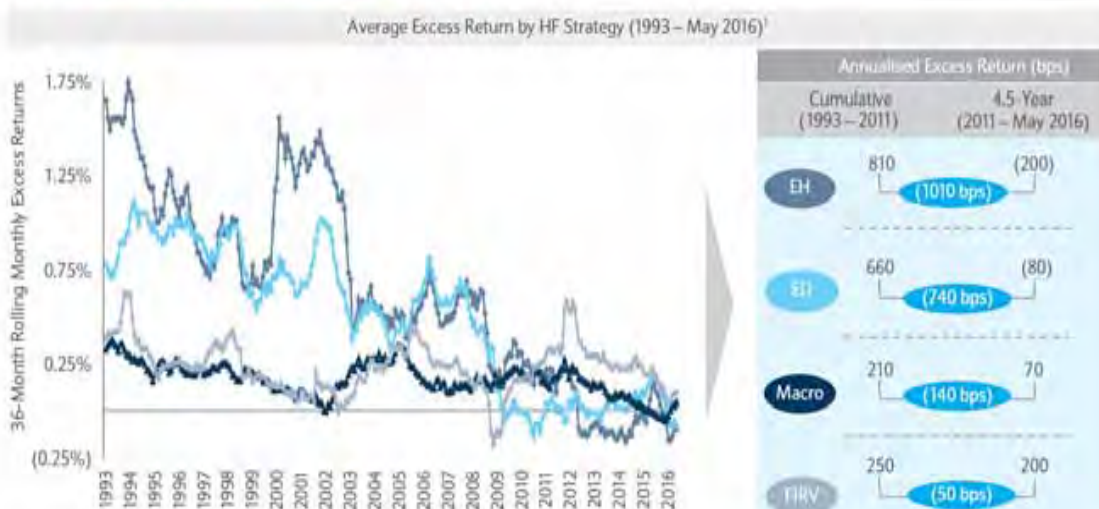


FIGURE 3: HF Performance – Excess Returns (II / III)



1. HFR, S&P 500, Barclays Strategic Consulting analysis. Performance is calculated net of different exposures. Between 1993 – May 2016 exposures were: Equity Hedge (0.45 to S&P 500), Relative Value (0.31 to Barclays Global HY and (0.05) to Barclays Aggregate), Event Driven (0.16 to the S&P 500 and 0.35 to Barclays Global HY) and Macro (0.33 to Barclays Agg).

What Do We Know About Hedge Funds? – Prof. Guidolin

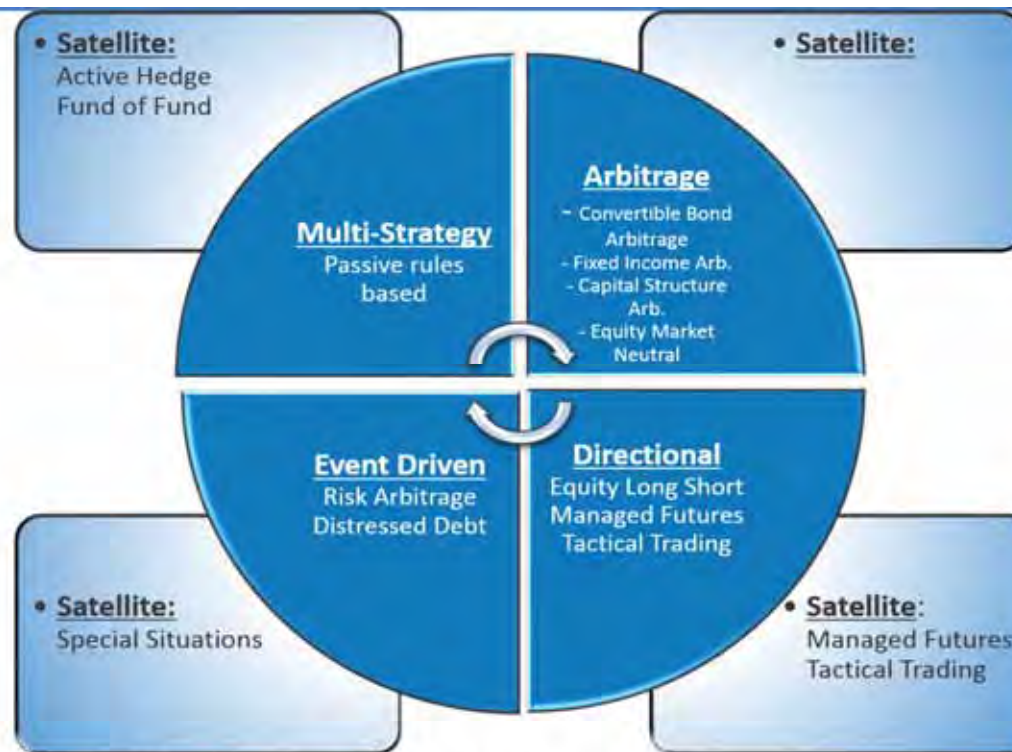
Types of Hedge Funds

- The different sensitivities of various HF strategies to various market factors result in different correlations among hedge fund strategies themselves

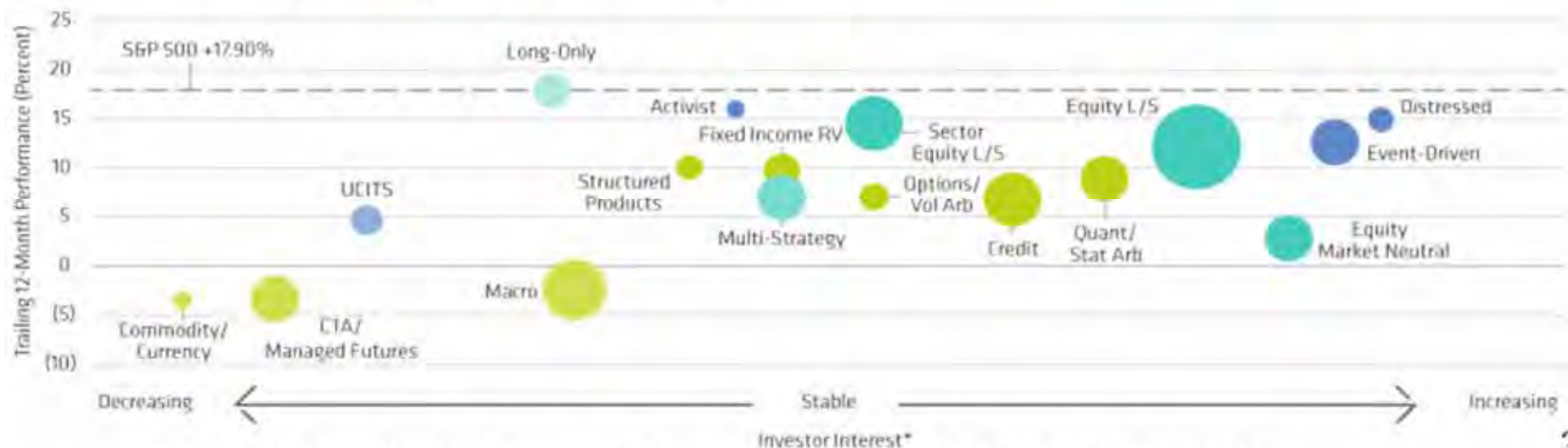
	HFCI	Event Driven	Equity Hedge	Equity Market Neutral	Merger/Risk Arbitrage	Distressed Securities	Fixed-Income Arbitrage	Convert. Arbitrage	Global Macro	Short Selling	S&P 500	Lehman Gov./Corp.	MSCI World	Lehman Global
HFCI	1.00													
Event driven	0.76	1.00												
Equity hedge	0.90	0.70	1.00											
Equity market neutral	0.32	0.13	0.27	1.00										
Merger/risk arbitrage	0.52	0.82	0.50	0.06	1.00									
Distressed securities	0.66	0.87	0.56	0.14	0.57	1.00								
Fixed-income arbitrage	0.38	0.34	0.19	0.13	0.12	0.42	1.00							
Convert. arbitrage	0.47	0.55	0.34	0.15	0.35	0.56	0.37	1.00						
Global macro	0.72	0.33	0.46	0.34	0.16	0.29	0.27	0.21	1.00					
Short selling	-0.64	-0.66	-0.77	0.00	-0.50	-0.54	-0.09	-0.28	-0.18	1.00				
S&P 500	0.59	0.59	0.64	0.09	0.48	0.42	0.06	0.19	0.26	-0.78	1.00			
Lehman Gov./Corp.	0.17	0.07	0.10	0.24	0.10	0.04	-0.06	0.13	0.34	-0.01	0.13	1.00		
MSCI World	0.56	0.54	0.62	0.07	0.42	0.39	0.09	0.17	0.24	-0.71	0.86	0.09	1.00	
Lehman Global	0.05	-0.03	0.06	0.21	0.04	-0.06	-0.16	0.00	0.19	-0.03	0.11	0.74	0.22	1.00

- Diversification among HF strategies should therefore also reduce the volatility of HF-based investment portfolios

Types of Hedge Funds



Demand Is Shifting Among Hedge-Fund Categories

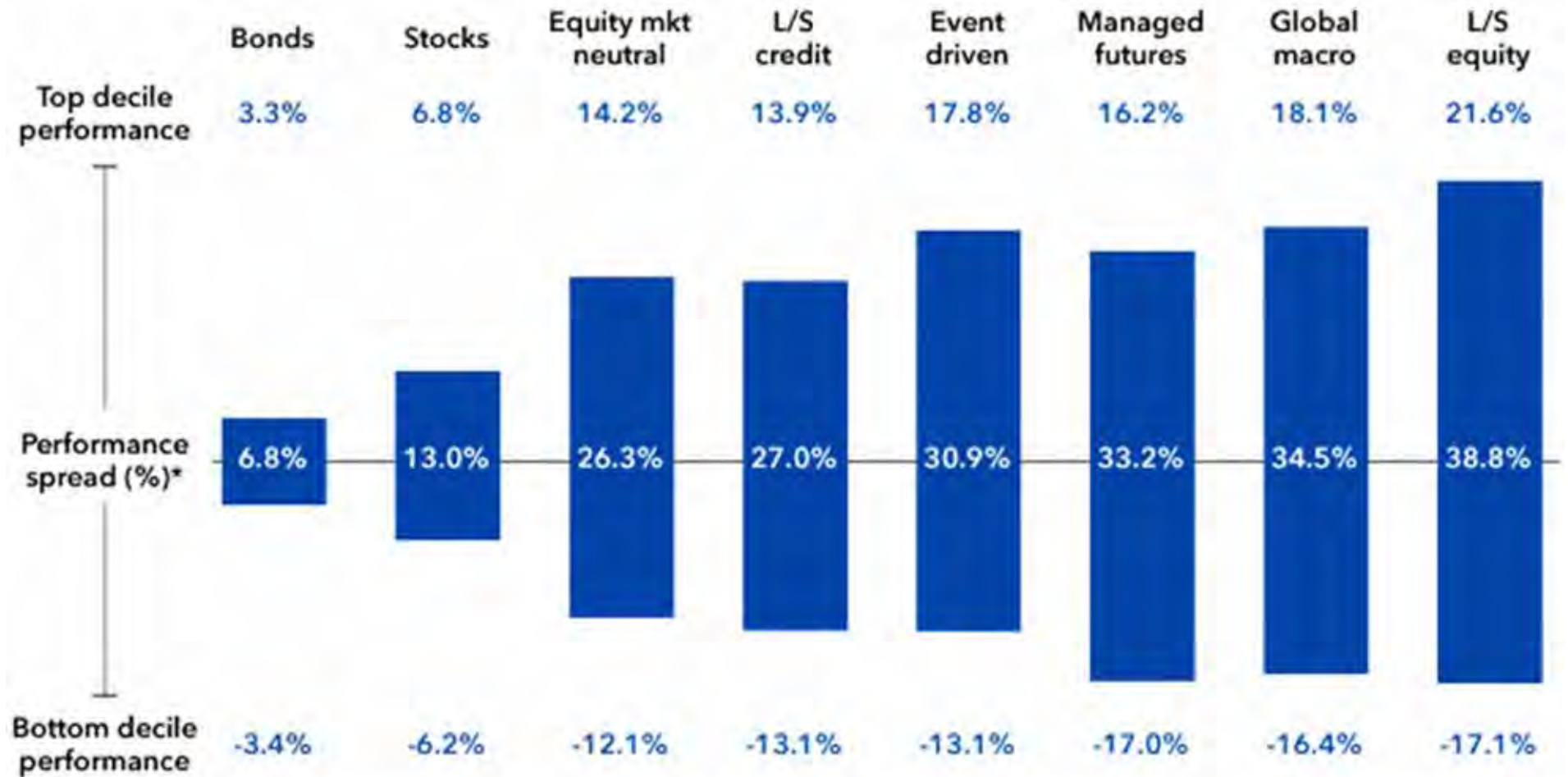


Through June 30, 2017

What Do We Know About Hedge Funds? – Prof. Guidolin

Types of Hedge Funds

- Regardless of the type, the real issue remain to pick out good HFs



Source: Morningstar, Lipper TASS database. **Past performance is no guarantee of future results.** Stocks represented by Morningstar US Large Cap Core Funds. **Bonds** represented by Morningstar US Core Bond Funds. **Hedge fund categories** represented by the following TASS fund classifications: Equity Market Neutral; Fixed Income Arbitrage (representing Long/Short Credit); Event Driven; Global Macro; Managed Futures; Long/Short Equity. For illustrative purposes only.

Source: Blackrock, data through the end of 2016

Types of Hedge Funds

- Heat maps can also be used to visualize this difficulty

The Changing Distribution of Hedge Fund Returns

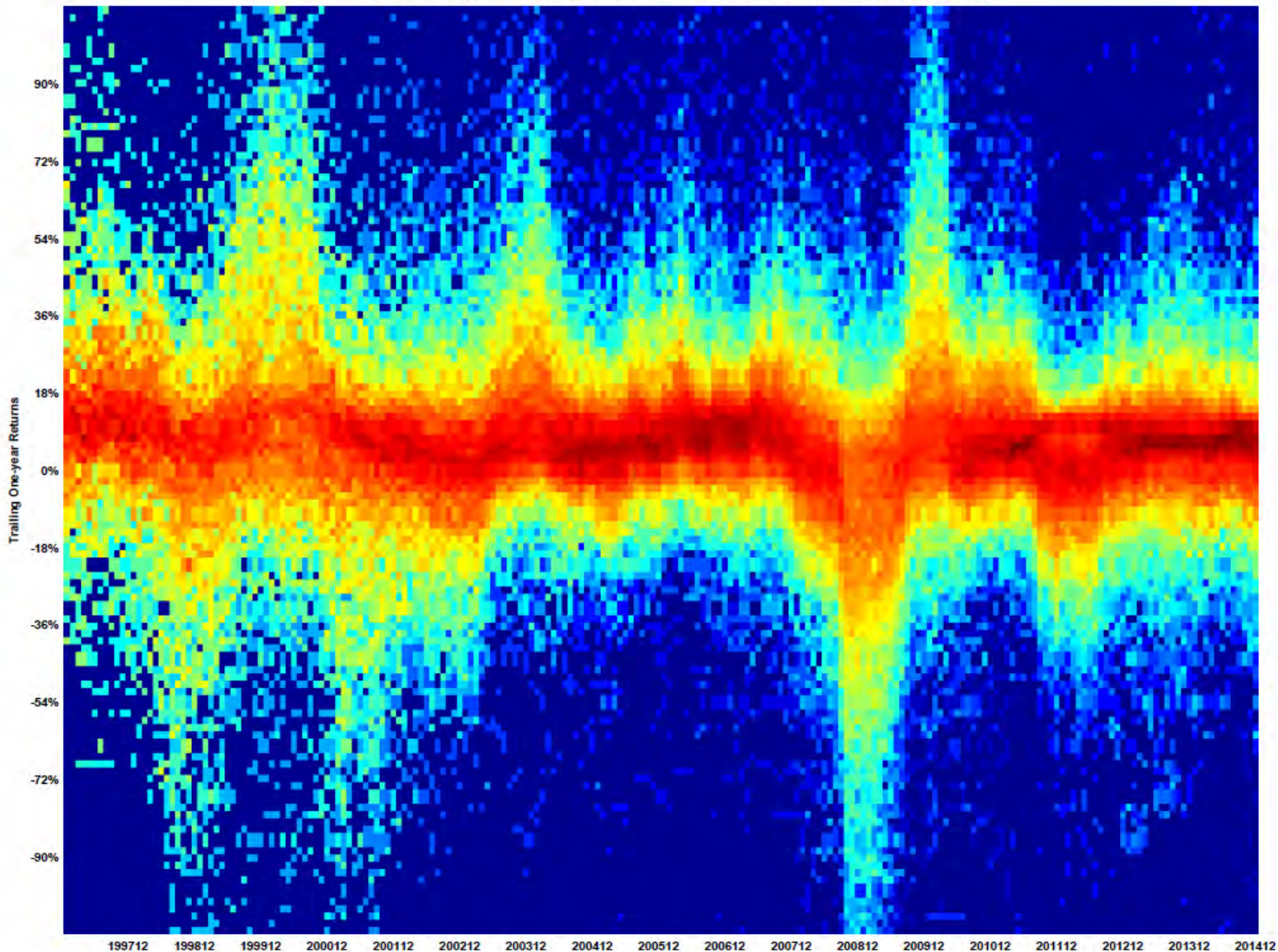
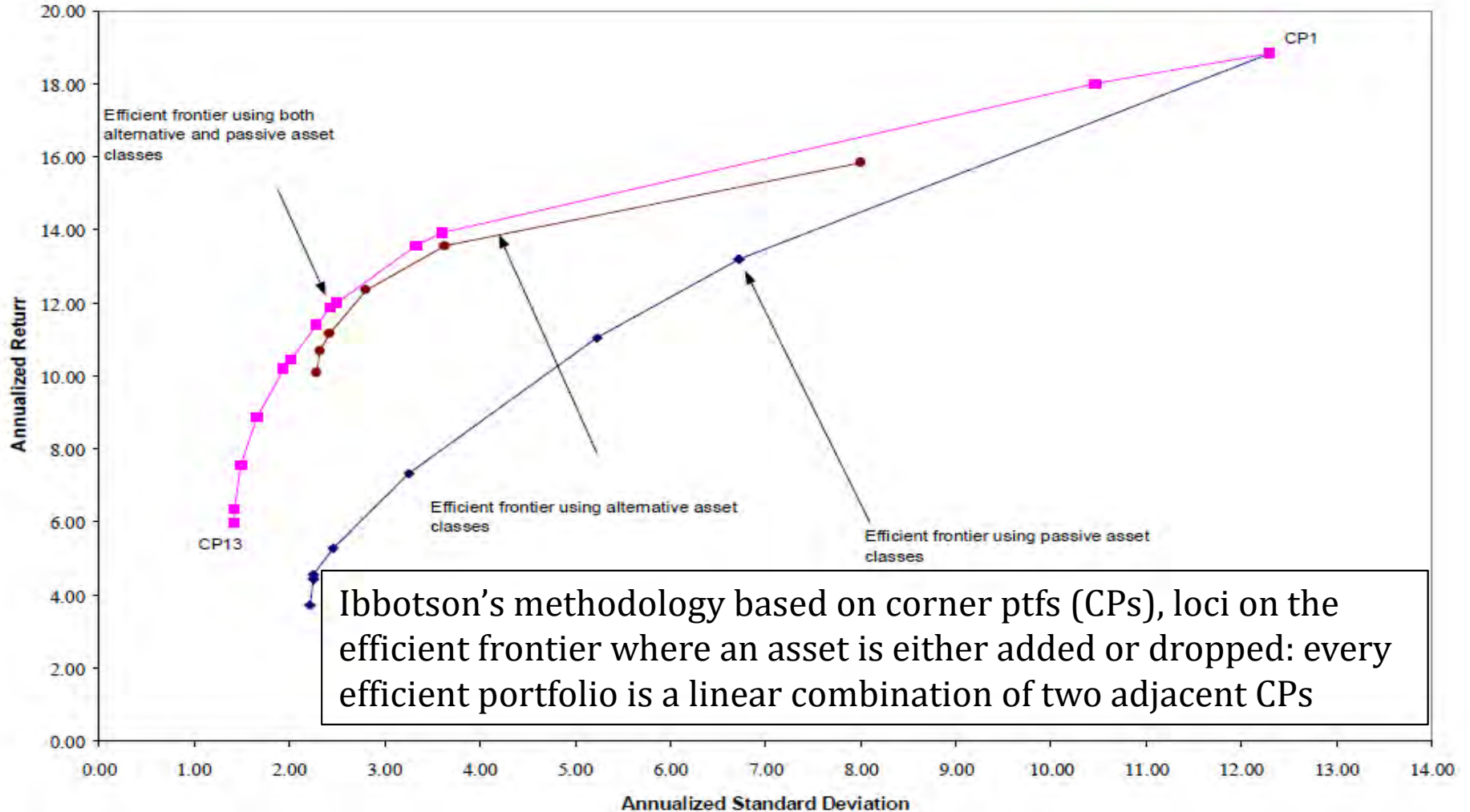


Figure 3: Empirical distribution of the trailing 12-month returns of single-manager hedge funds from 1997 through 2014, where red and yellow indicate higher density and turquoise and blue indicate lower density.

Are HFs Just Glorified Mutual Funds?

- Although HFs and MFs are both investment vehicles, the trading strategies they employ are very different
- Vs. MFs, HFs employ more dynamic strategies, typically take both long and short positions, and often purchase illiquid assets
- Until 1997, the tax code made short sales extremely expensive for mutual funds, but it no longer does
- The binding short-sale restriction for MFs is a restriction that funds select—in 2000, 2/3 of reporting MFs prohibited short sales (see Almazan, Brown, Carlson, and Chapman, 2004, JFE).
- The literature has generally found that hedge funds have higher risk-adjusted performance and bear higher risk (Ackermann, McEnally, and Ravenscraft, 1999, JF; Liang, 1999, FAJ)
- Agarwal and Naik (2000, JAI) find that a ptf comprising of passive asset classes and investment in mainly nondirectional HFs, provides better risk-return tradeoff than just investing passively in equities, bonds, currencies, and commodities

Are HFs Just Glorified Mutual Funds?



- Agarwal, Boyson, and Naik (2011, JFQA) compare HFs, traditional MFs, and what they refer to as “hedged mutual funds” (HMFs)
 - MFs that employ HF-like strategies but lack the incentive structure and regulatory freedom available to their HF counterparts

Are HFs Just Glorified Mutual Funds?

Alternative Mutual Funds and Hedge Funds
Are Structurally Different

	Alternative Mutual Fund	Hedge Funds
Liquidity	Daily Liquidity	Typically monthly or quarterly; may be subject to lock-ups
Pricing	Daily NAV	Typically Monthly NAV
Tax Reporting	1099	K-1
Availability	Available to most investors	Limited to accredited investors and qualified purchasers ³
Minimum Investment	Low, typically <\$10,000	High, typically >\$100,000
Fees	Typically higher than traditional mutual funds; no performance fees	Higher management fees and performance fees
Use of Leverage	Borrowing limited to 33% of assets	Unlimited
Regulation	Subject to the Investment Company Act of 1940	Fewer regulatory constraints

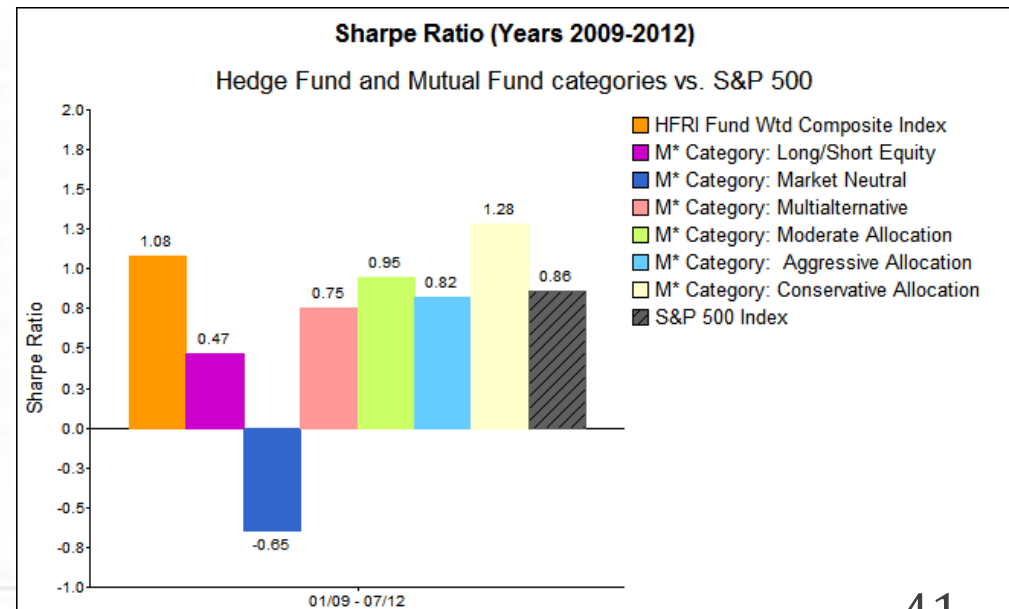
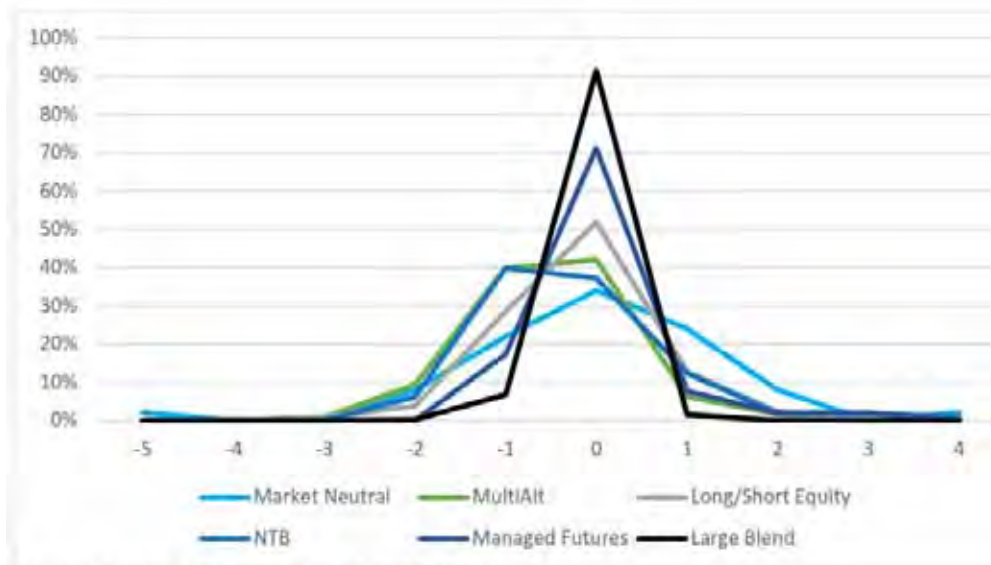
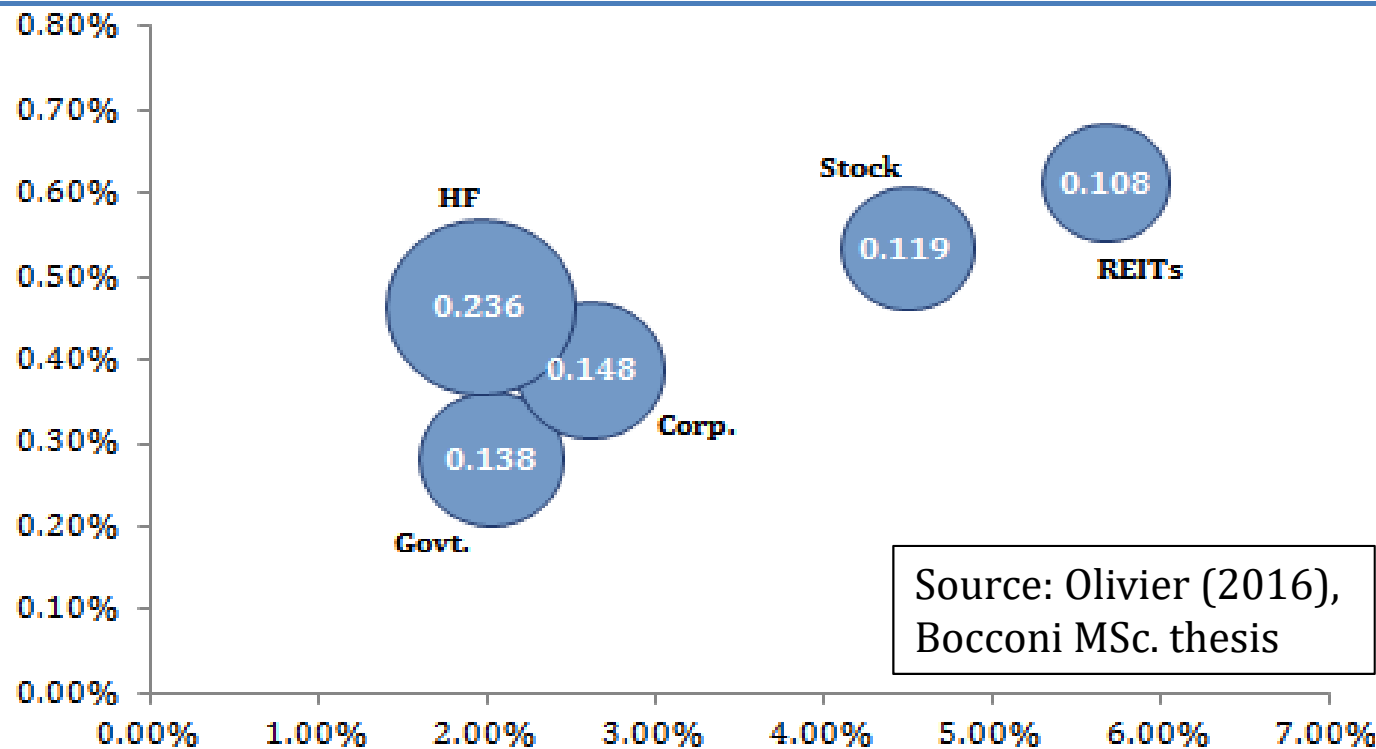
Are HFs Just Glorified Mutual Funds?

- Even though HMFs use investment strategies similar to those of HFs, they underperform by about 3.3 percent per year after accounting for both fees and risk)
 - HMFs outperform traditional MFs
- Stulz (2007, JEP) points out that several industry trends will likely cause HFs to more closely resemble MFs:
- First, increased belief that hedge funds may take too much risk or that their actions destabilize financial markets may result in increased regulation and thus lower funds' flexibility
- Second, because HFs' clientele has shifted from high net worth individuals to institutional investors, HFs' risk taking may decrease in the face of monitoring by these institutions
- Stulz predicts that hedge funds' performance will convergence towards that of mutual funds and writes that
"HFs appear an attractive diversification vehicle for investors who hold stocks, even though their correlations with the broad markets have increased, so that evaluating the diversification benefits of hedge funds has become trickier"

Are HFs Just Glorified Mutual Funds?

- MFs that employ HF-like strategies but lack the incentive structure and regulatory freedom available to their HF counterparts
- Although HMFs use strategies similar to those of HFs, they underperform by about 3.3% per year after accounting for fees and risk
 - HMFs outperform traditional MFs
- Stulz (2007, JEP) points out that several industry trends will likely cause HFs to more closely resemble and converge to MFs:
 - Increased belief they take too much risk or that their actions destabilize financial markets may result in increased regulation
 - Because HFs' clientele shifted from primarily high net worth individuals to institutional investors, their risk taking may decrease in the face of monitoring by these institutions fulfilling fiduciary duties
- Ackermann, McEnally, and Ravenscraft (1999, JF) use Sharpe ratios and find **mixed evidence of hedge funds outperforming primary asset classes such as stock and bond indices**
- Recently, Bali, Brown, and Demirtas (2013, MS) revisit this issue by addressing the documented limitations of Sharpe ratio

Are HFs Just Glorified Mutual Funds?



Are HFs Just Glorified Mutual Funds?

- HF payoffs are nonlinear due to dynamic option-like strategies
- This can potentially lead to non-normality of fund returns, making Sharpe ratio a less appropriate measure of HF performance

Panel A: Sharpe Ratios (using annualized returns)

Index	
Global stocks	0.12
Global bonds	0.50
Hedge funds	0.62
Commodities	0.01
Real estate	0.28
Private equity	0.34
Venture capital	0.32

- Testing for “almost stochastic dominance” and using the manipulation-proof performance of Goetzmann, Ingersoll, Spiegel and Welch (2007, RFS), BBD find long/short equity and emerging HF indices outperformed the S&P 500 between 1994 and 2011

Panel B: Downside Frequencies

Index	Frequency of Monthly Return Less Than...			Worst Monthly Return
	–1%	–5%	–10%	
Global stocks	32.1%	10.0%	2.1%	–19.8%
Global bonds	15.0	0.0	0.0	–3.8
Hedge funds	12.5	1.3	0.0	–7.5
Commodities	37.1	16.3	4.6	–28.2
Real estate	28.8	5.8	2.5	–30.5
Private equity	29.6	10.8	2.5	–23.4
Venture capital	30.0	16.7	3.8	–24.5

- Long/short equity, multistrategy, managed futures, and global macro hedge funds outperformed the U.S. treasury market at short and medium horizons (e.g., 1-2 year holding periods)

Are HFs Just Glorified Mutual Funds?

- Most HF strategies dominated the U.S. treasury market at longer horizons (e.g., 4-5 year holding periods)
- In the case of a few types of HF, standard deviation and historical beta measures can be particularly misleading
- This is because the strategies listed frequently display decidedly non-normal return distributions

Index	Mean	St. Dev.	Skewness	Excess Kurtosis	Correl. w/ Russell 1000
Hedge Fund	0.48	2.06	-0.30	2.88	0.59
Convertible Arbitrage	0.37	1.89	-2.64	17.39	0.38
Dedicated Short Bias	-0.60	4.71	0.72	1.59	-0.79
Emerging Markets	0.44	4.07	-0.85	5.94	0.55
Equity Market Neutral	0.22	2.80	-12.50	181.20	0.30
Event Driven	0.53	1.76	-2.24	11.65	0.65
Fixed Income Arbitrage	0.23	1.57	-4.47	32.93	0.34
Global Macro	0.68	2.64	-0.06	4.53	0.24
Long/Short Equity	0.56	2.73	-0.11	3.63	0.70
Managed Futures	0.26	3.31	0.00	-0.01	-0.08

O'Doherty, M. S., Savin, N. E., & Tiwari, A. (2016). Hedge Fund Replication: A Model Combination Approach. *Review of Finance*, 21(4), 1767-1804.

Are HFs Just Glorified Mutual Funds?

- Typically HFs resort to **maximum drawdown**, often defined as the worst-returning month or quarter for the portfolio or the worst peak-to-trough decline in a portfolio's returns



- In addition, it is not uncommon for those investing in hedge funds to look at the returns of the hedge fund during a relevant historical period, such as the 2008 financial crisis
- Avramov, Kosowski, Naik, and Teo (2011, JFE) evaluate HF performance through ptf strategies that incorporate predictability based on macroeconomic variables
- Incorporating predictability improves out-of-sample performance for the entire universe of HFs also for various investment styles

Mean-Variance Allocations for Hedge Funds?

- Mean-variance optimizers tend to generate massive weights to HFs
 - Usually helpful to constrain the set of solutions by eliminating solutions that are too risky, too illiquid, involve too much leverage, or are outside the feasible investment universe

Optimization Parameters			Characteristics of Optimal Portfolio			Optimal Portfolio Weights													
Maximum Volatility	Maximum Auto-correlation	Shorting Constraints	Optimized Annualized Return	Optimized Annualized Volatility	Optimized Auto-correlation	3 Month Treasury Bills	S&P 500 Total Return Index	Borclay U.S. Aggregate Bond Index	Convertible Arbitrage	Dedicated Short Bias	Emerging Markets	Equity Market Neutral	Event Driven	Fixed Income Arbitrage	Global Macro	Long/Short Equity Hedge	Managed Futures	Multi-Strategy	Fund of Funds
0.05	0.1	Long Only	6.8%	5.0%	0.10	0.00	0.15	0.54	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.30	0.00	0.00	0.00
0.05	0.25	Long Only	6.8%	5.0%	0.17	0.00	0.12	0.43	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.27	0.00	0.00	0.00
0.05	0.4	Long Only	6.8%	5.0%	0.17	0.00	0.12	0.43	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.27	0.00	0.00	0.00
0.1	0.1	Long Only	8.2%	10.0%	0.10	0.00	0.54	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00
0.1	0.25	Long Only	8.3%	10.0%	0.16	0.00	0.34	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00
0.1	0.4	Long Only	8.3%	10.0%	0.16	0.00	0.34	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00
0.15	0.1	Long Only	9.4%	15.0%	0.09	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
0.15	0.25	Long Only	9.4%	15.0%	0.09	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
0.15	0.4	Long Only	9.4%	15.0%	0.09	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
0.2	0.1	Long Only	9.4%	15.4%	0.08	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.2	0.25	Long Only	9.4%	15.4%	0.08	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.2	0.4	Long Only	9.4%	15.4%	0.08	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.1	Can Short T-bills	8.6%	5.0%	0.10	-1.06	0.03	1.12	0.00	0.13	0.00	0.27	0.24	0.00	0.01	0.22	0.04	0.00	0.00
0.05	0.25	Can Short T-bills	8.8%	5.0%	0.17	-1.11	0.02	1.03	0.00	0.12	0.00	0.37	0.42	0.00	0.00	0.14	0.02	0.00	0.00
0.05	0.4	Can Short T-bills	8.8%	5.0%	0.16	-1.12	0.02	1.03	0.00	0.12	0.00	0.39	0.40	0.00	0.00	0.14	0.02	0.00	0.00
0.05	0.1	Can Short Anything	12.0%	5.0%	0.10	-0.60	-0.06	0.75	-0.46	0.16	0.11	0.03	0.86	0.25	0.21	0.72	0.09	0.76	-1.82
0.05	0.25	Can Short Anything	12.1%	5.0%	0.14	-0.55	-0.06	0.76	-0.40	0.15	0.12	0.01	0.92	0.19	0.20	0.69	0.10	0.74	-1.88
0.05	0.4	Can Short Anything	12.1%	5.0%	0.14	-0.54	-0.06	0.76	-0.40	0.15	0.12	0.01	0.92	0.20	0.21	0.69	0.10	0.73	-1.89
0.1	0.1	Can Short Anything	21.4%	10.0%	0.10	-2.27	-0.12	1.50	-0.96	0.33	0.20	0.09	1.77	0.49	0.38	1.42	0.19	1.48	-3.50
0.1	0.25	Can Short Anything	21.5%	10.0%	0.14	-2.15	-0.11	1.51	-0.80	0.32	0.20	0.07	1.88	0.35	0.37	1.37	0.21	1.46	-3.66
0.1	0.4	Can Short Anything	21.5%	10.0%	0.14	-2.14	-0.11	1.51	-0.80	0.31	0.21	0.06	1.87	0.36	0.37	1.36	0.21	1.46	-3.68
0.15	0.1	Can Short Anything	30.8%	15.0%	0.10	-3.91	-0.18	2.23	-1.43	0.50	0.29	0.15	2.61	0.71	0.56	2.17	0.28	2.25	-5.23
0.15	0.25	Can Short Anything	31.0%	15.0%	0.14	-3.71	-0.16	2.25	-1.21	0.48	0.31	0.11	2.79	0.50	0.53	2.07	0.31	2.22	-5.49
0.15	0.4	Can Short Anything	31.0%	15.0%	0.15	-3.71	-0.17	2.26	-1.20	0.47	0.31	0.09	2.80	0.54	0.55	2.05	0.31	2.19	-5.50
0.2	0.1	Can Short Anything	40.2%	20.0%	0.10	-5.54	-0.24	2.98	-1.92	0.66	0.38	0.21	3.45	0.94	0.74	2.90	0.36	3.02	-6.95
0.2	0.25	Can Short Anything	40.4%	20.0%	0.14	-5.26	-0.22	3.03	-1.64	0.64	0.42	0.14	3.70	0.65	0.69	2.79	0.40	2.94	-7.30
0.2	0.4	Can Short Anything	40.4%	20.0%	0.14	-5.27	-0.22	3.01	-1.62	0.64	0.41	0.15	3.71	0.66	0.70	2.77	0.41	2.95	-7.30

Mean-Variance Allocations for Hedge Funds?

- Re-allocating 5%, 10%, 20%, or 50% from a classical 60/40 portfolio into the (non-investable) “average” HF would have decreased a traditional portfolio volatility more than its returns
 - The effect is to increase risk-adjusted excess return by roughly 13%
 - Performance of a 48/32/20 stock/bond/HF ptf with 20% allocated to one specific HF would have resulted in returns but had a smaller maximum drawdown (e.g., Event Driven)

From 1996 to 2014	# fund-months	Annualized Mean	Annualized Volatility	Sharpe Ratio	Sortino Ratio	Skewness	Kurtosis	Maximum DD	S&P 500 Correl.	$\alpha(1)$	Box-Q(3) p-value
60% Stocks, 40% Bonds, 0% HF	228	7.7%	9.3%	0.54	0.88	-0.67	4.30	-32.5%	0.99	0.06	0.25
48% Stocks, 32% Bonds, 20% Convertible Arbitrage	228	7.3%	8.3%	0.55	0.89	-1.00	6.51	-32.0%	0.98	0.14	0.06
48% Stocks, 32% Bonds, 20% Dedicated Short Bias	228	6.3%	5.8%	0.64	1.09	-0.67	5.18	-20.5%	0.89	0.02	0.34
48% Stocks, 32% Bonds, 20% Emerging Markets	228	7.6%	9.5%	0.52	0.82	-0.96	5.49	-34.1%	0.97	0.10	0.22
48% Stocks, 32% Bonds, 20% Equity Market Neutral	228	7.1%	7.7%	0.58	0.95	-0.80	4.80	-28.8%	0.99	0.10	0.13
48% Stocks, 32% Bonds, 20% Event Driven	228	7.6%	8.3%	0.59	0.96	-0.86	4.95	-31.0%	0.99	0.11	0.14
48% Stocks, 32% Bonds, 20% Fixed Income Arbitrage	228	7.2%	7.8%	0.58	0.95	-0.92	5.70	-29.8%	0.98	0.09	0.15
48% Stocks, 32% Bonds, 20% Global Macro	228	7.2%	7.9%	0.58	0.97	-0.59	3.90	-26.7%	0.98	0.06	0.35
48% Stocks, 32% Bonds, 20% Long/Short Equity Hedge	228	7.7%	8.9%	0.57	0.94	-0.73	4.26	-31.0%	0.98	0.09	0.23
48% Stocks, 32% Bonds, 20% Managed Futures	228	7.3%	7.7%	0.60	1.05	-0.44	3.24	-23.9%	0.95	0.02	0.57
48% Stocks, 32% Bonds, 20% Multi-Strategy	228	7.4%	8.1%	0.58	0.95	-0.80	4.71	-30.4%	0.98	0.08	0.24
48% Stocks, 32% Bonds, 20% Fund of Funds	228	6.9%	8.2%	0.52	0.84	-0.80	4.63	-30.4%	0.98	0.08	0.26
48% Stocks, 32% Bonds, 20% All Single Manager Funds	228	7.5%	8.4%	0.57	0.93	-0.77	4.52	-30.2%	0.99	0.09	0.23

Mean-Variance Allocations for Hedge Funds?

- Historical data show that HFs have not, on average, outperformed traditional ptf's of stocks and bonds after fees
 - On avg., once returns have been adjusted for various sampling biases, HFs do not routinely generate double-digit returns
- However, the ride for HF investors has generally been smoother
- There are a number of styles of HF investing: while many are correlated and have much in common, on the whole they are a heterogeneous lot: some are as dissimilar as stocks and bonds
- Guidolin and Orlov (2018) have studied the optimal allocation to HF strategies allowing for predictability and compared it across two layers of alternative allocations
 - Those that exclude HFs from the asset menu
 - Those that abstain from exploiting predictability
- Because there is evidence (see below) that simple quadratic, MV preferences may be inappropriate for HFs, they solve for optimal portfolios under expected power utility and assess OOS evidence
 - The predictors are both classical (e.g., dividend yield) and HF-specific

Mean-Variance Allocations for Hedge Funds?

- Not all HFs are likely to benefit a long-term investor already well diversified in stocks, government and corporate bonds, and REITs
- Only strategies whose payoffs are highly nonlinear (relative value, merger arbitrage, distressed restructuring, convertible arbitrage), and therefore not easily replicable, constitute viable options
- HF strategies which are well diversified (e.g., fund of funds) or which invest primarily in stocks (e.g., equity market neutral) may result in lower utility relative to the optimal baseline portfolio
- Medium to highly risk-averse investors benefit the most from this alternative asset class
 - HFs do not increase realized OOS Sharpe ratios
 - However, they create right-skewness and may deflate tails

