The Future of the Hedge Fund Industry

An Overview and Discussion

Christopher C. Geczy, Ph.D.
The Wharton School
Email: geczy@wharton.upenn.edu

http://www.wharton.upenn.edu/faculty/geczy.html
http://executiveeducation.wharton.upenn.edu/wmi

The Tokyo Club Foundation for Global Studies
The Brookings Institution
The Wharton Financial Institutions Center

After the Crash; The Future of Finance

October 2009

Wharton
University of Pennsylvania

Hedge Funds and the Future

- Important Items About Which to Talk (among others)
  - Industrial Organization and the signal to noise ratio
  - Regulation
  - Greater democratization and availability of hedge fund-like strategies (replicators, registered funds)
  - Overlap between private equity and hedge fund strategies will continue
  - Liquidity Generally
  - Mark to market rules will make a great deal of difference

Hedge Funds and the Future

- Important Items About Which to Talk (among others)
  - Specific comments on
    - Madoff, regulation and the SEC
    - Hedge fund performance, specifically
      - "Vanilla beta" and "Exotic beta"
        - » Risk exposures and changes in risk exposures
        - » Hedge fund replication
        - » Marking to market, SFAS 157 and beta estimation
      - Alpha and its demise
      - Time-varying beta (well, at least simple market timing measures)

The State of the World - Demand

- Demand in recent history (not as much now) was off the chart! Why?
  An Institutional Perspective

  - Difficult equity markets and investment choices have led to declines in funding status for many plans or have raised levels of concern among others
    - S&P500 Pension Plans
      - » 1999: $280Bn ***overfunded***
      - » 2003: $160Bn ***underfunded***
      - » 2004: $165Bn ***underfunded***
      - » 2005: $164Bn+ ***underfunded***
      - » 2006: $100Bn+ ***underfunded***
      - » 2007: $90Bn+ ***underfunded***
      - » ***2008: Early in the year…finally overfunded***
      - » ***2008: End of year, <u>dramatically</u> underfunded!***
      - » ***2009: 95% of pension plans in the U.S. are underfunded***

    - Underfunding is affecting business (SEI survey)
      - » 68% say funding obligations have a negative impact on corporate financial statements
      - » 33% say it is causing changes in business plans
      - » 25% say cutting back on CapEx currently
      - » Additional 11% expect to cut back in future

  - Search for new ideas?
    - Hedge funds becoming an asset class?
    - Were investors disappointed or realistic?

The State of the World

Setting the Stage – The Recent Past

- Hedge Fund Assets Grew to > $2.0 Trillion in 2008 (Hedge Fund Research)
  - Some say > $3 Trillion in the first half of 2008 with one survey reporting $3.8 Trillion
  - However, there has been a mass exit….as much as a third of assets have fled
  - Corresponding estimate to the number above is >$1.3 Trillion (a 36.1% decline)

  - Hedge Fund Performance
    - In 2006, about 9%-13% depending on data provider
      - Emerging market funds led (20%+)
    - 2007 was about 9%-12%
    - 2008, average was about -20% with some sub-sectors (like convertible bond arbitrage) down as much as 50%

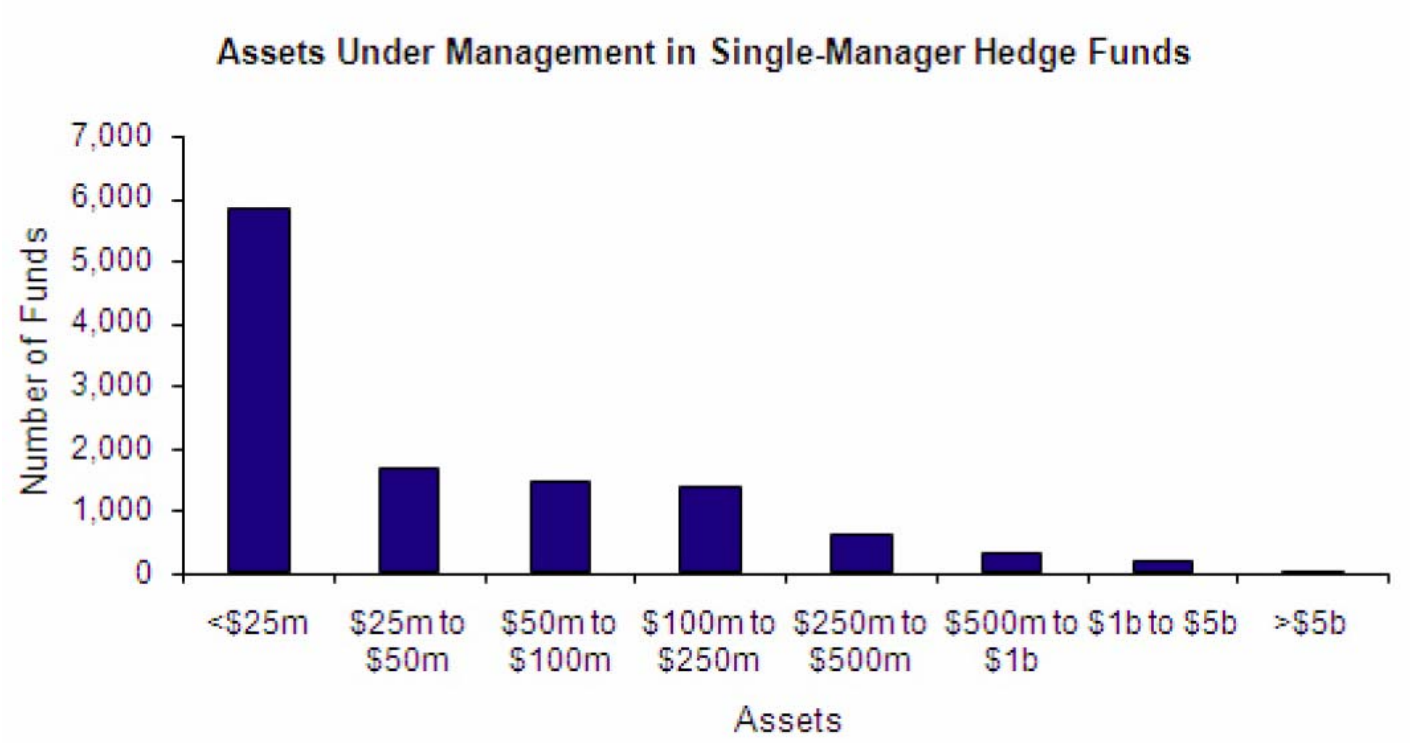
The State of the World

Setting the Stage – The Recent Past: Industry Organization

- The PFS Database Study*
  - 15,150 single manager hedge funds (20,200 reported performance in 2008)
    - 28% onshore; 72% offshore
    - $1.3 trillion in managed capital
      - » 200 funds with >$1Bn in managed capital!
      - » About 5,750 with <$25MM in managed capital!
  - 5,350 distinct fund companies
  - 7,200 funds of funds
    - By far, mostly offshore (87%)
    - About $750Bn in capital (23.5% decline over last year)
    - 46% of them manage < $25MM

*Source: PerTrac Financial Solutions LLC 2008 Hedge Fund Database Study

Setting the Stage – The Recent Past

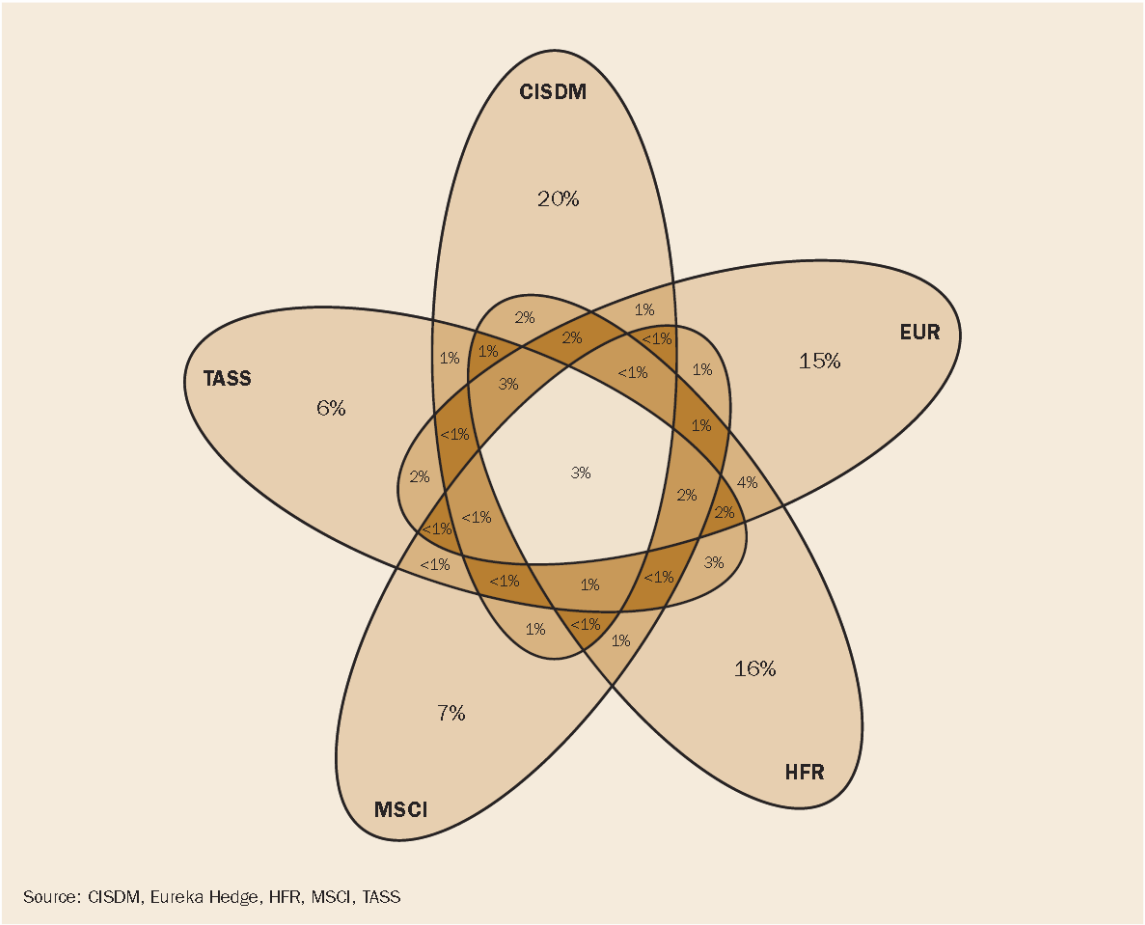


*Source: PerTrac Financial Solutions LLC 2009 Hedge Fund Database Study

The State of the World

Hedge Fund Database Overlap

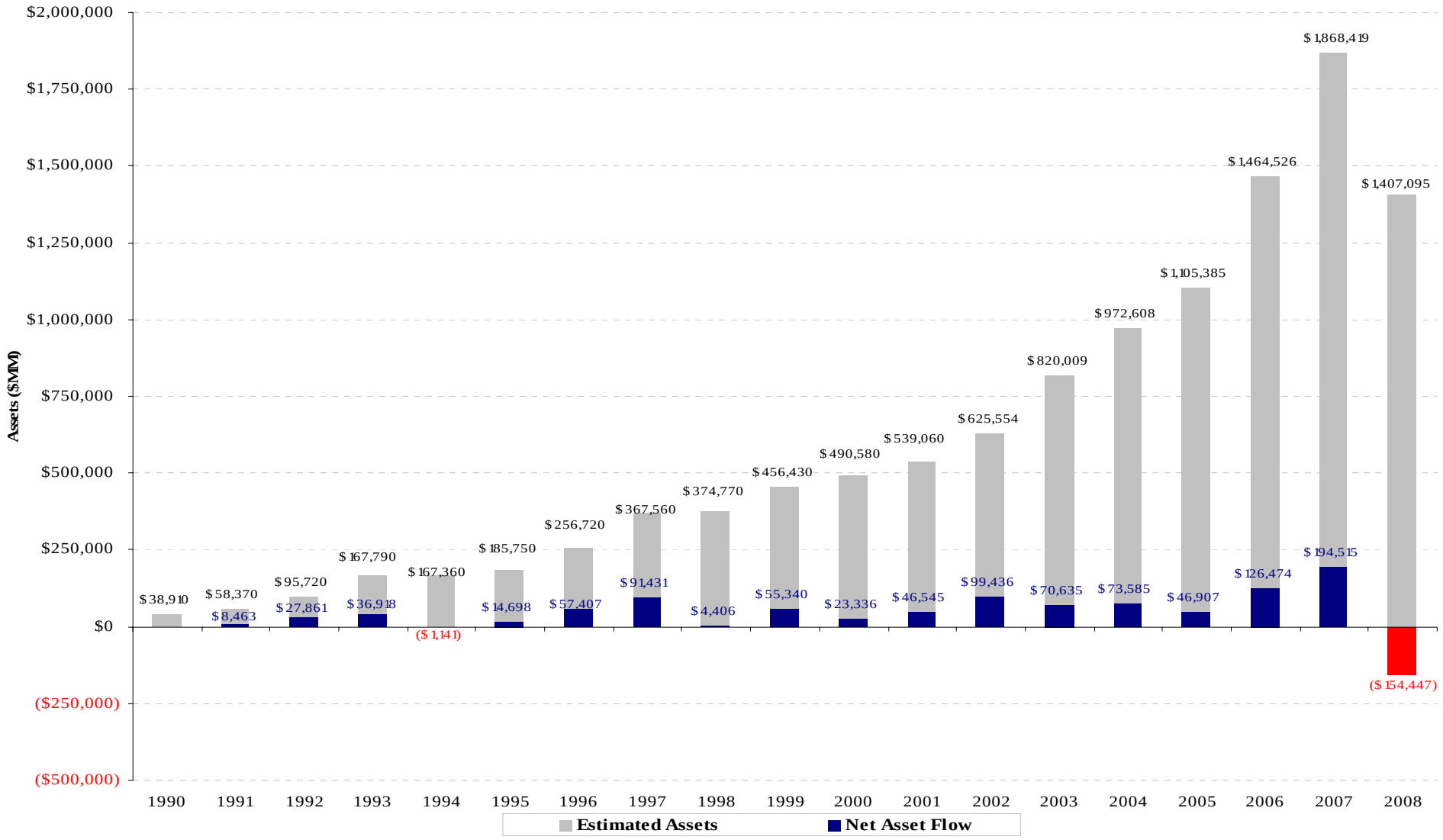
The Hedge Fund Universe in 2005: TASS, HFR, CISDM, Eureka Hedge, and MSCI



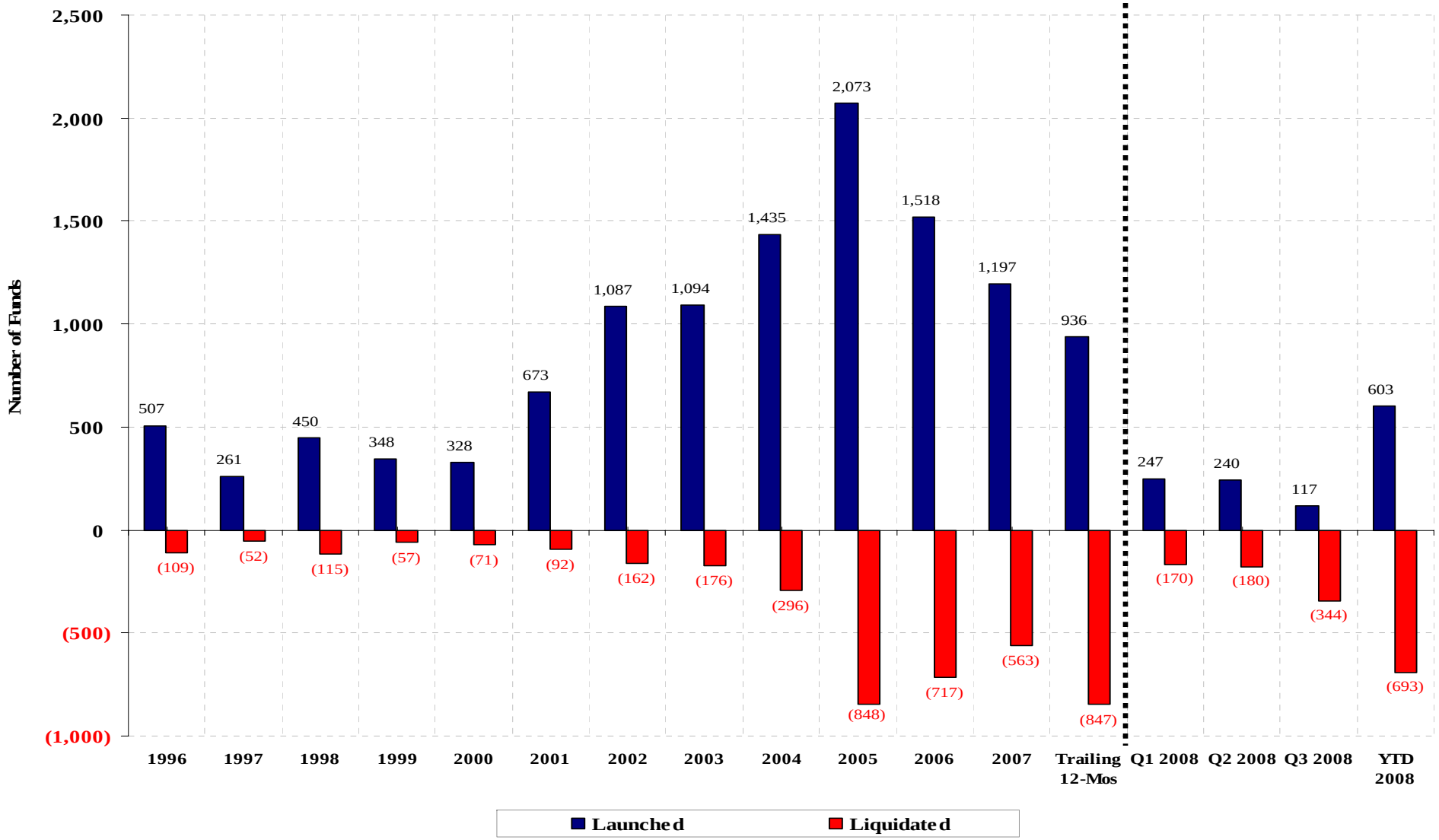
Source: CISDM, Eureka Hedge, HFR, MSCI, TASS

Fund and Hsieh (2006)

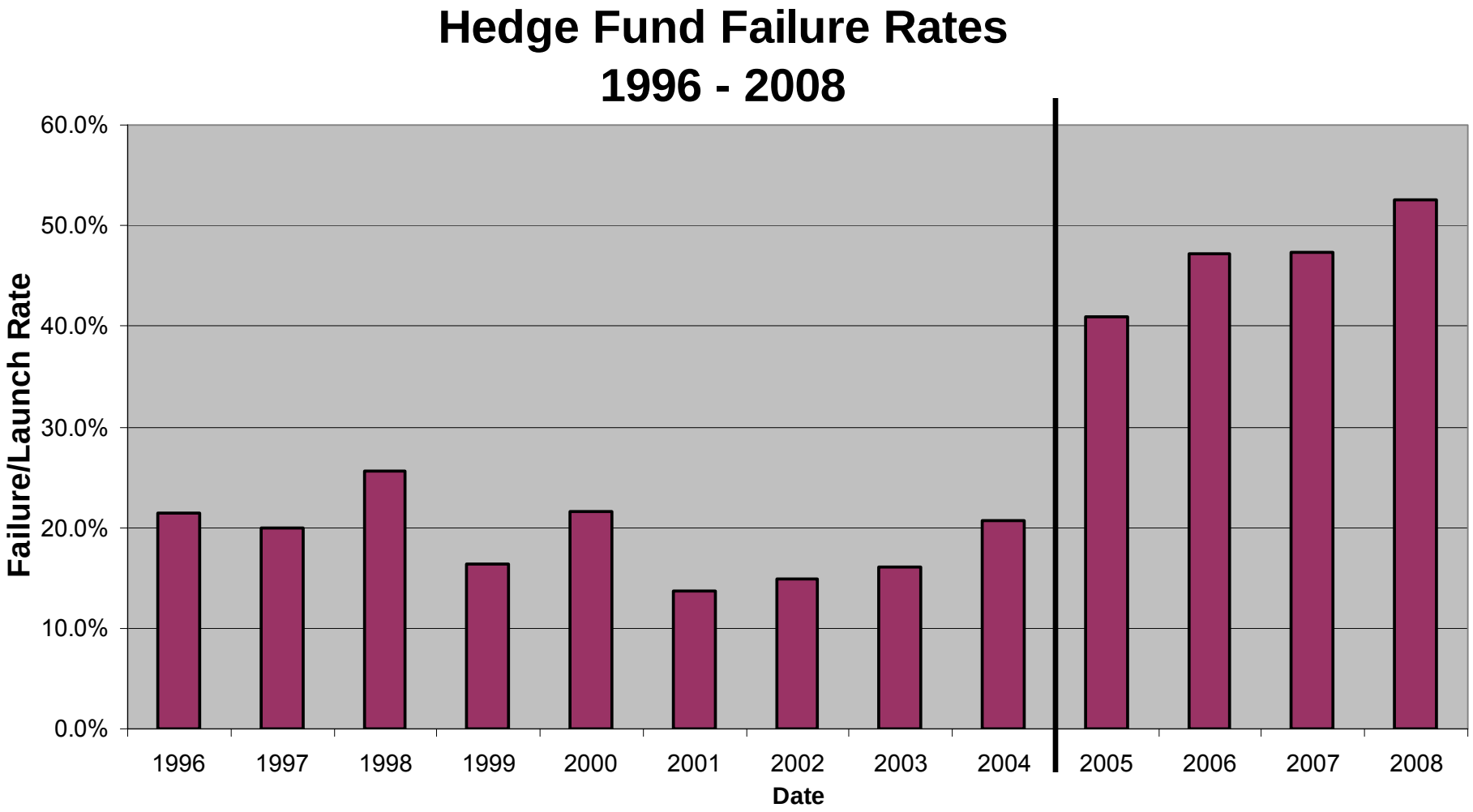
Estimated Growth of Assets / Net Asset Flow
Hedge Fund Industry 1990 – 2008



Estimated Number of Funds Launched/Liquidated
1996 – Q3 2008



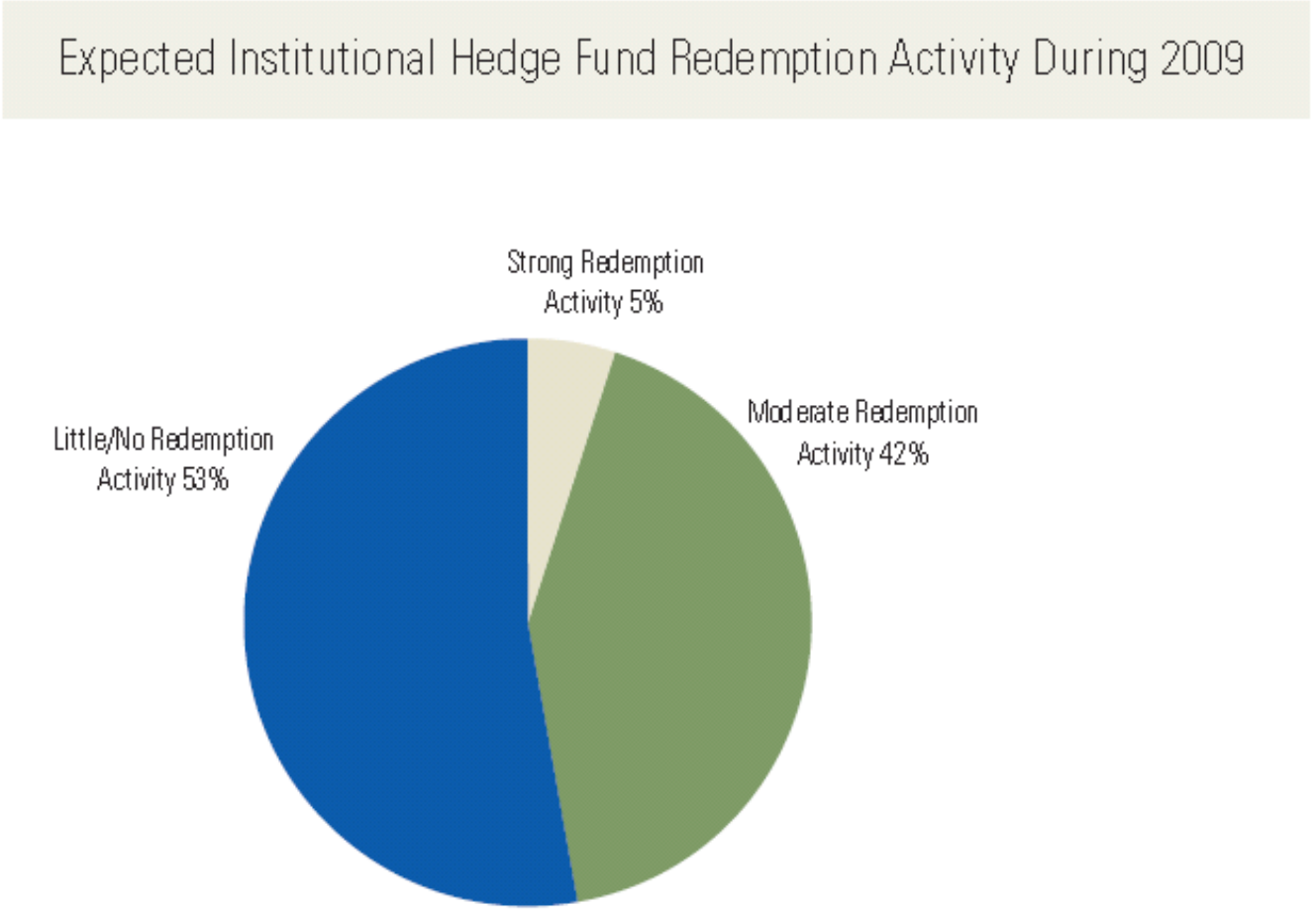
Liquidation Rates



Note: Liquidations as a % of launches

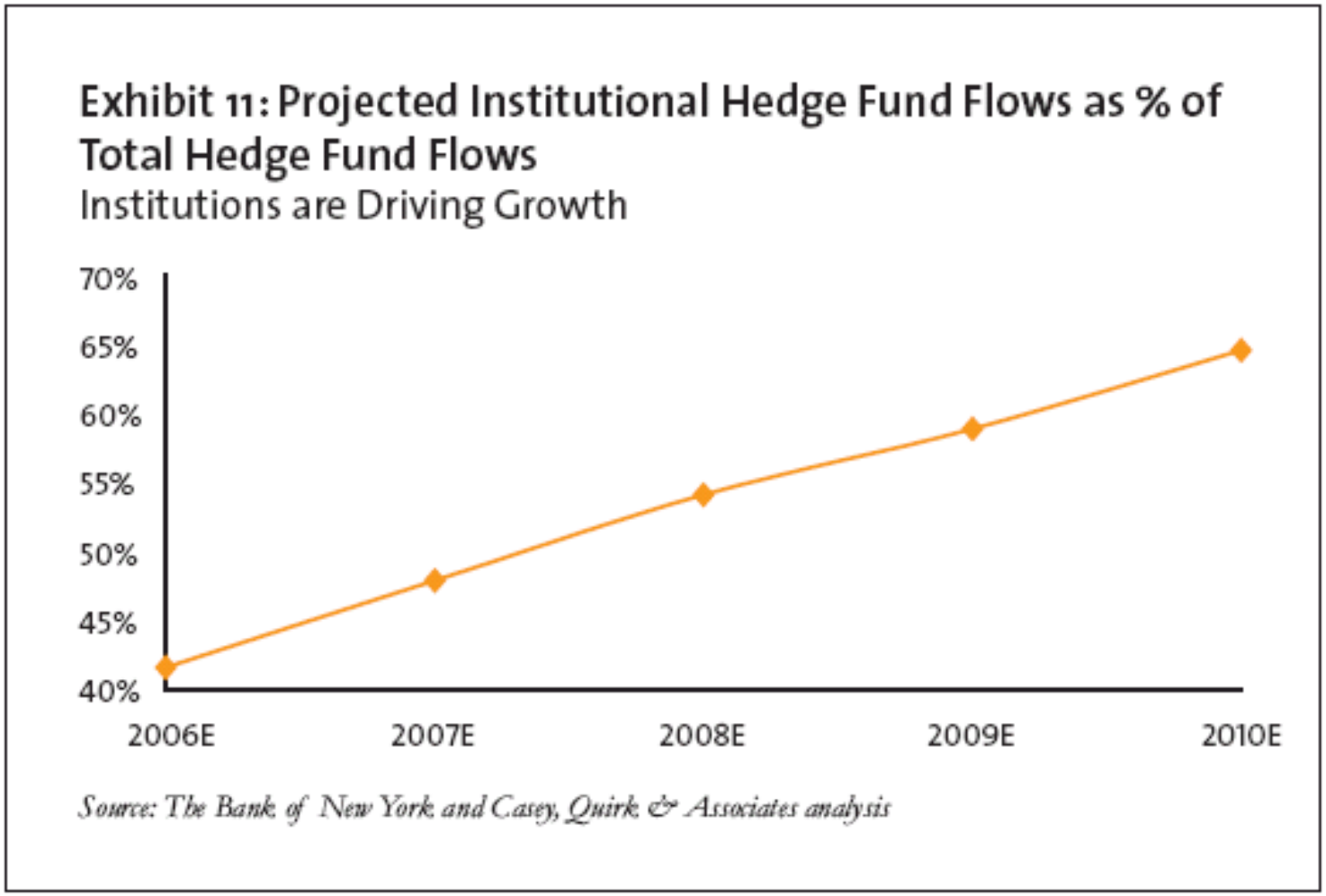
Institutions and Hedge Funds

- The Casey, Quirk/eVestment Alliance Survey

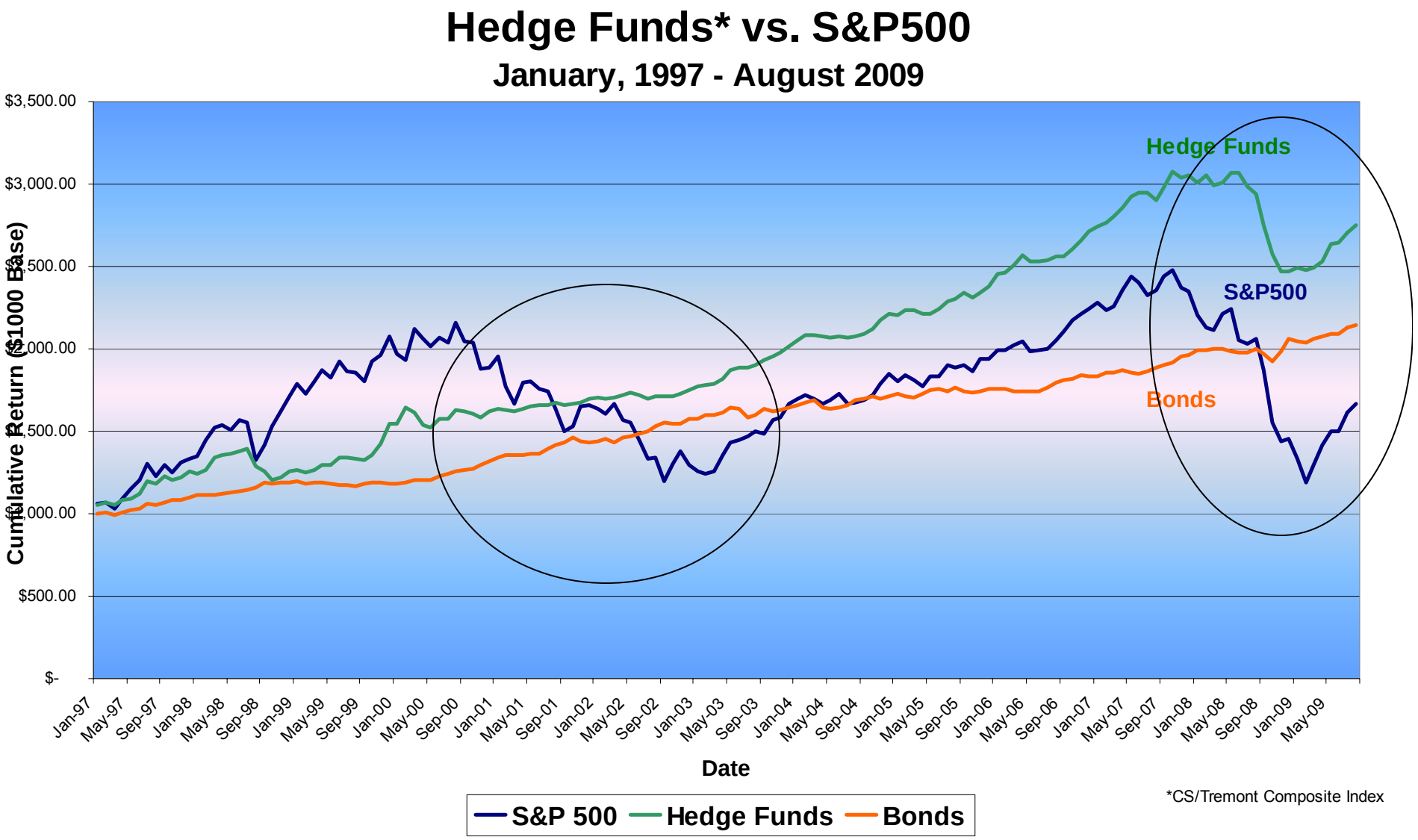


Who Invests in Hedge Funds?

- The Casey, Quirk and Associates/BoNY Survey



Why The Interest?



*CS/Tremont Composite Index

The Regs (U.S.)

Myth: Hedge Funds are Unregulated

- Reality: Hedge funds and their managers are subject to wide variety of regulations, including:
  - Securities Regulations (e.g., the 1933, 1934 and both 1940 acts)
  - Anti-fraud, anti-market manipulation provisions of securities and commodities laws
  - Insider trading regulations
  - Large position and other regulator reporting with SEC, Federal Reserve, FSA, FERC, CFTC
    - For example, both FERC and CFTC filed suit against Amaranth for market manipulation of energy futures contracts and physical natural gas. FERC had authority under anti-manipulation rules of the Energy Policy Act of 2005.
      - Amounts were large (e.g., FERC initially levied a $291MM fine, but Amaranth settled for $7MM in August 2009 with CFTC and with FERC)

- Many hedge fund managers including Funds of Funds are registered with:
  - the SEC as investment advisers or
  - the CFTC as CPOs or CTAs

- Some funds are even becoming registered under the Investment Company Act of 1940(!)

The Regs (U.S.)

- Investment Company Act of 1940
  - Sections 3(c)(1) and 3(c)(7)
- Securities Act of 1933
  - Private Placements Under Regulation D
- Securities Exchange Act of 1934
  - Number of Shareholders for Reporting Companies
- Investment Advisers Act of 1940
  - Section 203(b)(3), Rule 203(b)(3)-1
- Commodity Exchange Act

Hedge Fund vs. Mutual Funds

Mutual Funds	Hedge Funds	
Seek a high correlation (low "tracking error") to market benchmarks	Seek to profit in all market environments	
Stable investment strategy in a given asset class	Able to change investment strategies and the types of assets traded Sometimes maintain more concentrated portfolios	
Use only a small amount of leverage, options, futures and short positions and limited to 15% "illiquidity"; must have a reportable daily NAV	Use derivatives more frequently, and able to use nonpublic securities and leverage; can invest in highly illiquid positions	
Regulated by Investment Company Act of 1940	Not necessarily part of an Investment Company (typically find "safe harbor")	
	3(c)1 vehicle	***3(c)7 vehicle***
Available to all investors	Exempt through 3(c)1 exemption of Investment Company Act of 1940	Exempt through section 3(c)7 of National Securities Market Improvement Act of 1996
Can advertise on television or mainstream financial publications	Limited to 99 accredited investors	Limited to 500 qualified purchasers
	Not permitted to actively market its investment products	Only allowed to accept investments from qualified purchasers
Management fee only	Management fee and incentive fee	
Frequently have low minimum investments	Large minimum investments, often $500,000 to $1 million, or more	
Simple tax reporting (Form 1099)	More complex tax reporting (typically Schedule K-1)	

The Regs (U.S.)

- Important Recent "Events"
  - The CapCo Study (2002)
    - Most hedge fund failures are related to operational issues
  - SEC's failed attempt at forcing hedge funds to register in October 2004 (abrogated in 2006 by appellate court)
  - The President's Working Group Report(s)
    - No regulation
  - Then…Madoff (and so many others)
  - October 2008 worldwide experiment in short selling restrictions
  - And others…

Madoff Ponzi Scheme

- Bernie Madoff
  - Founder of Bernard L. Madoff Investment Securities, LLC (1960's)
  - Industry ties
    - Former Chairman of NASDAQ
    - Ties to SIA/SIFMA
  - Carried out the world's largest recorded Ponzi scheme
    - Supposedly traded "Split-Strike Conversion," essentially a bounded bull or bear spread
    - U.S. Attorney's office is currently estimating $13Bn from 2,336 victims
      - Madoff claimed $65Bn
    - Raised through direct investments and through so-called feeder funds

Madoff Ponzi Scheme

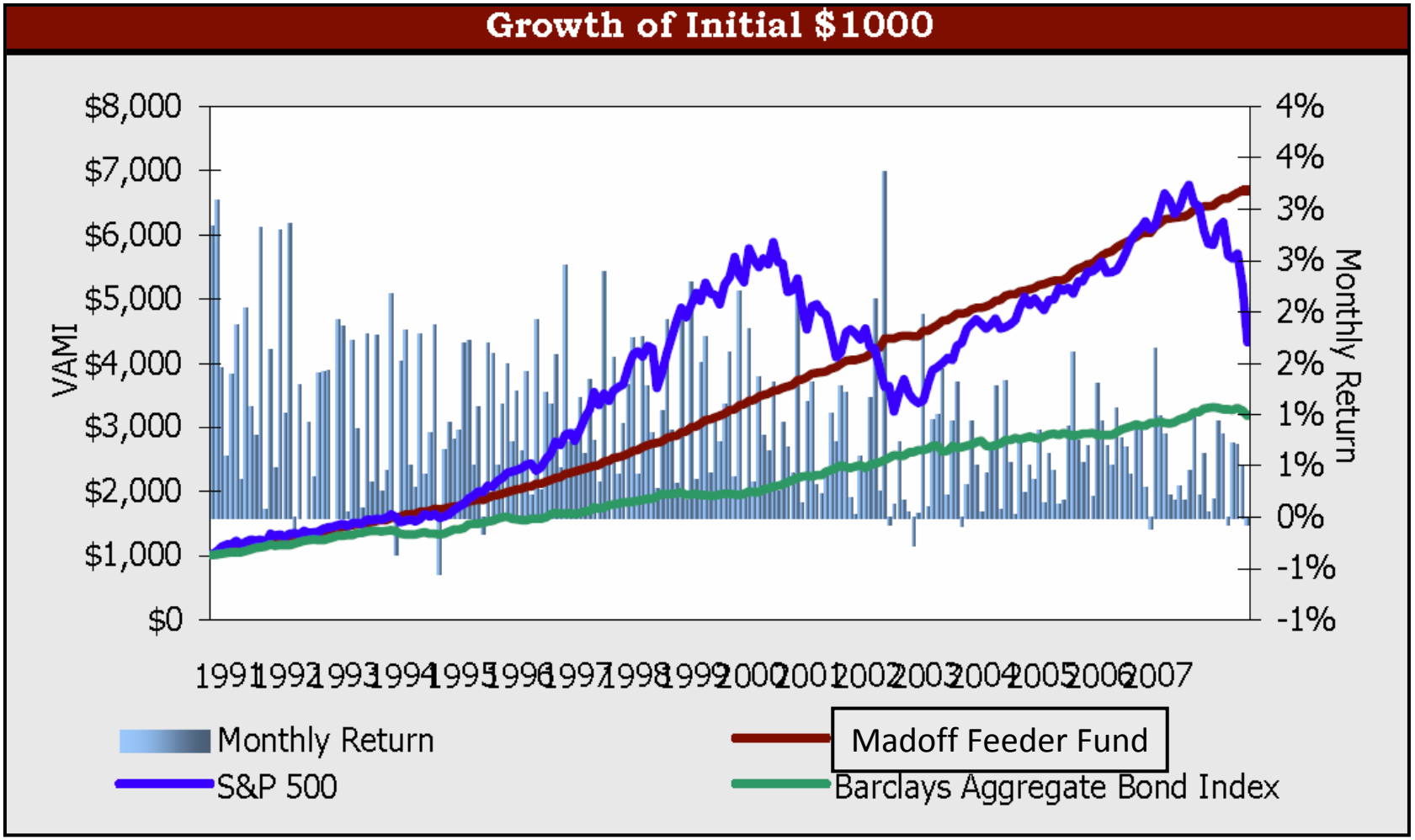
- Bernard L. Madoff Investment Securities, LLC
  - Madoff was investigated six times
    - 1999 SEC; 2000 SEC; 2004 SEC; 2005 NASD; 2005 SEC; 2006 SEC
    - For trading practice violations, front-running allegations, even Ponzi scheme allegations
  - Madoff registered with the SEC as an Registered Investment Advisor under the 1940 Advisers act

Madoff Ponzi Scheme

- There were problems with the Madoff situation…
  - Split-strike conversion was unreplicable by analysts
    - Other hedge funds have unreplicable returns (e.g., RenTech's Medallion and other quant funds)
  - S&P100 options market would have difficulty handling OTC $13-$17Bn in assets
    - Excuse was that no one would talk lest Madoff not trade with them in the future
  - Madoff Administrator and auditor (Friehling & Horowitz) was a 3-person company (one was 78 years old and lived out of state) and only one other was an accountant; suspiciously small and understaffed
    - But feeder funds had top firms (e.g., PWC, KPMG)
  - Form 13F positions were very small
    - Counter claim was that Madoff went to cash at the end of every quarter to hid positions
  - Paper statements were issued T+3; no electronic operations
  - Family involvement (brother, daughter, sons)
    - Feeder fund indicated that Peter Madoff "wrote the code" that ran the strategy
  - Madoff Securities acted as manager, broker, custodian and administrator, all in one or related organizations
  - Still, investors trusted regulators, feeder fund due diligence and representations, and liked the track record!

Madoff Ponzi Scheme

Madoff Feeder Fund Returns



Madoff Ponzi Scheme

Madoff Feeder Fund Returns

Statistical Analysis	Fund	BM1	BM2		Fund	BM1	BM2
Returns				**Annual Returns**			
Compound ROR	11.19%	8.52%	6.68%	2008	4.50%	-32.85%	-1.73%
Cumulative Return	568.8%	333.0%	218.6%	2007	6.35%	5.50%	6.96%
Cumulative VAMI	$6,688	$4,330	$3,186	2006	9.39%	15.79%	4.33%
Largest Month Gain	3.36%	11.44%	3.87%	2005	7.26%	4.89%	2.43%
Largest Month Loss	-0.55%	-16.80%	-3.36%	2004	7.07%	10.88%	4.34%
Average Period Return	0.89%	0.77%	0.55%	2003	8.21%	28.68%	4.11%
% Positive Months	95.35%	64.65%	69.77%	2002	9.33%	-22.10%	10.27%
				2001	10.68%	-11.88%	8.42%
Risk				**Latest Returns**			
Standard Deviation	2.48%	14.29%	3.75%	Last Month	-0.06%	-16.80%	-2.36%
Sharpe (3.75%)	2.82	0.39	0.77	Last Quarter	1.15%	-23.11%	-2.75%
Sortino (8.75%)	1.98	(0.02)	(0.63)	Last Year	5.82%	-36.10%	0.31%
Downside Deviation (8.8%)	1.13%	10.82%	3.09%	2-Year	6.33%	-14.44%	2.81%
Max Drawdown	-0.55%	-44.73%	-5.15%	3-Year	7.19%	-5.21%	3.60%
Months In Maximum Drawdown	1	25	5	4-Year	7.14%	-1.91%	2.98%
Months To Recover	1	49	8	5-Year	6.95%	0.26%	3.48%
Comparison To Benchmark(s)				**Drawdown Analysis**			
Alpha		0.85%	0.86%	1	-0.55%	-44.73%	-5.15%
Annualized Alpha		10.66%	10.77%	2	-0.36%	-36.10%	-3.82%
Beta		0.05	0.06	3	-0.27%	-15.37%	-3.55%
Correlation		0.32	0.09	4	-0.19%	-6.96%	-3.17%
R-Squared		0.10	0.01	5	-0.16%	-6.82%	-2.99%

Past performance is not necessarily indicative of future results.

BM1 = Benchmark 1 = S&P500

BM2 = Benchmark 2 = Lehman Aggregate Bond Index

Regulation

- But not just Madoff
  - Famous CapCo study
    - 50% of hedge fund failures arise due to operational issues including fraud
    - Something like 25% of failures step from fraud
  - Brown and Goetzmann (2009)
    - 20% of hedge funds misrepresents its fund or its performance
  - **The SEC has so far this year identified and prosecuted more than 45 Ponzi schemes**
    - **The Asset Management Unit of the SEC has "…focus on…hedge funds and private equity funds."**

Regulation

SEC Frauds and Ponzi Schemes Investigated Since the end of 2008

Name of Litigation	Date
SEC v. Frank J. Russo et al.	11/3/2008
SEC v. Biltmore Financial Group, Inc., J. V. Huffman, Jr., Defendants, and Gilda Bolick Huffman	11/13/2008
SEC v. Bernard L. Madoff and Bernard L. Madoff Investment Securities LLC	12/19/2008
SEC v. Creative Capital Consortium, LLC, et. al.	12/30/2008
SEC v. Anthony A. James	1/6/2009
SEC v. Joseph S. Forte, et al.	1/8/2009
SEC v. Gen-See Capital Corp. and Richard S. Piccoli	1/8/2009
SEC v. Rod Cameron Stringer, individually and d/b/a RCS Hedge Fund	1/21/2009
SEC v. William L. Walters	2/18/2009
SEC v. Daren L. Palmer and Trigon Group, Inc.	2/27/2009
SEC v. Stanford International Bank, et al.	2/17/2009
SEC v. Billion Coupons, Inc. (aka Billion Coupons Investment) and Marvin R. Cooper	2/19/2009
SEC v. CRE Capital Corporation and James G. Ossie	1/15/2009
SEC v. Craig T. Jolly and Quest Holdings, Inc.	2/9/2009
SEC v. Brian J. Smart, et al.	3/12/2009
SEC v. Ray M. White and CRW Management, L.P.	3/5/2009
SEC v. Shelby Dean Martin, D. Martin Enterprises, Inc. and DM Ventures, LLC	3/6/2009
SEC v. Anthony Vassallo, Kenneth Kenitzer, and Equity Investment Management and Trading, Inc.AD	3/11/2009
SEC v. John M. Donnelly, et al.	3/11/2009
SEC v. Millennium Bank, et al.	3/26/2009
SEC v. Oversea Chinese Fund Limited Partnership, et al.,	4/6/2009
SEC v. Market Street Advisors, Shawn R. Merriman, LLC-1, LLC-2, Marque LLC-3, and LLC-4	4/7/2009
SEC v. Robert P. Copeland	4/9/2009
SEC v. Maximum Return Investments, Inc. and Clelia A. Flores	4/13/2009
SEC v. Edward T. Stein et al.	4/15/2009
SEC v. Donald Anthony Walker Young, et al.	4/20/2009
SEC v. Bradley L. Ruderman, Ruderman Capital Management, LLC, Ruderman Capital Partners, LLC, and Rude	4/29/2009
SEC v. Gordon A. Driver and Axcess Automation, LLC	5/15/2009
SEC v. FTC Capital Markets, Inc., FTC Emerging Markets, Inc. also d/b/a FTC Group, Guillermo David Clamens	5/20/2009
SEC v. David E. Ruskjer	5/29/2009
SEC v. Christopher M. Kunkel	6/9/2009
SEC v. Peter C. Son, Jin K. Chung, SNC Asset Management, Inc., and SNC Investments, Inc.	6/9/2009
SEC v. John S. Morgan, Marian I. Morgan, Morgan European Holdings ApS a/k/a Money Talks, Inc., ApS, Stephe	6/12/2009
SEC v. David J. Hernandez, also doing business as "NextStep Financial Services, Inc.,"	6/15/2009
SEC v. Horizon Property Holdings, L.C. and Cydney Sanchez,	6/17/2009
SEC v. Stanford International Bank, Ltd., et al.	6/19/2009
SEC v. Moises Pacheco, Advanced Money Management, Inc., and Business Development & Consulting Co., et a	6/24/2009
SEC v. Regan & Company and Michael C. Regan	6/24/2009
SEC v. Thomas J. Petters, Gregory M. Bell and Lancelot Investment Management LLC, Defendants, and Inna Go	7/10/2009
SEC v. Sean Nathan Healy, Defendant, and Shalese Rania Healy and Sand Dollar Investing Partners, LLC	7/14/2009
SEC v. John J. Bravata, et al	7/28/2009
SEC v. Diversity Capital Investments, Inc., et al	7/29/2009
SEC v. Steven E. Tennies and Price Geld & Company, Inc.	7/31/2009
SEC v. Titan Wealth Management, LLC, Point West Partners, LLC, and Thomas Lester Irby II, Defendants, and J	8/26/2009
SEC v. Ben-Wal Leasing Company, et al.,	8/27/2009
SEC v. Provident Royalties, LLC, Provident Asset Management, LLC, Provident Energy 1, LP, Provident Resourc	7/7/2009
SEC v. David A. Souza and D.A. Souza Investments, LLC	8/31/2009
SEC v. Jeffrey L. Mowen et al.	9/3/2009
SEC v. Philip G. Barry, Leverage Group, Leverage Option Management Co., Inc., and North American Financial S	9/8/2009
SEC v. Frank Bluestein	9/28/2009
SEC v. William A. Huber and Hubadex, Inc.,	9/30/2009
SEC v. Randy M. Cho	10/7/2009

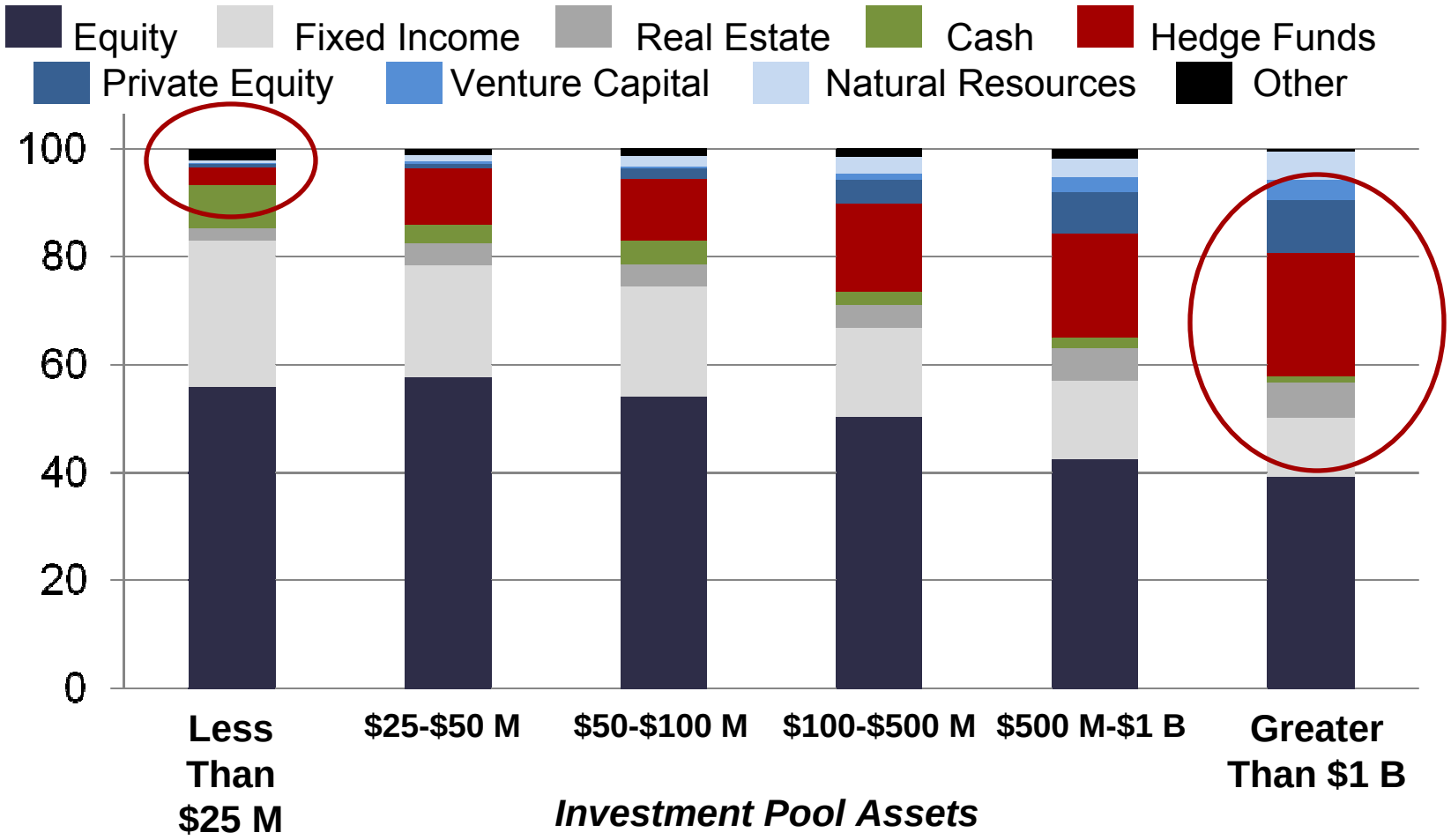
Regulation

- Outcomes
  - Renewed interest in hedge fund registration
    - In the U.S.
      - Either via changes in sections 501/506 of Regulation D of the 1933 Securities Act
      - Or Sections 3(c)1 or 3(c)7 of the 1940 Advisors Act
      - Will likely come from Congress in the U.S.
    - In the EU
      - Directives in place
  - Renewed interest in and resources dedicated to detection and enforcement around the world
  - Better investor due diligence
  - Greater distrust of investments, managers and regulators

The Move To Alternative Investments: University Endowments

Institutional Portfolios: Endowment Allocations

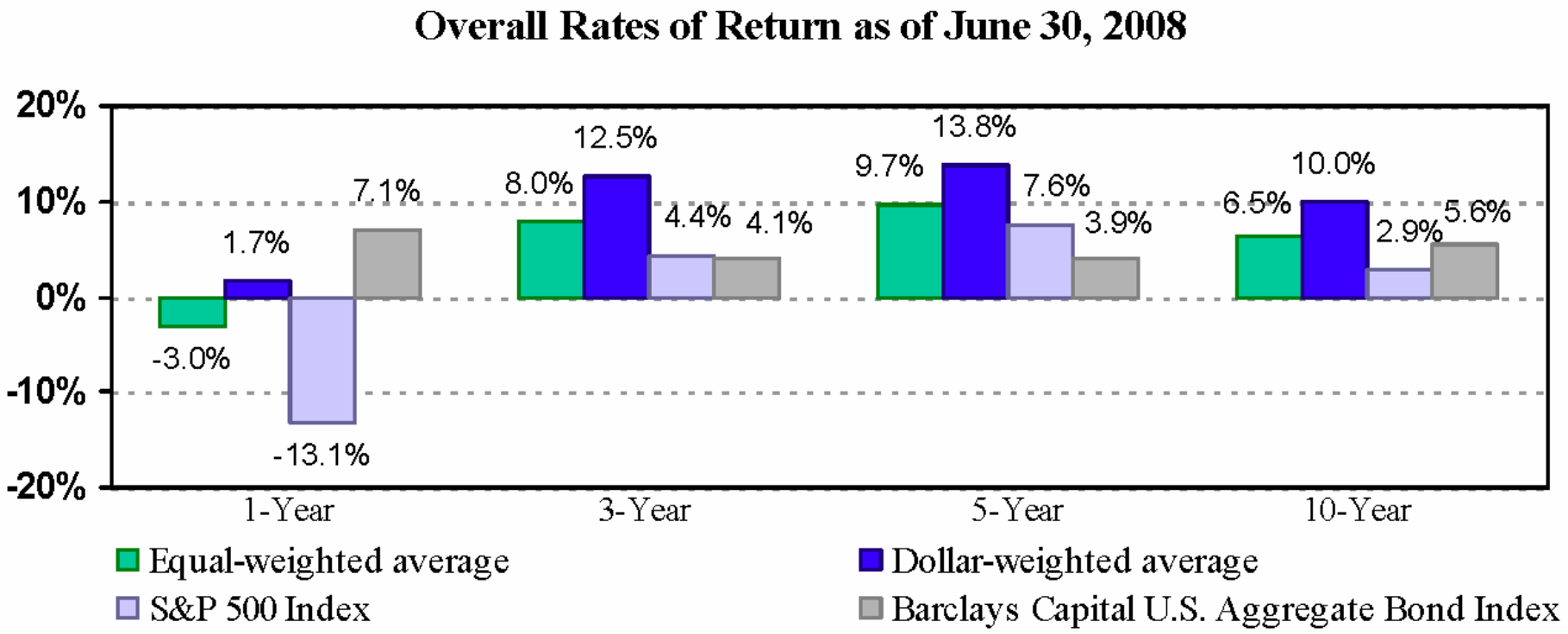
Average Asset Class Allocation of Total Assets (The NACUBO Study)



Source: 2008 NACUBO Endowment Study. 774 institutions provided investment pool asset class data in 2008. Table data are equal weighted unless otherwise noted. Natural resources include: Timber, Oil and Gas Partnerships, and Commodities.
Source: NACUBO and PPB Advisors Research

Endowment Allocations

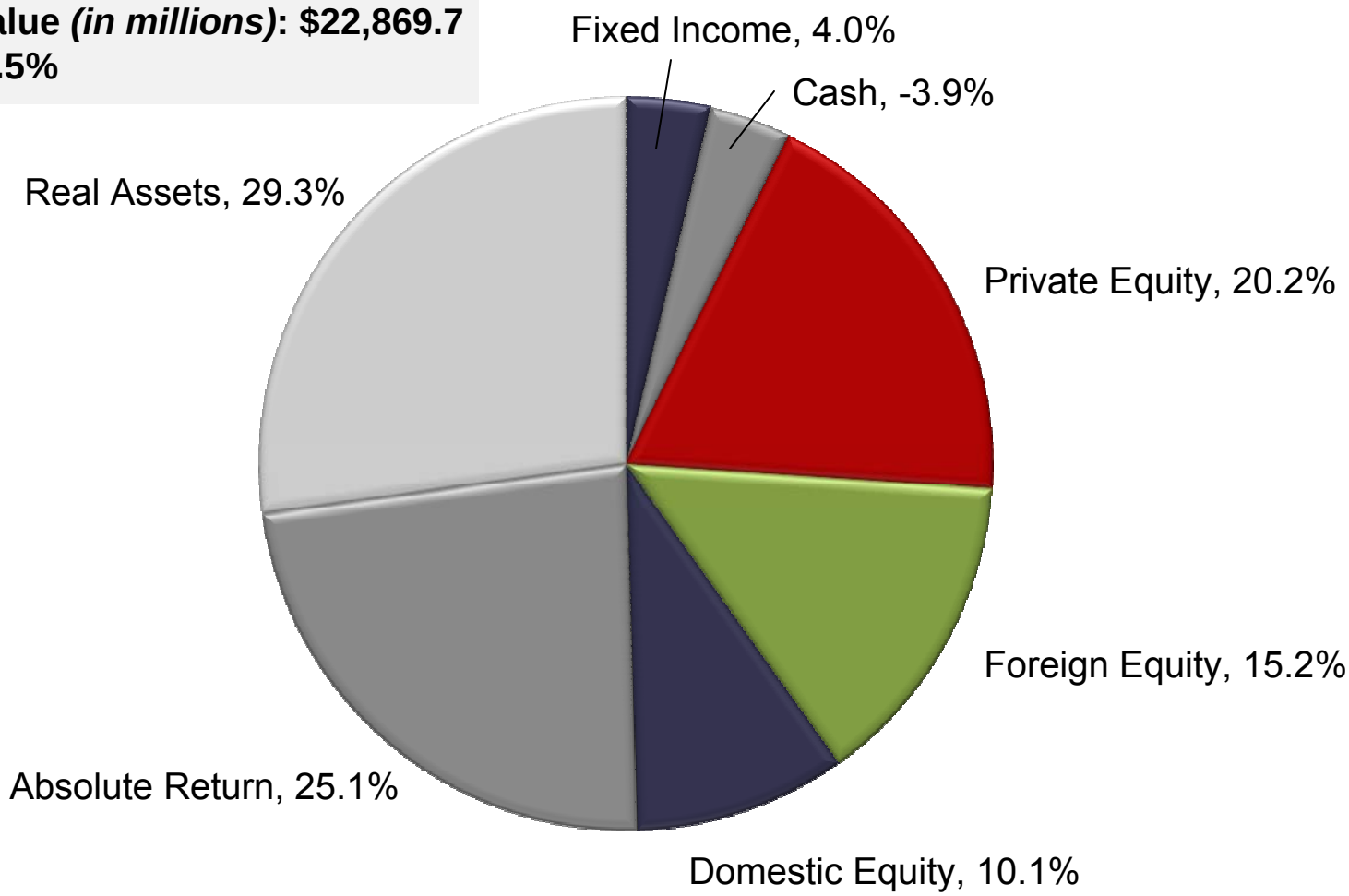
- Performance



Example: Yale University

Yale's Asset Allocation as of June

Market Value *(in millions)*: $22,869.7
Return: 4.5%



Source: PPB Advisors, LLC Research
Data complied from the Yale Investments Office

Endowment Allocations

Allocation Targets of Six Top Funds, FYE 2008

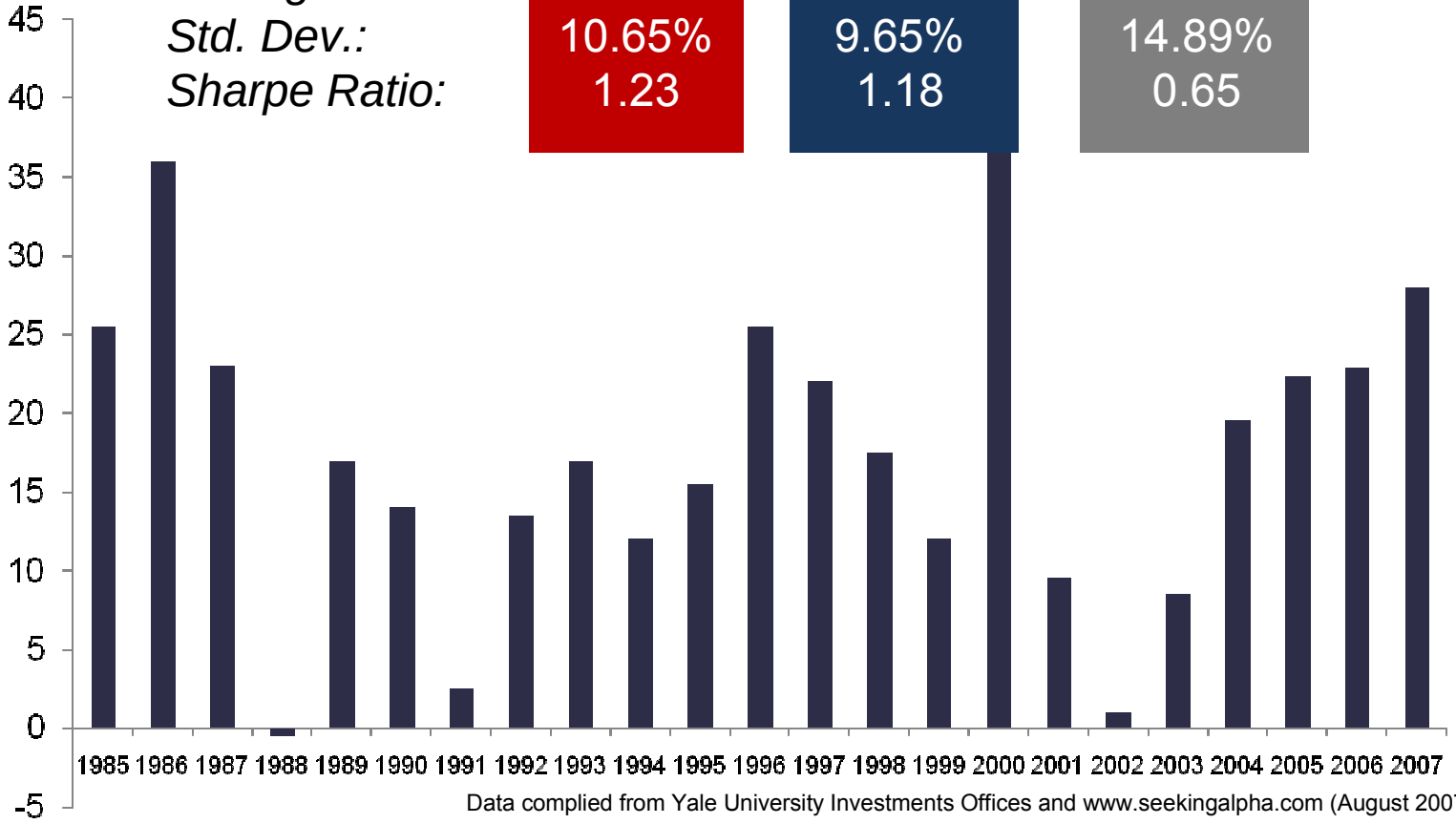
Asset Class	Peer Policy Targets						Average
	Fund #1	Fund #2	Fund #3	Fund #4	Fund #5	Fund #6	
Domestic Equity	15%	20%	14%	15%	18%	21%	17%
International Equity	10%	10%	7%	9%	13%	20%	11%
Emerging Markets Equity	5%	5%	7%	9%	5%	7%	6%
Real Estate	15%	16%	17%	12%	10%	8%	13%
Private Equity	15%	10%	17%	15%	20%	10%	15%
Natural Resources	7%	7%	8%	6%	5%	4%	6%
Absolute Return	15%	15%	25%	25%	20%	20%	20%
Special Situations	5%	5%	0%	0%	0%	5%	3%
Fixed Income	13%	12%	5%	10%	10%	5%	9%
Cash / Cash Plus	0%	0%	0%	0%	0%	0%	0%
Total Alternatives	57%	53%	67%	58%	55%	47%	56%
Total Public Equity	30%	35%	28%	32%	35%	48%	35%
Total Fixed Income / Cash	13%	12%	5%	10%	10%	5%	9%
Total Liquid Assets	43%	47%	33%	42%	45%	53%	44%

Source: Geczy, O'Conner and Proskine (Wharton, 2009)

Asset Allocation

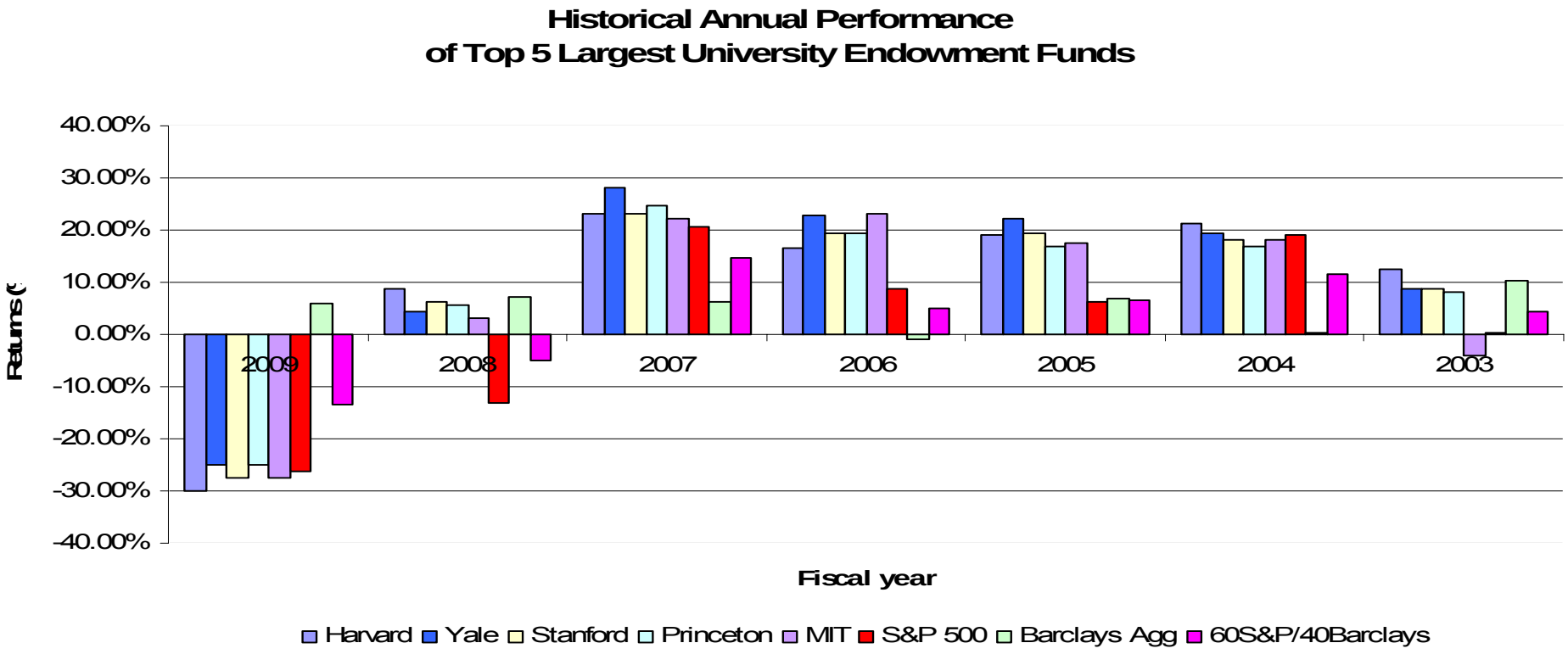
Yale Endowment Portfolio Performance
Fiscal Year 1985-2007

	Yale	*Harvard*	*S&P 500*
Average Return:	17.14%	15.92%	14.22%
Std. Dev.:	10.65%	9.65%	14.89%
Sharpe Ratio:	1.23	1.18	0.65

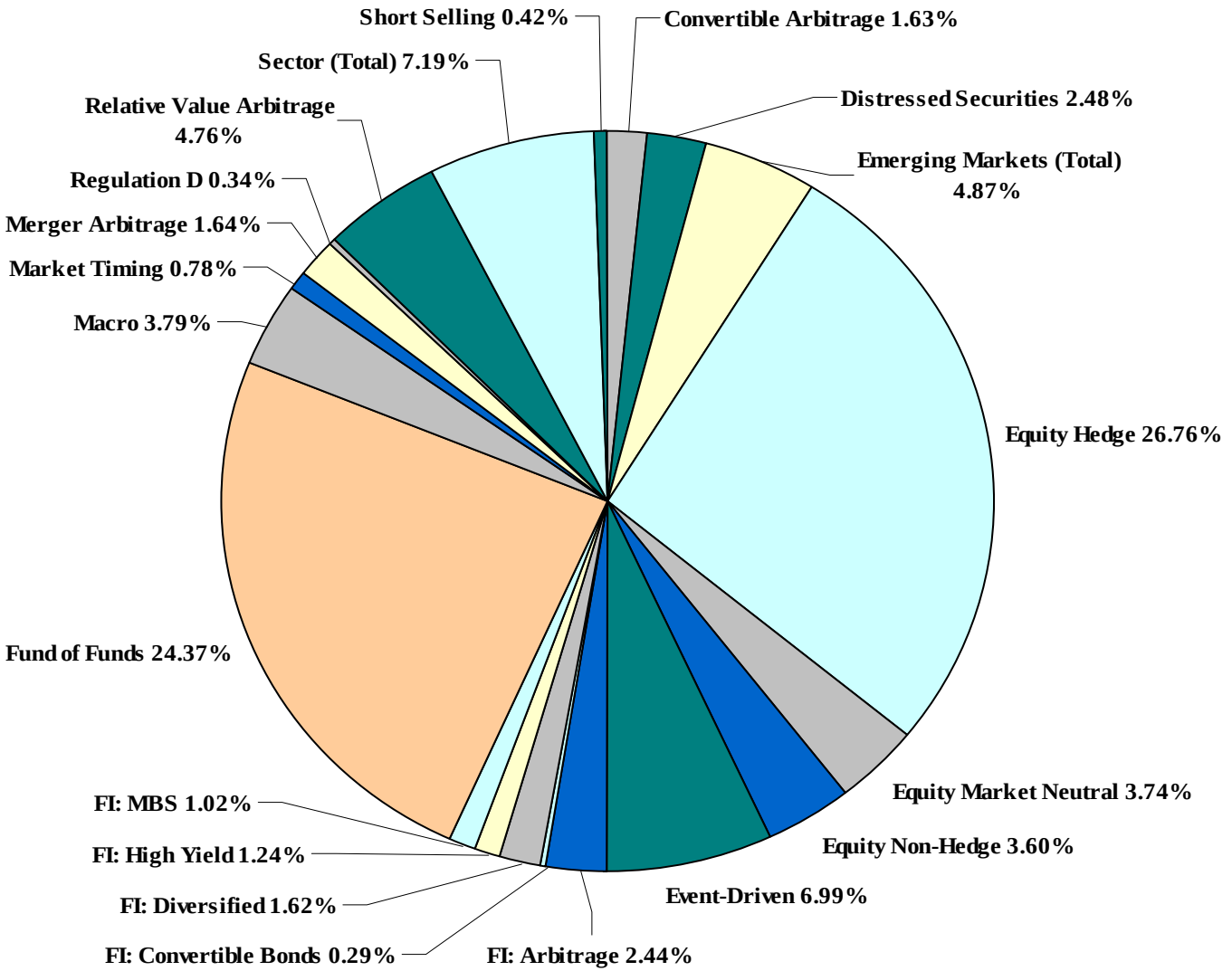


Data complied from Yale University Investments Offices and www.seekingalpha.com (August 2007)

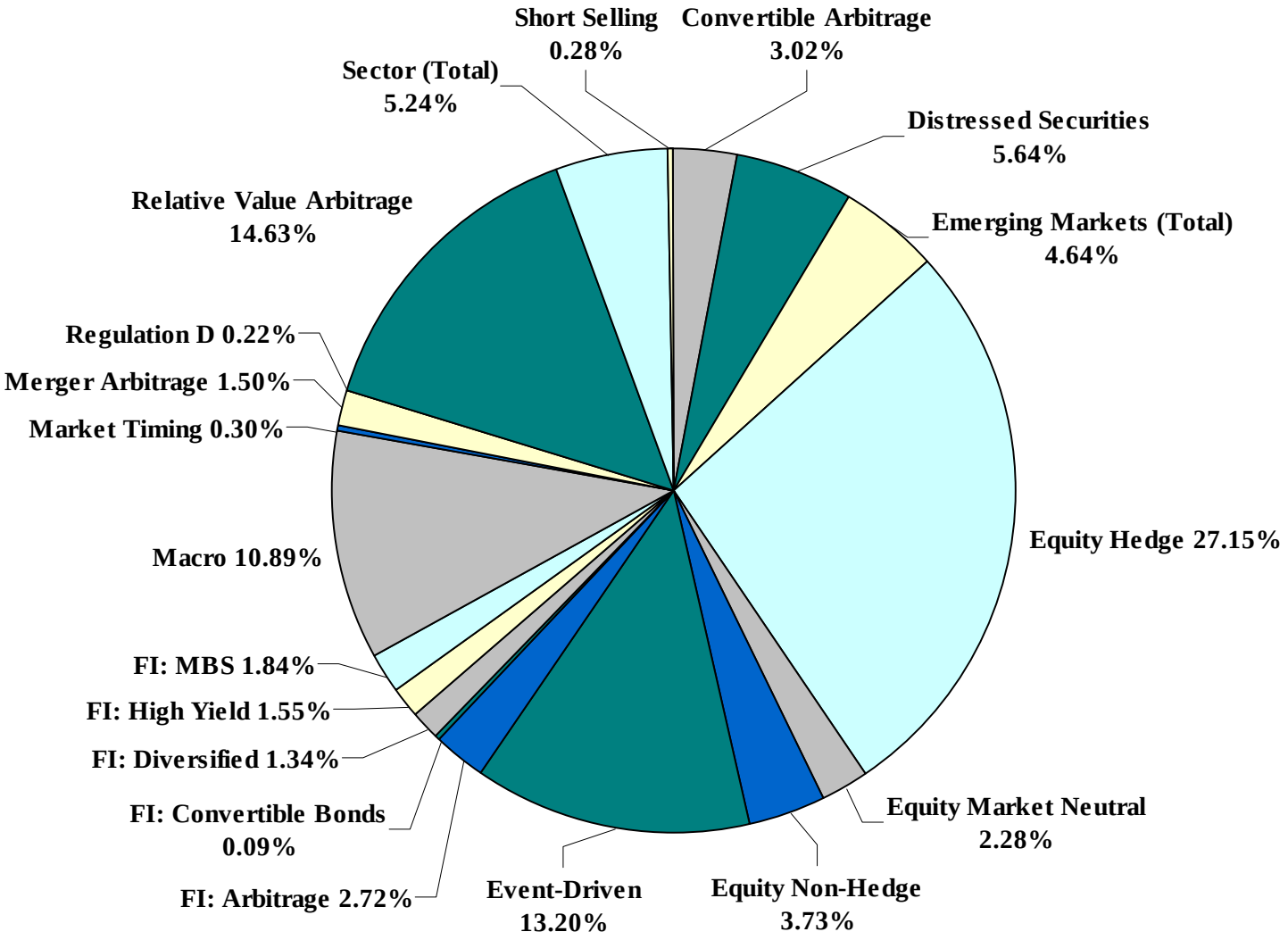
Endowment Allocations



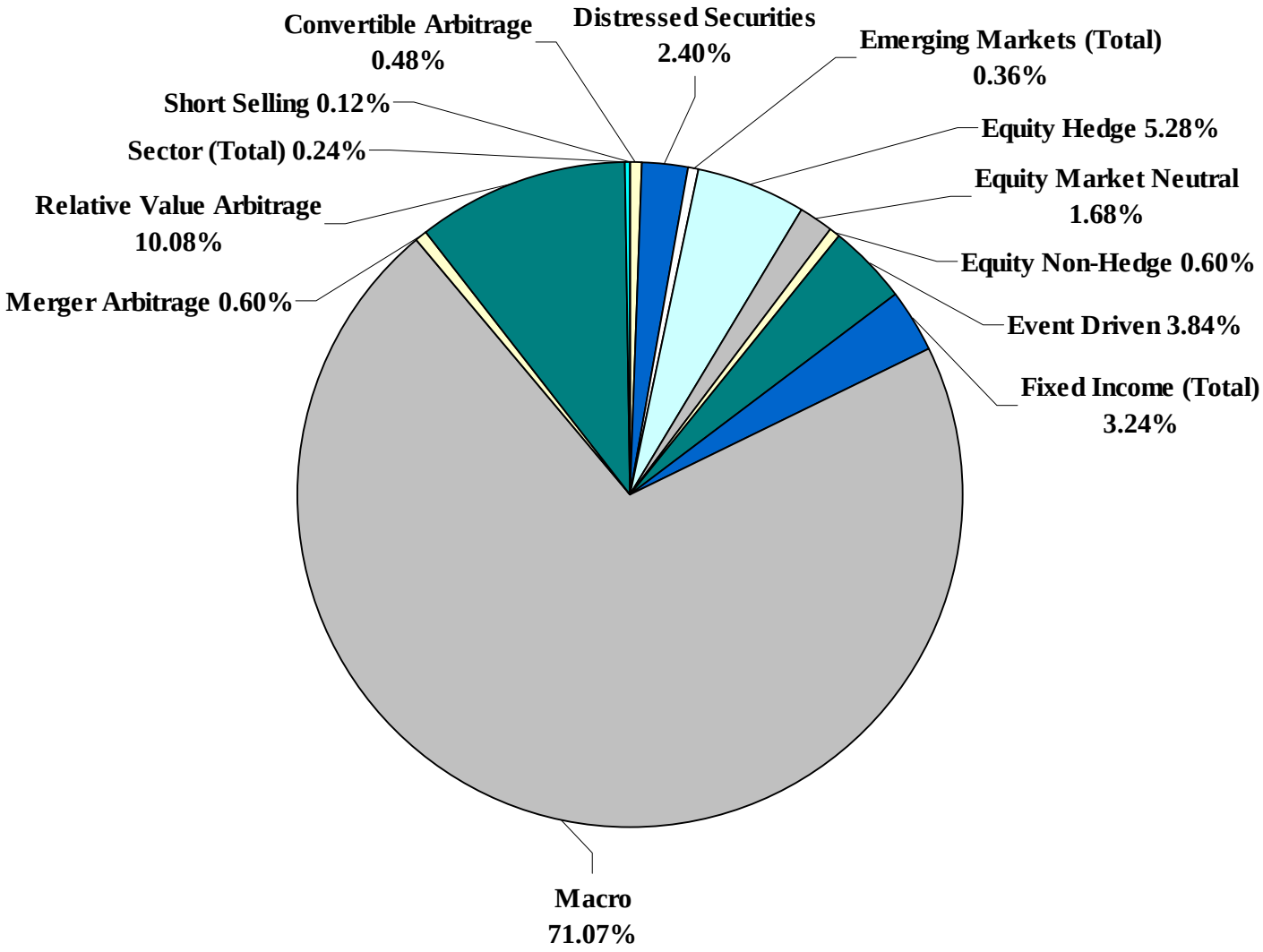
Estimated Strategy Composition by # of Hedge Funds and Fund of Funds Q4 2007



Estimated Strategy Composition by Assets Under Management
Q4 2007



Estimated Strategy Composition by AUM
1990



Source: HFR Industry Reports, © HFR, Inc. 2007, www.hedgefundresearch.com."

Distributional Properties of Returns: HFRI Index Analysis (through 2008)

	1-Year				3-Year				5-Year			
Index	**Mean**	**StD**	**Skew**	**Kurt**	**Mean**	**StD**	**Skew**	**Kurt**	**Mean**	**StD**	**Skew**	**Kurt**
HFRI Equity Hedge (Total)	(26.16)	12.87	(0.43)	(0.31)	(3.05)	10.24	(1.34)	2.01	1.65	8.83	(1.51)	3.18
HFRI EH: Energy/Basic Materials	(36.90)	24.08	(0.69)	(0.15)	(5.16)	17.24	(1.69)	3.54	7.27	15.52	(1.64)	4.52
HFRI EH: Equity Market Neutral	(6.20)	5.06	(0.28)	(0.63)	1.96	3.69	(1.39)	2.00	3.24	3.12	(1.64)	3.53
HFRI EH: Quantitative Directional	(21.62)	13.44	(0.52)	(0.55)	0.69	11.73	(0.84)	0.55	4.93	10.80	(0.80)	0.57
HFRI EH: Short Bias	28.62	13.65	0.29	(0.86)	9.45	10.40	1.04	0.57	6.23	9.50	0.94	0.67
HFRI EH: Technology/Healthcare	(16.72)	10.84	(0.07)	(1.03)	2.87	10.34	(0.46)	(0.19)	3.89	9.58	(0.41)	(0.30)
HFRI Event-Driven (Total)	(21.26)	9.73	(1.09)	0.93	(1.07)	8.22	(1.52)	3.09	3.62	7.22	(1.59)	4.31
HFRI ED: Distressed/Restructuring	(24.94)	9.77	(0.87)	(0.06)	(2.94)	8.23	(1.70)	3.01	3.31	7.10	(1.97)	5.33
HFRI ED: Merger Arbitrage	(4.62)	5.71	(0.26)	(0.65)	5.27	4.76	(0.74)	0.60	5.22	4.17	(0.75)	0.86
HFRI ED: Private Issue/Regulation D	(5.12)	3.80	(1.22)	1.58	2.62	5.31	0.15	0.58	5.20	5.48	0.33	0.06
HFRI Macro (Total)	5.18	6.26	0.29	0.65	8.12	5.39	0.06	(0.19)	7.15	4.94	(0.04)	0.15
HFRI Macro: Systematic Diversified	17.70	9.82	0.18	0.15	14.92	9.67	0.16	(0.16)	13.06	8.54	0.14	0.07
HFRI Relative Value (Total)	(16.77)	9.64	(1.47)	1.76	0.63	6.98	(2.57)	7.81	2.67	5.59	(3.17)	13.10
HFRI RV: Fixed Income-Asset Backed	(0.08)	3.44	(0.62)	(1.17)	3.17	2.70	(1.25)	0.27	5.79	2.36	(1.66)	2.36
HFRI RV: Fixed Income-Convertible Arbitrage	(34.67)	18.97	(1.84)	2.76	(8.27)	12.78	(3.34)	12.04	(5.18)	10.13	(4.13)	19.82
HFRI RV: Fixed Income-Corporate	(21.73)	11.19	(1.39)	3.09	(4.88)	8.22	(2.30)	7.10	0.02	6.71	(2.99)	12.28
HFRI RV: Multi-Strategy	(19.93)	10.36	(1.49)	1.81	(3.87)	7.18	(2.78)	8.79	0.31	5.78	(3.64)	15.68
HFRI RV: Yield Alternatives	(22.22)	11.72	(0.62)	(0.93)	(3.94)	8.44	(1.78)	3.05	2.04	8.23	(1.66)	3.05
HFRI Fund Weighted Composite	(18.36)	9.60	(0.50)	(0.28)	0.45	7.91	(1.23)	1.72	3.85	6.80	(1.41)	2.84
HFRI Fund of Funds Composite	(20.68)	9.16	(0.44)	(0.27)	(1.16)	7.85	(1.19)	1.42	2.09	6.61	(1.46)	2.93
HFRI Emerging Markets (Total)	(36.80)	17.29	(0.62)	0.34	(0.64)	15.03	(1.36)	2.06	7.05	12.84	(1.62)	3.53
HFRI Emerging Markets: Asia ex-Japan	(33.60)	16.38	0.04	(1.04)	4.36	15.72	(0.79)	(0.23)	7.41	13.27	(0.86)	0.51
HFRI Emerging Markets: Global	(30.51)	14.81	(0.94)	1.15	(0.39)	12.56	(1.49)	3.03	5.32	10.57	(1.79)	4.95
HFRI Emerging Markets: Latin America	(28.26)	19.73	(0.90)	0.61	(0.89)	14.38	(1.76)	4.08	4.63	12.12	(2.01)	6.04
HFRI Emerging Markets: Russia/Eastern Europe	(57.75)	28.23	(0.44)	(0.03)	(9.90)	23.73	(1.39)	2.28	8.07	21.31	(1.51)	3.25
Lehman Brothers Government/Credit Aggregate Bond	6.09	8.37	0.67	0.08	5.96	5.33	0.75	2.35	4.98	4.97	0.30	2.17
S&P 500 w/ dividends	(36.99)	21.01	(0.79)	0.49	(8.36)	15.28	(1.80)	4.12	(2.19)	12.85	(2.03)	6.28

*In probability theory and statistics, **skewness** is a measure of the asymmetry of the probability distribution of a real-valued random variable*

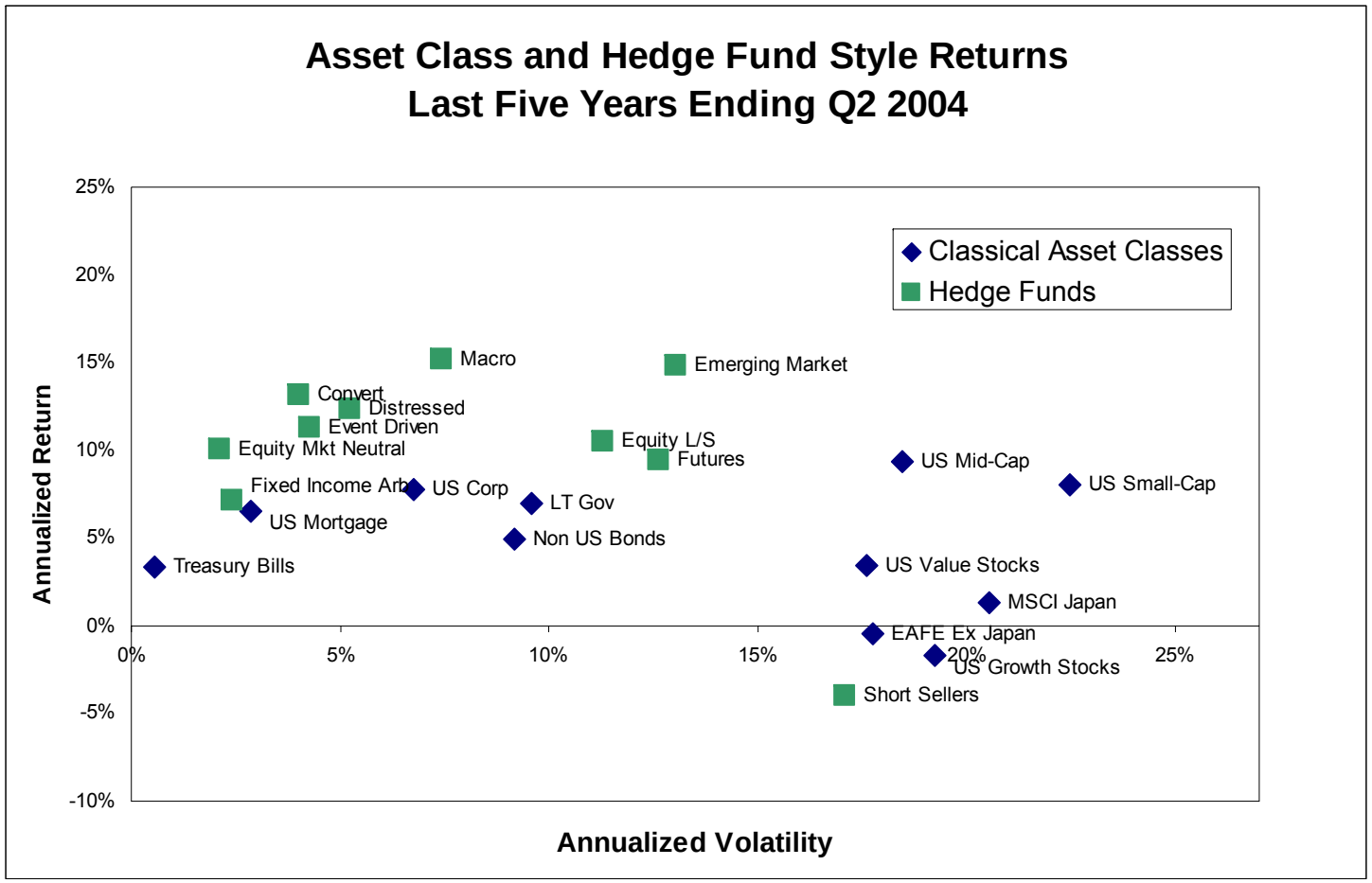
***Positive skew**: The right tail is the longest; the mass of the distribution is concentrated on the left of the figure. The distribution is said to be right-skewed.*
***Negative skew**: The left tail is the longest; the mass of the distribution is concentrated on the right of the figure. The distribution is said to be left-skewed.*

*In probability theory and statistics, **kurtosis** is a measure of the "peakedness" of the probability distribution of a real-valued random variable. Higher kurtosis means more of the variance is due to infrequent extreme deviations, as opposed to frequent modestly-sized deviations.*

A high kurtosis distribution has a sharper "peak" and fatter "tails", while a low kurtosis distribution has a more rounded peak with wider "shoulders".

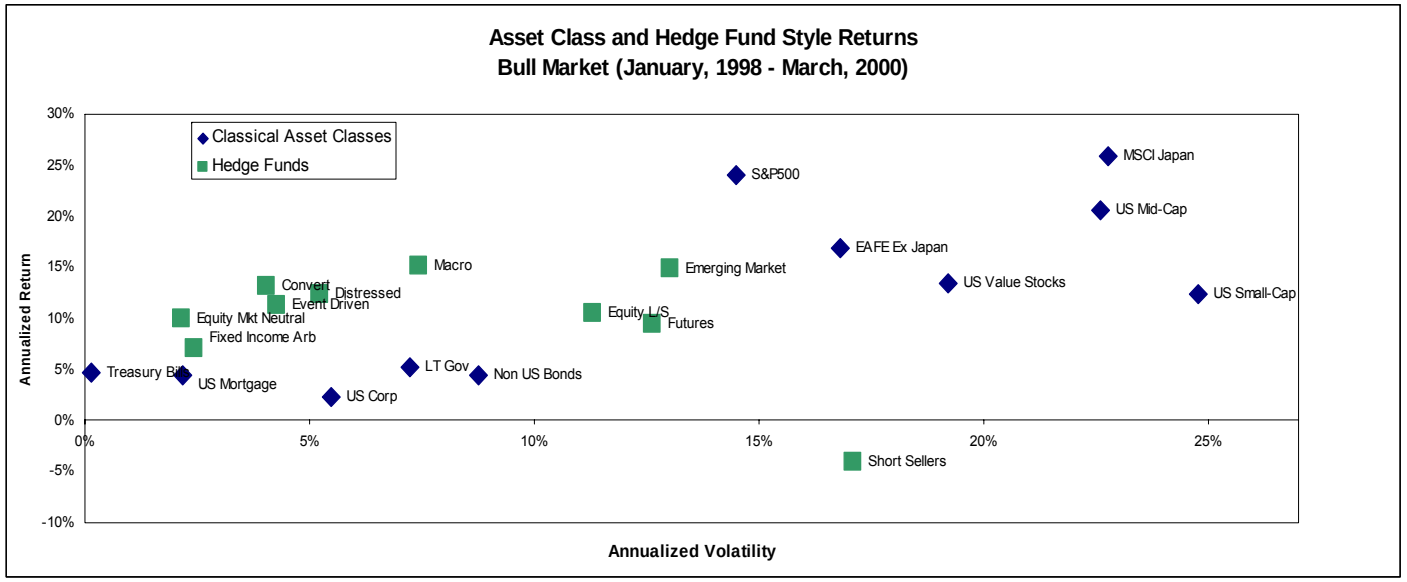
Asset Allocation
Do Hedge Funds Systematically Add Value?

Performance of a number of standard classes has broadly waned in the last several years.

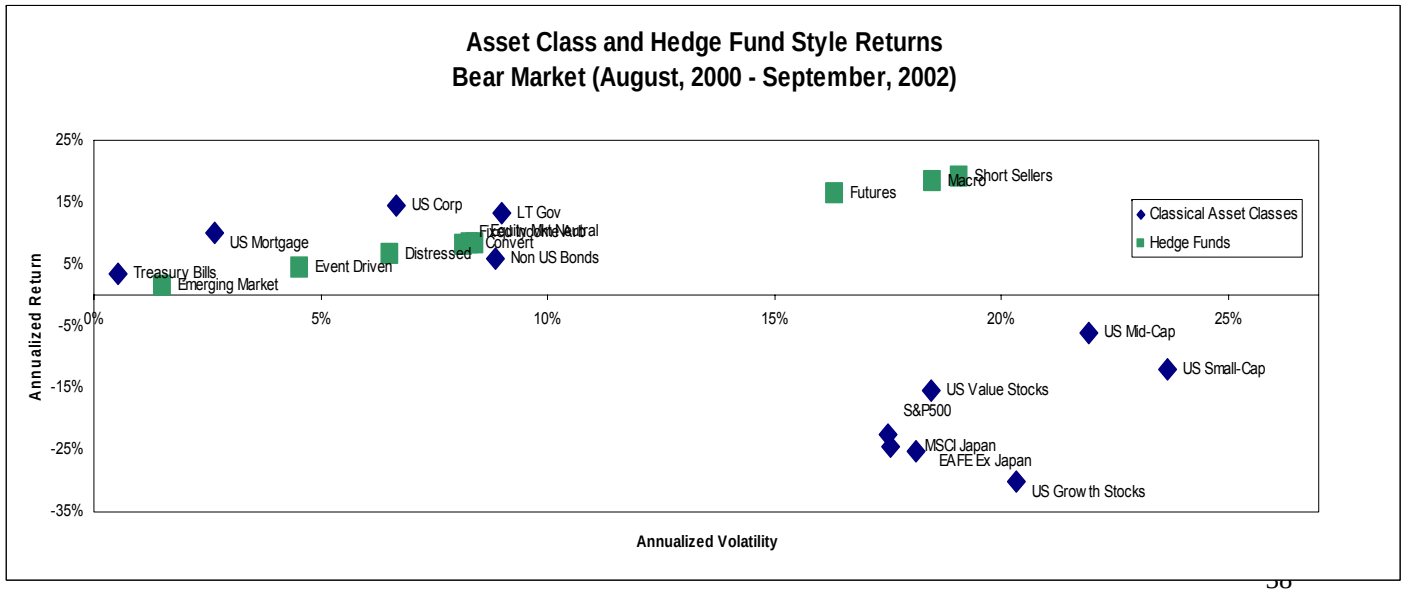


Asset Allocation
Do Hedge Funds Systematically Add Value?

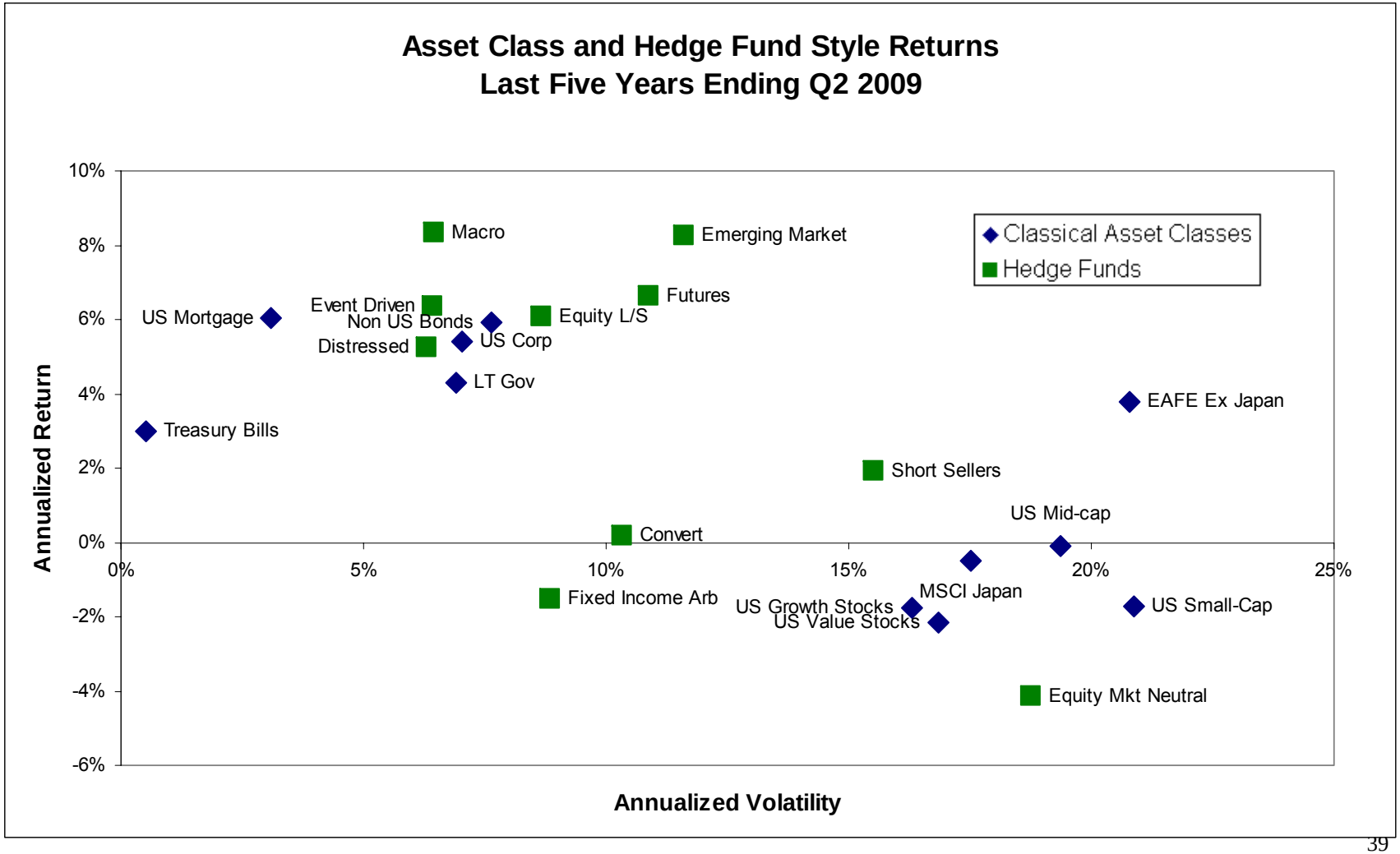
A rising tide (bull markets) raises all boats.



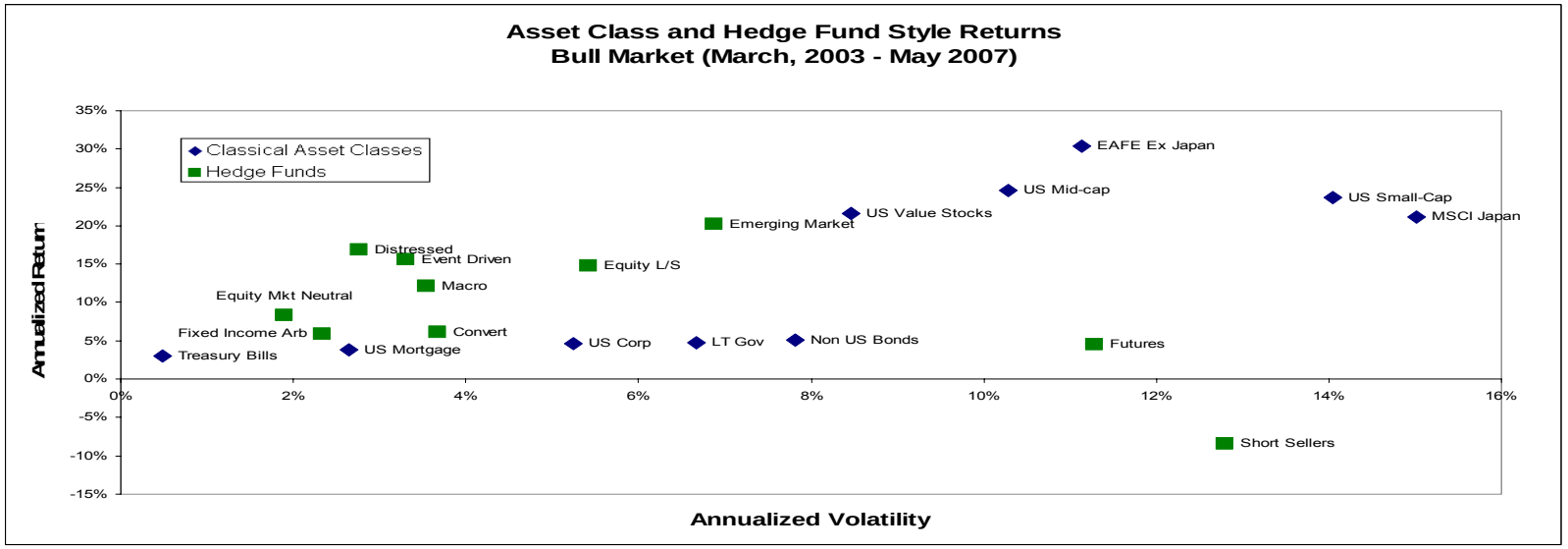
However, few traditional asset classes provide protection against bear markets.

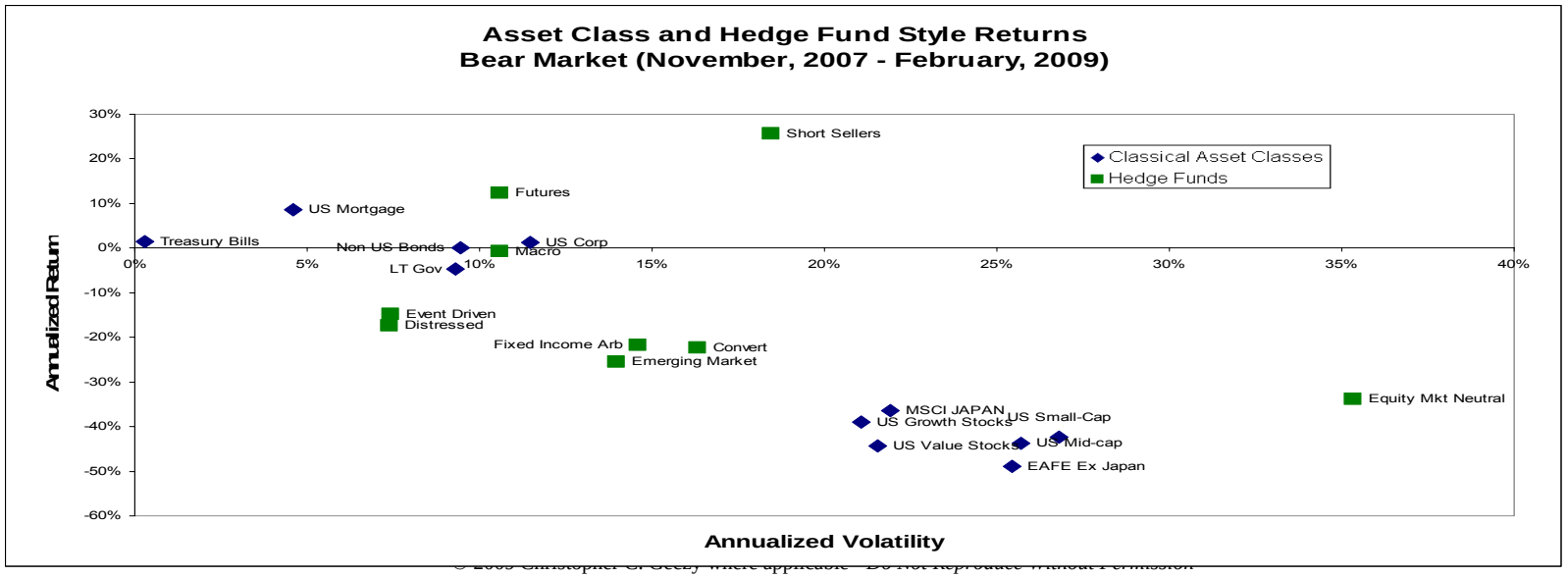


Asset Allocation
Do Hedge Funds Systematically Add Value?

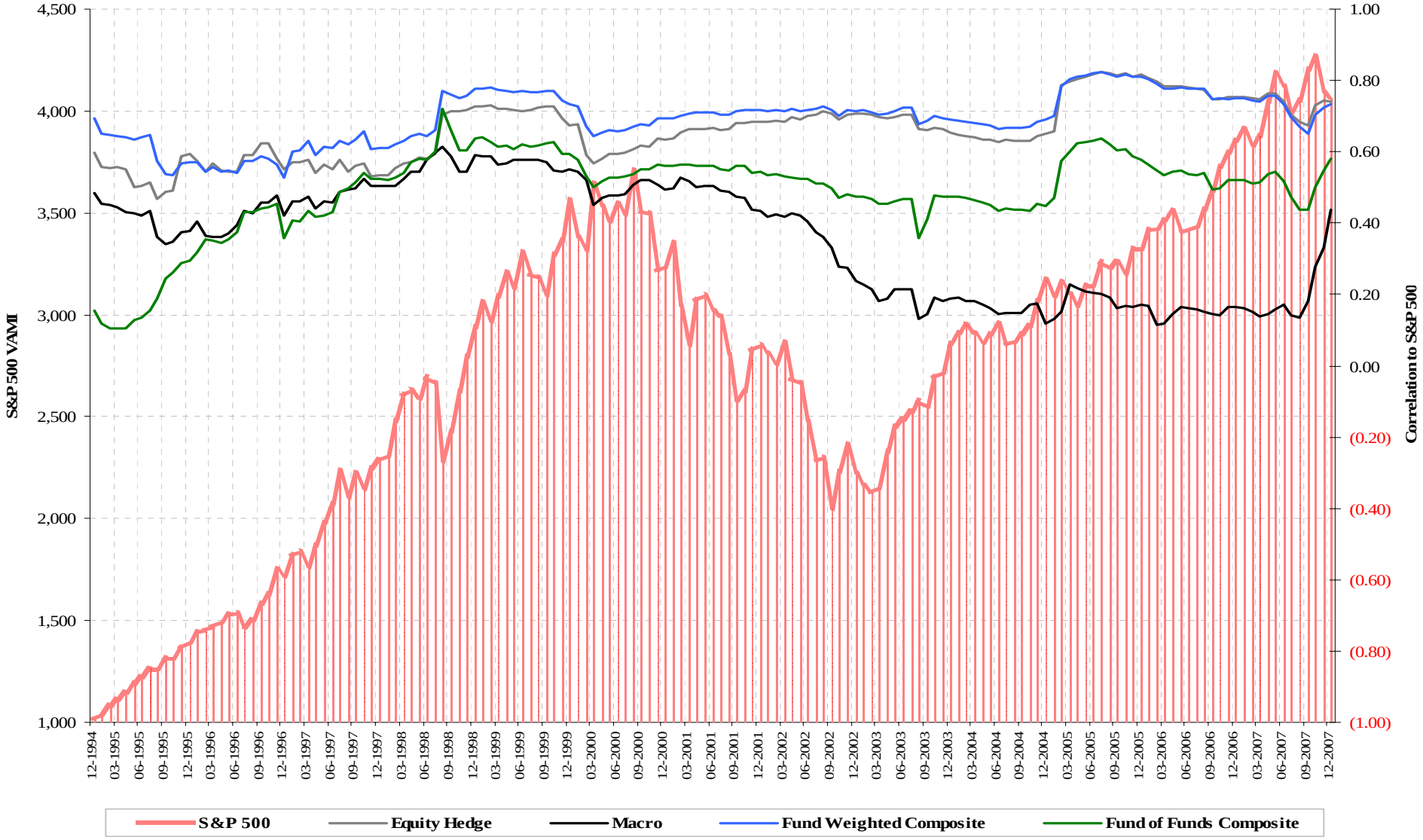


Asset Allocation
Do Hedge Funds Systematically Add Value?





Historical Monthly Correlation to S&P 500 Index
5 Year Rolling



Hedge Fund Replication

*Amazing Fact: Hedge Funds **Can** Be Characterized*

- Regression of monthly HFR FOF index returns on multiple factors:

	1994-1999		2001-2002	
	Coeff	t-stat	Coeff	t-stat
Constant (alpha)	**0.0032**	1.87	**0.0024**	2.02
S&P 500	**0.31**	7.49	**0.15**	4.59
Small-Large Cap	**0.23**	4.24	**0.13**	4.18
10Y Bond	**-1.91**	-2.27	**-1.62**	-2.52
Baa-10Y	**-8.72**	-4.92	**-1.31**	-1.47
Bond Option	-0.0049	-0.50	-0.0030	-0.56
FX Option	0.0026	0.36	0.0072	1.16
Commod Option	0.0203	1.81	**0.0232**	2.01
R^2		**67%**		**77%**

Bold indicates statistical significance at standard levels

Fung and Hsieh, 2003

Potential Exposures

TABLE 1 Potential Exposures of Alternative Asset Classes

	EQUITY MARKET	EQUITY MARKET VOLATILITY	CREDIT SPREADS	INCREASES IN LIQUIDITY	TERM STRUCTURE	VALUE-GROWTH SPREAD	SMALL CAP-LARGE CAP SPREAD
Convertible Arbitrage	0	+	+ or –	+	–	0	+
Event Driven	+	–	–	+	–	–	+
Long/Short Equity	+	0 to +	–	+	–	–	+
Equity Market Neutral	0	0 to –	0	0	0 to –	0 to +	0 to –
Risk Arbitrage	+	–	–	+	–	0 to +	+
Fixed Income Arbitrage	0	–	–	+	–	–	+
Managed Futures	+ and –	+	+	0 to –	0	+	0
Short Sellers	–	0 to –	+	–	–	+	–
Emerging Markets	+	+	+ or –	+	+	0	+
Global Macro	0 to +	+ or –	+ or –	+	0	–	0
Private Equity	+	+	–	+	–	–	–
Venture Capital	+	+	–	+	–	–	+
Real Assets	0 to –	+ or –	+ or –	+ or –	–	0	0
Commodity Futures	–	+	0	0 to –	0	0	0

Source: Geczy (2006)

*Hedge Fund Styles: Some Style and Risk Models**

Benchmark and Style Regressions for monthly CSFB/Tremont hedge fund index returns, (**January 1994 – August 2004**)

Regressor	Hedge Funds	Convert Arb	Dedicated Shortseller	Emerging Markets	Equity Market Neutral	Event Driven	Distressed	Event-driven Multi-strategy	Risk Arb	Fixed Income Arb	Global Macro	Long Short Equity	Managed Futures	Multi-Strategy	Factor Selection Count
Sample Size:	118	118	118	118	118	118	118	118	118	118	118	118	118	117	
R2:	54.5%	45.1%	79.7%	44.1%	25.5%	75.1%	65.0%	66.4%	58.0%	54.3%	34.3%	73.2%	21.4%	16.3%	
Constant	0.30	0.08	1.9	-0.58	0.98	0.29	0.94	0.75	1.14	0.06	0.31	1.09	0.19	0.58	14
	(1.22)	(0.22)	(4.25)	(-0.81)	(7.00)	(0.84)	(4.65)	(4.93)	(7.34)	(0.20)	(0.78)	(3.35)	(0.59)	(3.97)	
SP500	0.23		-0.63	0.44			0.13					0.28			5
	(5.81)		(-7.11)	(3.29)			(3.17)					(4.29)			
SP500(Lag 1)						0.06	0.06			-0.05					3
						(2.39)	(1.82)			(-1.80)					
SP500^2					0.07		-0.10			-0.06					3
					(2.49)		(-2.03)			(-2.08)					
SP500^2(Lag 1)	-0.12		-0.14	-0.30		-0.12	-0.09	-0.10	-0.06		-0.16	-0.09		0.09	10
	(-2.12)		(-1.60)	(-2.44)		(-3.70)	(-2.09)	(-2.68)	(-1.89)		(-1.76)	(-1.74)		(2.07)	
SP500^3		0.21	-0.24	0.44	0.07	0.26	0.21	0.32	0.15			0.15	-0.26		10
		(5.92)	(-2.49)	(2.82)	(2.80)	(8.22)	(3.63)	(12.00)	(5.57)			(2.10)	(-3.15)		
SP500^3(Lag 1)		0.15	-0.15					0.08	0.05	0.19			-0.17	0.08	7
		(5.21)	(-2.27)					(2.31)	(2.32)	(5.82)			(-2.09)	(2.36)	
SP500^3(Lag 2)	0.09	0.13								0.12	0.15			0.14	5
	(1.74)	(4.34)								(4.79)	(1.75)			(4.39)	
Banks					0.06	0.10			0.07	0.1	0.24				5
					(2.47)	(2.94)			(2.85)	(3.76)	(3.43)				
Banks(Lag 1)	0.08					0.07	0.08	0.07		-0.06					5
	(1.85)					(2.16)	(1.80)	(2.19)		(-2.14)					
Banks(Lag 2)	0.09					0.05	0.07			0.05	0.18	0.10			6
	(1.71)					(1.98)	(2.05)			(1.78)	(2.04)	(2.33)			
USD	0.42	0.13		0.65		0.15	0.11	0.21		0.11	0.68			-0.15	9
	(4.86)	(2.21)		(3.74)		(3.00)	(2.06)	(3.95)		(2.97)	(4.85)			(-2.78)	
Gold	0.08			0.17		0.05	0.08							-0.05	5
	(1.62)			(1.50)		(2.14)	(2.33)							(-1.39)	
Lehman Bond	0.59	0.18				0.13		0.22		0.24	0.98	0.38	0.79		8
	(3.77)	(1.56)				(1.32)		(2.16)		(3.17)	(3.69)	(2.82)	(3.08)		
Large Minus Smal	-0.19	-0.07	0.34	-0.40		-0.10	-0.11	-0.17	-0.13			-0.36			9
	(-4.30)	(-2.98)	(5.55)	(-4.35)		(-3.98)	(-3.89)	(-6.69)	(-6.24)			(-8.38)			
Value Minus Grow	-0.08		0.23			-0.04				-0.03	-0.08	-0.21	0.08	-0.05	8
	(-2.09)		(4.59)			(-2.29)				(-2.10)	(-1.71)	(-5.76)	(1.47)	(-2.35)	
LIBOR		-1.09	2.26				-2.02								3
		(-1.93)	(2.16)				(-3.55)								
Credit Spread		0.20				0.14				0.09					3
		(2.26)				(1.68)				(1.42)					
Term Spread		-0.20	-0.65	0.89	-0.24	-0.20			-0.31			-0.38			7
		(-1.99)	(-3.26)	(2.66)	(-3.86)	(-2.14)			(-4.51)			(-2.69)			
VIX		0.08		0.22						0.07		0.12			4
		(2.37)		(1.69)						(2.80)		(2.11)			
Number of Factors Selected:	10	10	8	8	4	13	11	7	6	12	7	9	4	6	

Risk models for monthly CSFB/Tremont hedge-fund index returns, from January 1994 to August 2004.

*Chan, et al (2005)

*Hedge Fund Styles: Some Style and Risk Models: Updates**

Benchmark and Style Regressions for monthly CSFB/Tremont hedge fund index returns, (**January 1994 – August 2009**)

Regressor	Hedge Funds	Convert Arb	Dedicated Shortseller	Event Driven	Distressed	Emerging Markets	CST HF Market Neutral	HFRX Equity Market Neutral	CST Blue Chip Market Neutral	Event Driven Multi-strategy	Risk Arb	Fixed Income Arb	Global Macro	Long Short Equity	Managed Futures	Multi-Strategy	Factor Selection Count
Sample Size:	128	128	128	128	128	128	128	80	56	128	128	128	128	128	128	125	
Annualized Return:	10.7%	9.9%	-2.2%	11.2%	13.2%	6.9%	10.4%	3.7%	6.5%	10.1%	8.0%	6.8%	14.0%	11.5%	5.9%	9.2%	
Annualized Volatility:	7.9%	7.3%	17.0%	6.1%	6.7%	15.7%	10.9%	3.9%	13.5%	6.5%	4.2%	6.1%	10.4%	10.1%	11.7%	5.5%	
Intercept	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	16
	0.44	-1.13	-0.14	2.70	2.90	1.54	0.75	-0.41	1.04	1.77	-1.20	2.18	0.63	-0.28	0.54	0.62	
S&P 500		-0.11	-0.65					-0.12						0.15			4
		-2.30	-5.86					-2.22						2.09			
S&P 500 (lag 1)																	0
S&P 500^2		1.29															1
		2.90															
S&P 500^2 (lag 1)			-1.97	-0.74				0.96									3
			-2.15	-1.95				1.99									
S&P 500^3		25.29		22.54	19.15					26.71	11.40						5
		4.80		4.62	2.96					4.71	2.50						
S&P 500^3 (lag 1)		13.24										13.87					2
		2.54										3.40					
S&P 500^3 (lag 2)	16.11	13.42										16.55	30.55			13.54	5
	3.56	4.71										7.41	3.80			4.10	
Banks	0.15			0.07		0.38				0.09	0.09		0.24	0.19			7
	2.48			1.96		2.63				2.24	2.75		2.21	3.51			
Banks(Lag 1)								0.08									1
								1.95									
USD							1.54		2.25		2.53						3
							2.65		3.07		3.81						
Gold																	0
Barclay's Aggregate		1.15		0.78	1.03							0.96					4
		3.02		2.19	2.19							3.22					
Small Minus Large	0.14	0.09	-0.46	0.14	0.13	0.38				0.15	0.13			0.27			9
	2.61	2.78	-6.08	4.37	3.20	2.99				4.13	4.61			5.78			
Value Minus Growth	-0.18		0.23			-0.23								-0.37			4
	-4.18		3.71			-2.18								-9.40			
Term Spread		-0.59										-0.48			1.63		3
		-2.38										-2.49			2.13		
VIX																	0
Number of Factors Selected	5	9	5	6	4	4	2	4	2	4	5	5	3	5	2	2	

*Geczy (2009)

*Hedge Fund Styles: Some Style and Risk Models: Updates**

Benchmark and Style Regressions for monthly CSFB/Tremont hedge fund index returns, (**January 2004 – August 2009**)

	Hedge Funds	Convertible Arbitrage	Dedicated Short Bias	Emerging Markets	Eq-Mkt-Neutral - CS	Eq-Mkt-Neutral HFRX	Eq-Mkt-Neutral - CS Blue Chip	Event Driven	Distressed	Event Driven Multi-Strategy	Risk Arbitrage	Fixed Income Arbitrage	Global Macro	Long Short Equity	Managed Futures	Muti-Strategy	# Factors
R2:	88.5%	83.5%	73.1%	85.6%	95.3%	30.3%	89.0%	87.6%	89.6%	83.5%	65.3%	82.1%	70.2%	89.5%	61.4%	89.2%	
Adjusted R2:	83.1%	75.7%	60.3%	78.7%	93.0%	2.8%	83.8%	81.7%	84.6%	75.6%	48.8%	73.5%	56.1%	84.5%	43.1%	84.1%	
Intercept	-0.01	-0.02	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	-0.01	1
	-1.39	-2.12	-0.92	-1.61	0.54	0.59	0.22	-0.56	0.38	-0.95	-0.17	-0.39	-1.16	-1.20	0.42	-1.80	
S&P 500	0.48	0.08	-0.29	0.54	0.17	-0.15	0.43	0.62	0.41	0.79	0.23	0.01	0.32	0.66	0.46	0.37	7
	3.97	0.36	-0.69	2.37	0.82	-1.01	1.35	5.27	3.84	5.34	1.94	0.04	1.78	4.57	1.32	2.98	
S&P 500 (lag 1)	0.13	0.14	-0.09	0.05	-0.14	0.02	-0.05	0.13	0.08	0.17	0.11	0.09	0.11	0.14	0.43	0.19	1
	1.66	0.94	-0.34	0.32	-1.02	0.18	-0.24	1.64	1.13	1.76	1.44	0.68	0.93	1.44	1.86	2.31	
S&P 500^2	0.44	0.68	0.38	1.24	-0.12	0.97	-0.79	-0.08	0.02	-0.14	-0.19	0.30	1.43	0.15	1.51	0.62	0
	0.61	0.50	0.15	0.91	-0.09	1.11	-0.42	-0.12	0.04	-0.16	-0.26	0.25	1.32	0.17	0.73	0.85	
S&P 500^2 (lag 1)	1.38	1.72	3.79	2.71	0.13	-1.39	-2.38	1.67	0.81	2.25	1.04	0.97	0.23	1.98	-2.21	1.21	5
	2.00	1.34	1.61	2.09	0.11	-1.67	-1.33	2.48	1.33	2.67	1.53	0.86	0.22	2.40	-1.13	1.72	
S&P 500^3	-7.92	2.47	16.07	8.14	-20.94	5.24	44.23	-10.64	-6.93	-13.58	-9.19	12.87	5.69	-14.50	-29.78	-7.64	1
	-1.19	0.20	0.71	0.65	-1.81	0.65	2.54	-1.64	-1.18	-1.66	-1.40	1.18	0.57	-1.82	-1.57	-1.12	
S&P 500^3 (lag 1)	12.27	-6.17	41.14	19.43	85.71	-10.22	-17.39	11.19	8.87	12.95	5.61	9.67	5.10	7.74	-17.71	5.58	5
	2.32	-0.62	2.28	1.94	9.31	-1.60	-1.26	2.17	1.90	2.00	1.08	1.12	0.64	1.22	-1.17	1.03	
S&P 500^3 (lag 2)	4.30	13.83	-4.54	3.90	6.16	0.36	0.32	4.01	5.28	3.16	4.22	8.41	5.18	2.49	-2.77	7.54	3
	1.44	2.47	-0.45	0.69	1.19	0.10	0.04	1.38	2.01	0.86	1.44	1.72	1.16	0.70	-0.33	2.48	
Banks	-0.20	-0.14	-0.60	-0.16	0.03	0.08	-0.11	-0.29	-0.18	-0.37	-0.08	0.01	-0.30	-0.18	-0.16	-0.21	7
	-2.63	-0.99	-2.32	-1.09	0.25	0.89	-0.55	-3.90	-2.76	-4.04	-1.11	0.07	-2.62	-1.97	-0.74	-2.74	
Banks(Lag 1)	-0.04	-0.03	-0.08	-0.03	-0.07	0.03	0.29	-0.03	0.00	-0.06	-0.08	-0.09	-0.03	-0.03	0.00	-0.06	1
	-0.92	-0.33	-0.50	-0.36	-0.81	0.51	2.34	-0.66	0.03	-1.01	-1.74	-1.13	-0.46	-0.48	0.03	-1.36	
Banks(Lag 2)	-0.01	-0.01	0.18	0.01	-0.05	-0.04	-0.01	0.00	0.02	0.00	-0.01	-0.02	-0.01	-0.01	0.04	0.00	1
	-0.21	-0.18	2.01	0.10	-1.04	-1.20	-0.21	0.15	0.70	-0.06	-0.25	-0.44	-0.25	-0.40	0.48	0.12	
USD	6.27	8.10	3.38	12.44	-0.84	0.66	-9.40	8.40	7.75	9.09	1.75	6.96	0.84	7.95	-10.36	8.16	7
	2.75	1.89	0.43	2.89	-0.21	0.24	-1.58	3.77	3.85	3.25	0.78	1.87	0.25	2.91	-1.59	3.51	
Gold	0.14	0.05	-0.12	0.24	0.02	0.03	0.07	0.09	0.06	0.11	0.06	0.07	0.20	0.17	0.33	0.09	10
	5.74	1.16	-1.45	5.43	0.61	1.09	1.06	3.70	2.80	3.62	2.75	1.88	5.52	5.93	4.88	3.65	
Barclay's Aggregate	-0.25	1.71	-2.42	1.37	-3.06	-0.54	-5.21	0.04	-0.18	0.13	-0.23	1.21	-0.57	-0.07	-4.93	-0.02	3
	-0.48	1.77	-1.37	1.41	-3.42	-0.86	-3.87	0.09	-0.40	0.21	-0.46	1.43	-0.74	-0.11	-3.35	-0.04	
Small Minus Large	-0.01	-0.03	-0.76	0.07	-0.13	0.09	-0.25	0.01	-0.02	0.03	-0.03	-0.11	-0.10	0.03	0.05	-0.05	1
	-0.20	-0.24	-3.57	0.63	-1.20	1.18	-1.55	0.12	-0.34	0.40	-0.53	-1.06	-1.06	0.39	0.27	-0.73	
Value Minus Growth	-0.03	-0.04	0.53	-0.12	-0.06	-0.05	0.16	0.04	0.05	0.04	-0.03	-0.06	0.11	-0.13	-0.01	0.00	1
	-0.53	-0.30	2.41	-1.00	-0.56	-0.67	0.95	0.59	0.93	0.50	-0.47	-0.53	1.13	-1.65	-0.04	0.07	
LIBOR	-3.38	-3.44	0.67	-6.26	0.33	-1.57	6.74	-5.61	-5.74	-5.69	-0.85	-5.39	2.49	-4.93	7.39	-4.82	5
	-1.68	-0.91	0.10	-1.64	0.10	-0.65	1.28	-2.85	-3.23	-2.31	-0.43	-1.63	0.82	-2.04	1.29	-2.35	
Credit Spread	-0.19	-0.62	-0.38	0.14	-0.79	0.01	-0.92	-0.04	-0.11	0.00	-0.24	-0.18	-0.17	-0.14	-0.49	-0.38	4
	-1.31	-2.28	-0.77	0.51	-3.15	0.04	-2.44	-0.31	-0.87	0.02	-1.67	-0.76	-0.81	-0.84	-1.20	-2.59	
Term Spread	0.22	-0.62	1.67	-0.74	2.12	0.20	3.29	0.00	0.16	-0.08	0.39	-0.58	0.49	0.09	2.82	0.15	3
	0.64	-0.95	1.41	-1.13	3.51	0.49	3.63	0.01	0.51	-0.18	1.15	-1.03	0.95	0.22	2.85	0.42	
VIX	-0.02	-0.02	-0.06	-0.02	0.02	-0.01	0.05	-0.01	-0.01	-0.01	-0.01	-0.01	-0.04	-0.02	-0.06	-0.02	2
	-1.62	-0.95	-1.76	-1.02	1.08	-0.90	1.96	-0.89	-1.57	-0.52	-0.72	-0.50	-2.46	-1.32	-2.28	-1.60	
Number of Factors Selected																	

*Geczy (2009)

Hedge Fund Replication

Hedge Fund Replication

- Attempt to replication hedge fund returns or return distributions
  - Target funds of funds, hedge fund aggregate return indexes, or sub-indexes
- Three generally approaches
  - Factor-based
    - Typically based on style or factor analysis related techniques
      - » Can be shockingly simple (5-factor style analysis) or more sophisticated (Kalman filtering or high-dimensioned variable selection)
  - Distribution-based
    - Attempt to mimic the unconditional or even conditional distributions of hedge fund returns subject to desired constraints
  - Passive strategy-based
    - Trade underlying strategies passively or track hedge fund holdings (obviously may not be exclusive with above)
    - Position-based tracking (e.g., AlphaClone; www.alphaclone.com)

Hedge Fund Replication

- Pros:
  - **Diversification**: Hedge fund replicator returns may correlate with risks or benchmarks not represented in an investor portfolio at a desired level, thereby providing systematic diversification benefits.
  - **Return Profile and Customization:** Replicators may be engineered to try to attain customized return distribution characteristics (e.g., non-negative skewness while having low correlation with U.S. market returns).
  - **Liquidity**: Since replicators may trade liquid underlying securities or contracts, investors might be able to get in or out of the product faster and with fewer restrictions than hedge funds.
  - **Cost and Lower Minimums**: Current replicator products seem to charge annual fees of 100 basis points or less with lower minimums
  - **Transparency**: Some replicators disclose the underlying securities traded, allowing investors to judge inherent liquidity, credit quality and other asset characteristics.
  - **Benchmarking Facilitated**: If replicators offer feasible, cheap passive beta, then they may represent useful benchmarks against which to judge managers who strive to produce alpha.
  - **Structured Vehicle**: Unlike some hedge fund or hedge fund strategies, some replicators' products may be offered via structures that offer capital protection, leverage and so on.
  - "**Equitization**": Hedge fund clones may provide short-term, liquid hedge fund exposure as investors go through the process of manager selection, providing an option to those who do not want to keep assets in cash or other forms while searching for managers.
  - **"Manager Risk" may be Mitigated**: (Including "headline risk") and require less need for manager selection and monitoring.
  - **Fewer Capacity Problems**: May arise
  - To date, actual, out of sample performance has proven interesting…

Hedge Fund Replication

- Cons:
  - "**Backward Looking**": Factor-based techniques in particular may necessarily be "backward looking" in that they use past data to estimate the desired mimicking weights, and may therefore lag hedge fund managers as they trade risk dynamically.
  - **May be Suboptimal, ex ante**: Even if tracking error is low, the target index may itself not represent an optimal weighting of underlying exposures or may not optimally diversify an investor
  - **Benchmarks Bias**: Some critics have suggested that all hedge fund indexes are by their very natures biased representatives of hedge funds due to selection, survivorship, reporting and other biases.
  - **May Miss Important Factors or have Unacceptable Tracking Error**: Hedge fund clones are only as good as the underlying trades or positions identified to replicate the desired return patterns, which may be incomplete.
  - **Other Techniques**: Some techniques require the tradability of the investor's portfolio, which itself may contain illiquid assets and therefore misestimate the exposures or correlations
  - **Tracking may Require Market or Common Beta Exposure**
  - **Complicated Underlying Distributions**: Whether and how hedge fund trackers address this common effect remains to be seen.

Hedge Fund Replication

Company	Index/Fund Name	Replication Method	Inception
AQR Capital Management	AQR Wholesale DELTA Fund		Sep-09
AlphaSimplex Group LLC	Natixis ASG Global Alternatives	Factor Analysis	9/30/2008
AlphaSimplex Group LLC	Natixis ASG Diversifying Strategies Fund		8/3/2009
Barclays Capital	Long Barclays Alternatives Replication	Factor Analysis	10/1/2007
Barclays Capital	Shortable Barclays Alternatives Replication	Factor Analysis	
Concept Fund Solutions	DB Alternative Return Fund	Factor Analysis	7/11/2007
Goldman Sachs	Absolute Return Tracker Index Fund	Factor Analysis	3/1/2007
IceCapital Fund Management	Alternative Beta Fund	Factor Analysis	3/19/2007
True Beta, LLC	TrueBetaD	Factor Analysis	Sep-09
Fulcrum Asset Management	Alternative Beta Fund	Rule based	10/17/2007
Fulcrum Asset Management	Fulcrum Alternative Beta Plus	Rule based	11/1/2007
IndexIQ	IQ Hedge Multi-Strategy Tracker ETF	Rule based	10/31/2007
IndexIQ	IQ Hedge Macro Tracker ETF	Rule based	6/9/2009
IndexIQ	IQ ALPHA Hedge Strategy Fund	Rule based	6/30/2008
IndexIQ	IQ Hedge Composite Beta Index	Rule based	Mar-07
IndexIQ	IQ Hedge Long/Short Beta Index	Rule based	Mar-07
IndexIQ	IQ Hedge Market Neutral Beta Index	Rule based	Mar-07
IndexIQ	IQ Hedge Fixed Income Arbitrage Beta Index	Rule based	Mar-07
IndexIQ	IQ Hedge Global Macro Beta Index	Rule based	Mar-07
IndexIQ	IQ Hedge Event-Driven Beta Index	Rule based	Mar-07
IndexIQ	IQ Hedge Emerging Markets Beta Index	Rule based	Mar-07
Rydex SGI	Multi-Hedge Strategies Fund	Rule based	9/19/2005
Aqila Capital	Alceda Statistical Value Market Neutral 7 Vol Fund	Distribution approach	2/5/2008
Desjardins Global Asset Manageme	Synthetic Alternative Investment Fund	Distribution approach	6/29/2007
Desjardins Global Asset Manageme	DGAM Alternative Investments Fund		7/1/2007
State Street Global Advisors Luxeml	Premia Strategy		
Stonebrook	Alternative Beta Fund		
ING	Alternative Beta Fund	Factor Analysis	
Merrill Lynch	Factor Index	Factor Analysis	4/3/2006
JP Morgan	Alternative Beta Index	Factor Analysis	2/12/2007
Morgan Stanley	altera Index	Factor analysis/Rule based	8/1/2007
SGAM Alternative Investment	Total Return Index (T-rex)		
Credit Suisse	Long/Short Equity Replication Index	Factor Analysis	3/3/2008
Credit Suisse	Inverse Long/Short Equity Replication Index	Factor Analysis	3/3/2008
Credit Suisse	Global Macro Replication Index		
Innocap Investment Management	Salto Index	Factor Analysis	7/3/2007
Innocap Investment Management	Verso Index	Factor Analysis	3/2/2007
Societe Generale	Alternative Beta Index	Factor Analysis	3/1/2007
Societe Generale	Alternative Beta Shortable Index	Factor Analysis	3/1/2007
Deutsche Bank	Absolute Return beta Index	Rule based	5/1/2007
SGAM Alternative Investment	Total Return Index		
Partners Group	Alternative beta strategies Index	Factor analysis/Rule based	10/6/2004

Hedge Fund Replication

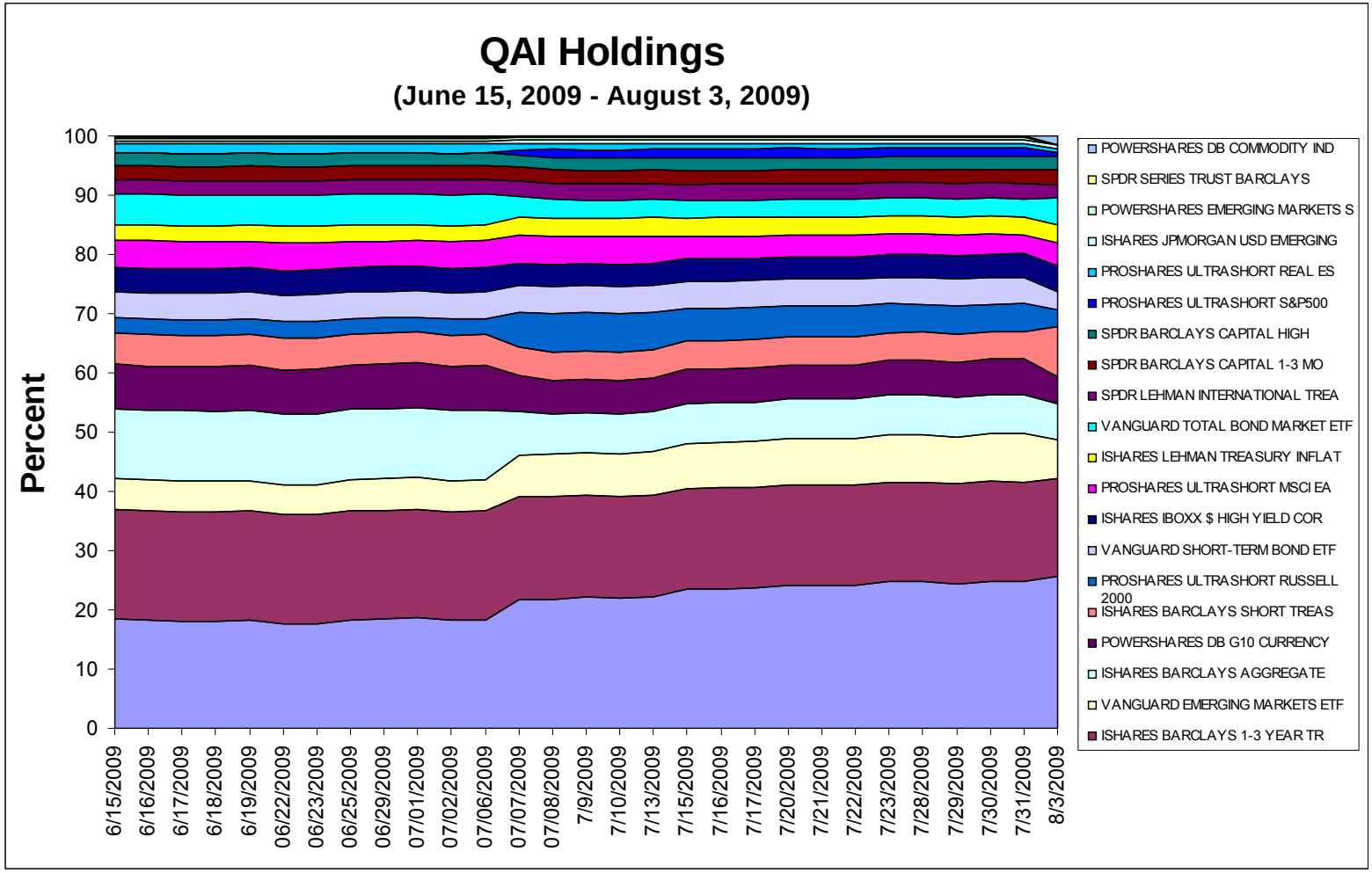
Hedge Fund Tracker Performance

Name	Inception	Obs	Mean	St Dev	Skewness	Kurtosis	Tracks
Natixis ASG Global Alternatives	Oct-08	12	0.65	1.60	-1.09	2.92	n/a
Natixis ASG Diversifying Strategies Fund	Aug-09	2	1.08	2.07			n/a
Goldman Sachs Absolute Return Tracker Index Fund	Jun-08	16	-0.46	2.55	-0.13	-0.01	GS Absolute Return Beta Index
IQ QAI	Apr-09	6	1.05	1.42	0.21	-2.40	IQ Hedge Multi-Strategy Index
IQ MCRO	Jun-09	4	1.30	2.18	-1.20	0.86	IQ Hedge Macro Index
IQ Alpha Hedge Strategy	Jun-09	4	1.89	2.65	-0.59	-2.65	IQ Alpha Hedge Strategy
Rydex SGI Multi-Hedge Strategies Fund	Oct-05	48	-0.15	2.56	-2.03	6.54	n/a
ING Alternative Beta	Dec-08	10	0.95	2.38	-0.03	-0.95	HFRI Fund Weighted Composite Index
ML Factor Model	Jan-03	78	0.51	1.83	-0.94	2.24	HFRI Fund Weighted Composite Index
SGAM T-Rex	Oct-08	8	0.28	2.38	-0.62	-1.97	Hedge Fund Research Index
CS Global Macro Replication Index	Jan-98	141	0.56	1.64	-0.72	1.63	CST Global Macro and Long/Short
CS Inverse Global Macro Replication Index	Jan-98	141	-0.31	1.64	0.81	2.04	CST Global Macro and Long/Short
CS Long/Short Equity Replication Index	Jan-98	141	0.73	3.22	0.24	2.82	CST Global Macro and Long/Short
CS Inverse Long/Short Equity Replication Index	Jan-98	141	-0.44	3.14	0.12	2.28	CST Global Macro and Long/Short

Hedge Fund Tracker Performance Sample

June 2008 - August 2009	Beta vs. CST HF Index	Alpha vs. CST HF (%)	Std Dev (%)	Skewness	Kurtosis	Mean (Annualized)
Goldman Sachs Absolute Return Tracker Index Fund	0.47	-2.16	9.12	-0.09	-0.21	-5.76%
Merrill Lynch Factor Model*	0.86	6.03	11.51	0.05	-0.63	-5.15%
Rydex SGI Multi-Hedge Strategies Fund	0.49	-11.5	12.62	-1.45	2.79	-14.96%
Credit Suisse Global Macro Replication Index	0.48	-1.47	7.21	-0.4	1.68	-5.17%
Credit Suisse Inverse Global Macro Replication Index	-0.52	-0.74	7.71	0.51	1.52	3.45%
Credit Suisse Long/Short Equity Replication Index	0.88	1.92	11.09	-0.9	0.70	-5.02%
Credit Suisse Inverse Long/Short Equity Replication Index	-0.87	-5.59	11.01	0.81	0.41	1.22%

Hedge Fund Replication



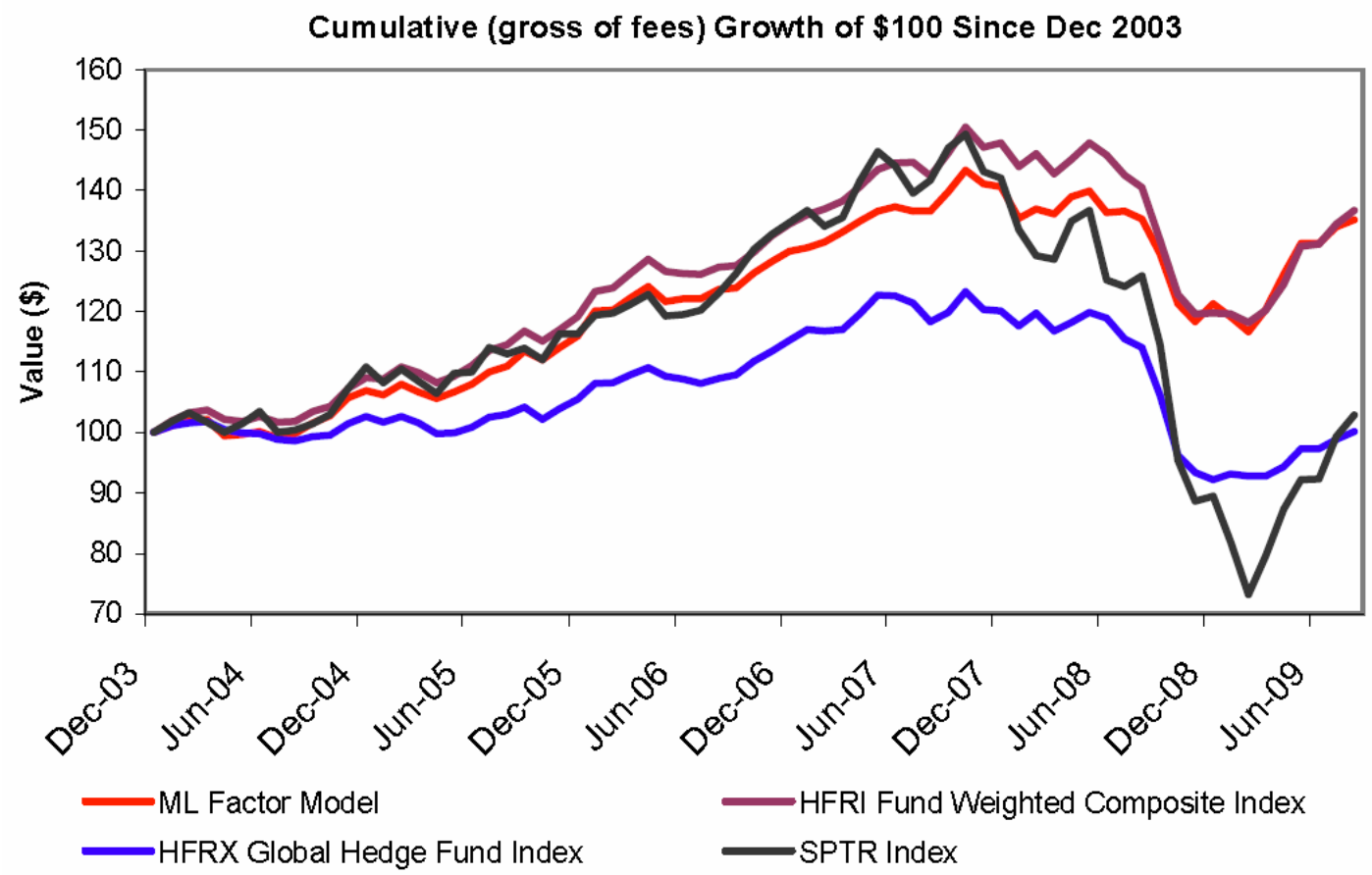
Hedge Fund Replication

Another Example: The Merrill Lynch Factor Model

ML Factor Model Component	August 2009 Weight	September 2009 Weight
S&P 500	**-11.20%**	**-8.00%**
Russell 2000	**-1.80%**	**-4.20%**
MSCI EAFE	**15.30%**	**11.30%**
MSCI Emerging Markets	**24.00%**	**26.70%**
US Dollar Index	**17.80%**	**16.90%**
BBA Libor USD 1 Month	**73.70%**	**74.20%**

Hedge Fund Replication

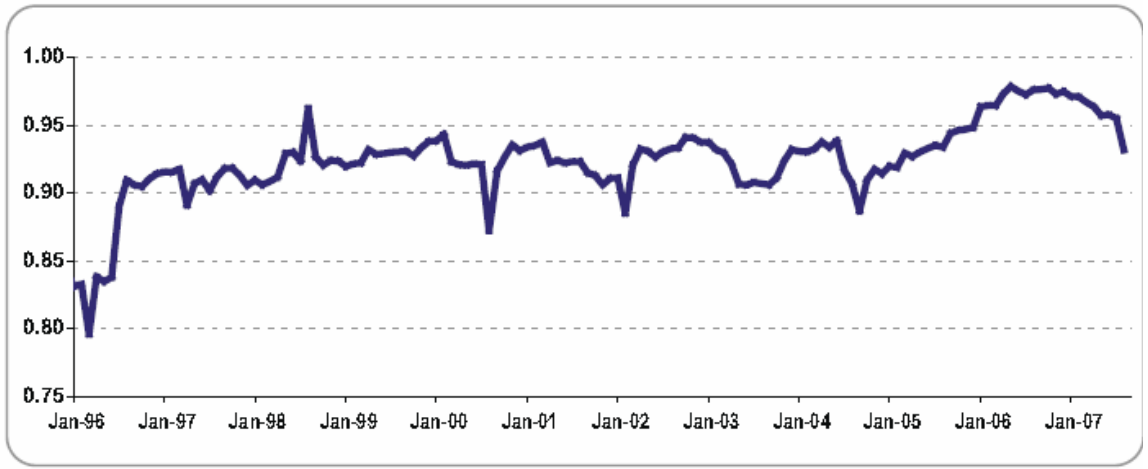
Another Example: The Merrill Lynch Factor Model



Hedge Fund Replication

Another Example: The Merrill Lynch Factor Model

Correlation between the Model and the HFRI Composite Index[2]



The above chart shows the correlation of the monthly returns of the Model and the HFRI Composite Index over the preceding 24 month period from January 1996 through August 2007.

Hedge Fund Replication

Allocations of an Anonymous (Traditionally Allocated) Institution

Institutional Investor Asset Class Allocations												
		Returns		Institutional Investor Asset Allocation								
Year		Return on 60/40 portfolio	Institutional Investor Return	Cash or money market accounts	Stocks	Private equities	Hedge funds	Venture capital	Bonds or other fixed income investments	Real estate	Other investments
2008		-20.10%	-17.40%	10.00%	62.00%	0.00%	0.00%	0.00%	28.00%	0.00%	0.00%
2007		6.08%	17.30%	4.00%	74.00%	0.00%	0.00%	0.00%	22.00%	0.00%	0.00%
2006		11.21%	5.20%	2.90%	71.40%	0.00%	0.00%	0.00%	25.70%	0.00%	0.00%
2005		3.92%	6.70%	11.00%	62.00%	0.00%	0.00%	0.00%	27.00%	0.00%	0.00%
2004		8.26%	16.30%	5.00%	67.00%	0.00%	0.00%	0.00%	28.00%	0.00%	0.00%

Hedge Fund Replication

Ex Post Performance of an Anonymous (Traditionally Allocated) Institution
With and without a Hedge Fund Tracker Allocation (2003-2009)
15% to Tracker, pro rata

Institutional Investor Historical Performance with and without a Hedge Fund Tracker							
	Return (Ann.)	Std Dev (Ann.)	Downside Risk	Market Beta	Sharpe Ratio	Worst Month	Worst 12-Months
HF tracker	5.56	6.91	5.35	0.39	0.37	-6.39	-16.1
Institutional Investor	0.83	11.02	8.72	0.71	-0.21	-10.25	-27.4
Institutional Investor + 15% reallocation to HF tracker	1.56	10.26	8.13	0.64	-0.14	-9.63	-25.5

Hedge Fund Replication

Implications of Hedge Fund Replication

- Democratization of hedge funds
- Replication of vanilla risk exposures (simple betas) at potentially higher fees
- An explosion of alternatives and a lower signal to noise ratio
- If beta-oriented hedge fund replicators "add value" or augment the span of the investment opportunity set, then one obvious possibility is simply that vanilla asset allocation as been flawed to date
  - Tactical, conditional allocation models?
  - Or without hedge funds, simply less diversified?

Do Hedge Funds Hedge?

The Hidden Dangers of Smooth Returns

Hedge Fund Returns Can Appear Too Smooth

- Prices Can Be Stale
  - Illiquidity and bad prices
  - Nonsynchronous trading
- Managers might manage how they report returns
  - Marking to Market Issues
- Time-varying expected returns
- Inefficiencies
- Recent Research by Asness, Krail and Liew (JPM, 2001), Lo (FAJ, 2002), and Getmansky, Lo and Makarov (2003), as well as classical references in Dimson (1979), Scholes & Williams (1979)

Problems with Hedge Fund Performance Records

Why "smoothed?" Many hedge funds trade illiquid securities:

- Illiquid securities can bias the type of analysis from the previous page
- And possibly worse…

	Month			
	T	T+1	T+2	T+3
S&P 500	-20%	0%	0%	0%
Liquid Security	-20%	0%	0%	0%
Illiquid Security	0%	0%	0%	-20%
"Smoothed" Security	-8%	-6%	-4%	-2%

Illiquid securities will make hedge funds look less correlated to the market and thus bias betas towards zero.

We can adjust for this effect by matching up T+N returns of the smoothed security with market exposures in the past…use "lagged" betas.

Problems with Illiquid Performance Records

	Annualized Figures for the Period Ended 12/31//08										
	α	β	$(\Sigma \beta_i)^2$	σ^2_m	σ^2_n	$\Sigma_i w^2_i$	σ^2_{true} (1)	σ_{true}	$\sigma_{smoothed}$	ρ^2_{true}	$\rho_{smoothed}$
Venture Capital[3]											
Single-Factor	10.3%	0.74	–	2.5%	6.6%	–	–	–	25.6%	–	0.47
Multi-Factor 7-Qtr Lag	0.3%	2.25	5.06	2.5%	6.6%	0.18	**49.1%**	**70.1%**	–	**0.51**	–
Private Equity Buyout[4]											
Single-Factor	6.6%	0.47	–	2.5%	1.3%	–	–	–	11.3%	–	0.71
Multi-Factor 4-Qtr Lag	4.1%	0.86	0.75	2.5%	1.3%	0.31	**6.0%**	**24.5%**	–	**0.56**	–
Natural Resources[5]											
Single-Factor	19.5%	0.40	–	3.1%	1.7%	–	–	–	13.0%	–	0.54
6-Qtr Lag	17.9%	1.06	1.12	3.1%	1.7%	0.18	**12.7%**	**35.7%**	–	**0.52**	–
Timber[6]											
Single-Factor	5.3%	0.06	–	2.9%	0.3%	–	–	–	5.7%	–	0.17
Multi-Factor 4-Qtr Lag	4.1%	0.24	0.06	2.9%	0.3%	0.23	**1.6%**	**12.6%**	–	**0.33**	–
Private Real Estate[7]											
Single-Factor	4.9%	0.29	–	2.5%	0.8%	–	–	–	8.9%	–	0.23
Multi-Factor 2-Qtr Lag	4.1%	0.44	0.19	2.5%	0.8%	0.16	**5.6%**	**23.7%**	–	**0.29**	–
Hedge Fund[8]											
Single-Factor	1.1%	0.30	–	2.3%	0.6%	–	–	–	8.0%	–	0.56
Multi-Factor 2-Month Lag	0.9%	0.49	0.24	2.3%	0.6%	0.43	**2.0%**	**14.3%**	–	**0.52**	–

Source: Geczy, O'Conner and Proskine (Wharton, 2009)

Problems with Illiquid Performance Records

Table Footnotes:

1) $\sigma^2_{true} = (\Sigma \beta_i)^2 * \sigma^2_m + (\sigma^2_n / \Sigma_i w^2_i)$

2) $\rho_{true} = (\beta^2_{true} \sigma^2_m) / [B^2_{true} \sigma^2_m + (\sigma^2_n / \Sigma_i w^2_i)]$

3) *Quarterly net investment returns data for the Cambridge Associates Venture Capital Index (1989-2008).*

4) *Quarterly net investment returns data for the Cambridge Associates Private Equity (Buyout) Index (1989-2008).*

5) *Quarterly net investment returns data for the Cambridge Associates Natural Resources Index comprised of private equity partnerships focused on oil- and gas-related investments (1999-2008).*

6) *Quarterly net investment returns for the NCREIF Timberland Index comprised of specialty investment managers / advisors that acquire and manage timberland real estate assets for tax-exempt institutional real estate investors (1994-2008).*

7) *Quarterly net investment returns for the private real estate portfolio of a top 5 endowment (1989-2008).*

8) *Monthly net investment returns data for the Credit Suisse / Tremont Hedge Fund Index (1994-2008).*

Source: Geczy, O'Conner and Proskine (Wharton, 2009)

SFAS 157 and Mark to Market Rules

SFAS 157 and Valuation Rule Changes

- In the U.S., Statement of Financial Accounting Standards 157 governs the principles of fair valuation and the rules about when marking to market of illiquid assets is appropriate.
  - Requires all publicly-traded companies in the U.S. to classify their assets based on the certainty with which fair values can be calculated
  - Created a hierarchy of three asset categories: Level 1, Level 2 and Level 3.
    - **Level 1** - the value of these assets are observable and reflect quoted prices for identical assets or liabilities in active markets that the reporting entity has access to on the measurement date
    - **Level 2** -the assets are valued through means other than quoted prices for identical assets or liabilities in active markets that are observable by the reporting entity on the measurement date
    - **Level 3** -the value of these assets is based on the reporting entity's own assumptions regarding the assumptions market participants would use in valuing the asset or liability.
  - SFAS 157 was passed to help investors and regulators understand how accurate a given company's asset estimates truly were. Investors are able to see what percentage of the balance sheet could be open to revaluation or susceptible to sudden write-downs

SFAS 157 Timeline

- SFAS 157 to take effect for fiscal years beginning November 15, 2007

- **However…**
  - **January 24, 2008**: The National Association of Realtors (NAR) announced that 2007 had the largest drop in existing home sales in 25 years
  - **March 16, 2008**: Bear Stearns acquired for $2 a share by JPMorgan Chase in a fire sale avoiding bankruptcy
  - **September 7, 2008**: Federal takeover of Fannie Mae and Freddie Mac, which at that point owned or guaranteed about half of the U.S.'s $12 trillion mortgage market
  - **September 15, 2008**: Lehman Brothers filed for bankruptcy protection.

- **September 30, 2008**: SEC and the FASB issued a joint clarification regarding the implementation of fair value accounting in cases where a market is disorderly or inactive. They explain that forced liquidations are not indicative of fair value, as this is not an "orderly" transaction.

- **April 9, 2009**: FASB released the official update to FASB 157, which eases the mark-to-market rules when the market is unsteady or inactive

Implications for Hedge Funds

- FASB 157 will have significant impact on the respective controls and procedures related to the summary and documentation of the valuation process
- The standard provides more transparency to investors about the types of securities the fund is invested in, as well as the portion of the fund's performance derived from Level 3 securities.
- Funds will need to designate all securities into the three levels and provide detailed activity of profit and loss and related movement into and out of the Level 3 investments
- Tracking systems may need to be designed to mirror the disclosure requirements of this statement while providing a trail for the funds management and auditors to review
- Management will need to continually monitor the fund's front- and back-office accounting systems that will be used to track and produce data.
- Management needs to understand the content and format of the financial statement disclosures up front.
- Management will need to understand the nature and content of the services provided by the third party pricing services regarding valuation information
- Will marks be closer to market?

SFAS 157 and Mark to Market Rules

SFAS 157 and Valuation Rule Changes

- Regression with dummy variables indicating the required adoption of SFAS 157 (third quarter, 2008)
- An simple, extended market model:

$$R_{HF} - R_{TB} = \alpha_{HF} + \alpha_{HF,2} D_{SFAS157} + \beta_{HF,1}(R_{SP500} - R_{TB}) + \beta_{HF,2}[D_{SFAS157}(R_{SP500} - R_{TB})] + \beta_{HF,3}(R_{SP500,t-1} - R_{TB}) + \beta_{HF,4}[D_{SFAS157}(R_{SP500,t-1} - R_{TB})] + \varepsilon_{HF}$$

Where R_{HF} is a hedge fund index

R_{TB} is the return on the 1-month treasury bill

$D_{SFAS157}$ is an indicator variable for the adoption of SFAS 157 (3rd Quarter, 2008)

R_{SP500} is the S&P500 total return index and

$R_{SP500,t-1}$ is the S&P500 lagged on month

SFAS 157 and Mark to Market Rules

SFAS 157 and Valuation Rule Changes

- Regression with dummy variables indicating the required adoption of SFAS 157 (third quarter, 2008)

$$R_{HF} - R_{TB} = \alpha_{HF} + \alpha_{HF,2} D_{SFAS157} + \beta_{HF,1}(R_{SP500} - R_{TB}) + \beta_{HF,2}[D_{SFAS157}(R_{SP500} - R_{TB})] + \beta_{HF,3}(R_{SP500,t-1} - R_{TB}) + \beta_{HF,4}[D_{SFAS157}(R_{SP500,t-1} - R_{TB})] + \varepsilon_{HF}$$

Regressor	Hedge Funds	Convert Arb	Dedicated Shortseller	Event Driven	Distressed	Emerging Markets	CST HF Market Neutral	HFRX Equity Market Neutral	CST Blue Chip Market Neutral	Event Driven Multi-strategy	Risk Arb	Fixed Income Arb	Global Macro	Long Short Equity	Managed Futures	Multi-Strategy	Factor Selection Count
Sample Size:	188	188	188	188	188	188	188	140	116	188	188	188	188	188	188	188	
R2:	38.1%	35.1%	60.5%	51.9%	55.3%	49.2%	41.7%	4.7%	69.7%	41.5%	29.1%	49.6%	16.5%	31.3%	6.5%	46.4%	
Adjusted R2:	35.2%	32.1%	58.7%	49.7%	53.3%	46.9%	39.0%	0.3%	68.3%	38.9%	25.9%	47.3%	12.7%	28.1%	2.3%	43.9%	
Intercept	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	14
	4.65	3.14	0.83	7.30	7.39	3.96	2.34	2.09	1.75	6.28	5.21	2.90	6.97	2.67	2.29	5.74	
Booleans	-0.01	0.00	-0.02	-0.01	-0.01	-0.01	-0.02	-0.01	-0.03	-0.01	0.00	-0.01	-0.02	-0.01	-0.01	-0.01	7
	-2.14	0.21	-2.36	-2.56	-3.03	-1.73	-2.17	-1.66	-4.84	-1.98	-0.95	-1.26	-3.20	-1.17	-1.28	-1.99	
S&P 500	0.14	0.06	-0.89	0.15	0.15	0.41	0.03	-0.01	0.03	0.16	0.09	0.01	-0.02	0.26	-0.16	0.11	9
	3.96	1.12	-11.93	5.63	5.40	7.06	0.33	-0.47	0.64	4.94	4.02	0.34	-0.51	4.78	-1.94	3.66	
(S&P 500 * Booleans)	0.11	0.38	0.44	0.05	0.05	0.11	0.11	0.00	1.02	0.04	0.06	0.41	0.19	0.09	0.01	0.12	6
	1.62	4.20	3.19	0.97	1.03	1.06	0.80	0.09	10.20	0.73	1.30	6.36	2.60	0.88	0.08	2.15	
S&P 500 [Lag 1]	0.02	0.07	-0.02	0.09	0.10	0.04	-0.01	-0.03	0.00	0.09	0.07	0.04	-0.06	0.03	-0.08	0.06	5
	0.57	1.40	-0.31	3.43	3.51	0.62	-0.09	-1.00	0.06	2.77	2.85	1.10	-1.58	0.50	-0.90	2.09	
(S&P 500 [Lag 1] * Booleans)	0.09	0.06	-0.08	0.04	0.08	0.03	0.75	-0.03	0.05	0.01	-0.10	0.07	0.02	0.00	0.04	0.10	2
	1.37	0.71	-0.60	0.74	1.50	0.32	5.45	-0.61	0.48	0.25	-2.25	1.13	0.32	0.04	0.27	1.81	

Hedge Funds and Market Timing

- **Hedge funds (and funds of funds) offer the potential to time market exposure (aka beta)**
  - Ability to sell short
  - Ability to use leverage
  - Ability to ‘manage the balance sheet’ or net exposure
  - Ability to use derivatives

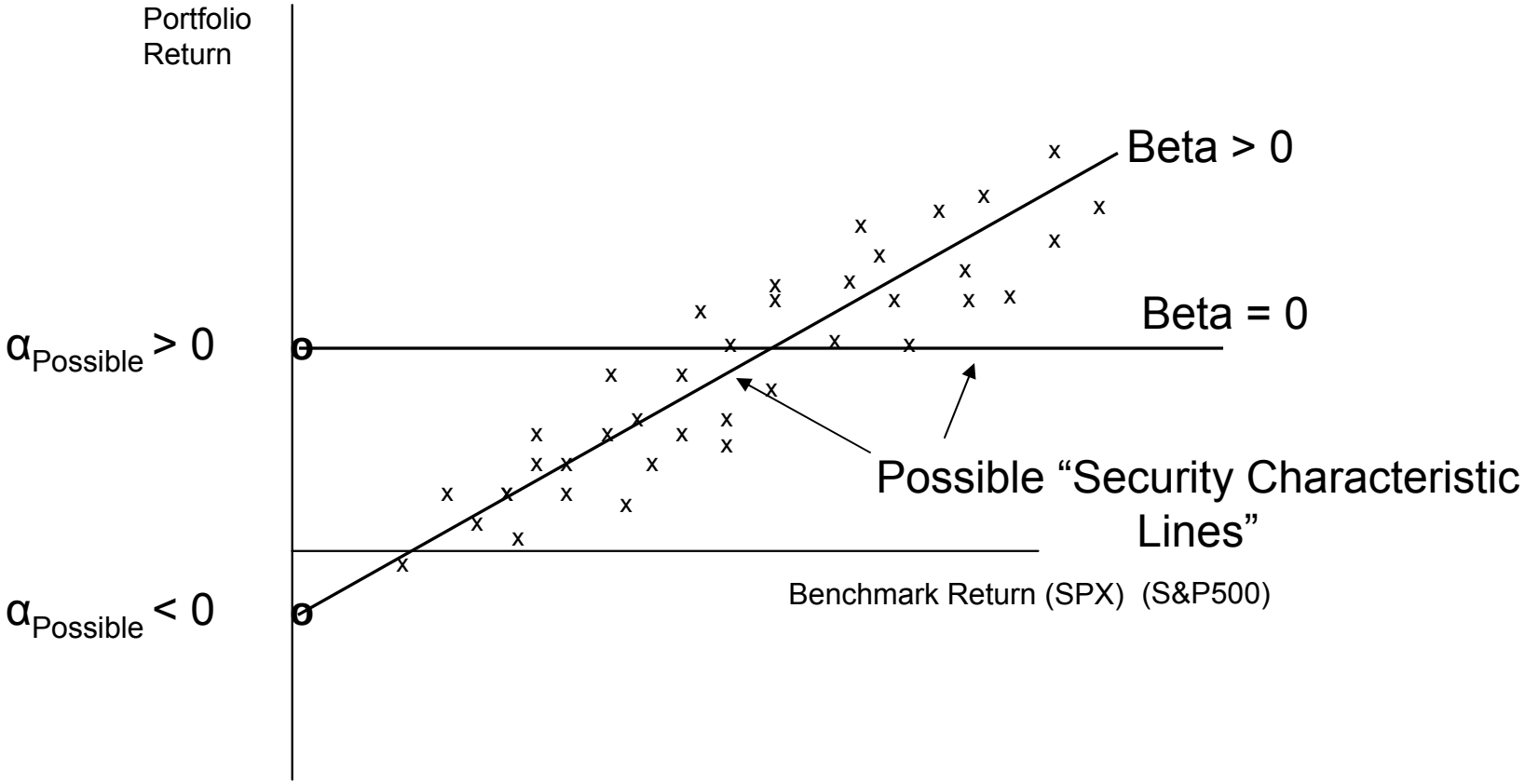
- It is often a selling point, for example, for equity L/S managers who do not fully hedge out market risk

- Can they actually do it?

- And what about horizon?

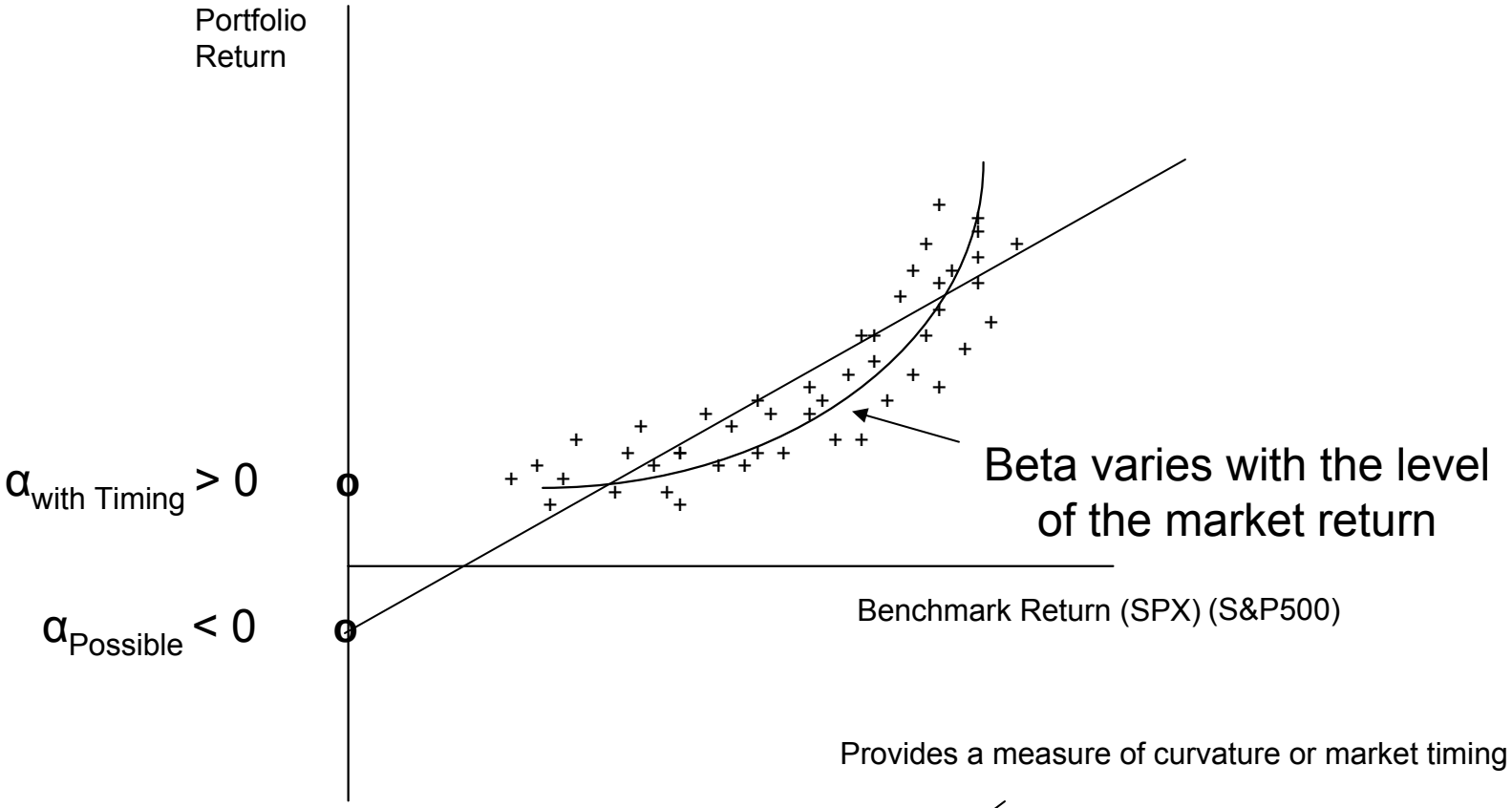
Hedge Funds and Market Timing

The standard method of measuring market exposure (beta)



Hedge Funds and Market Timing

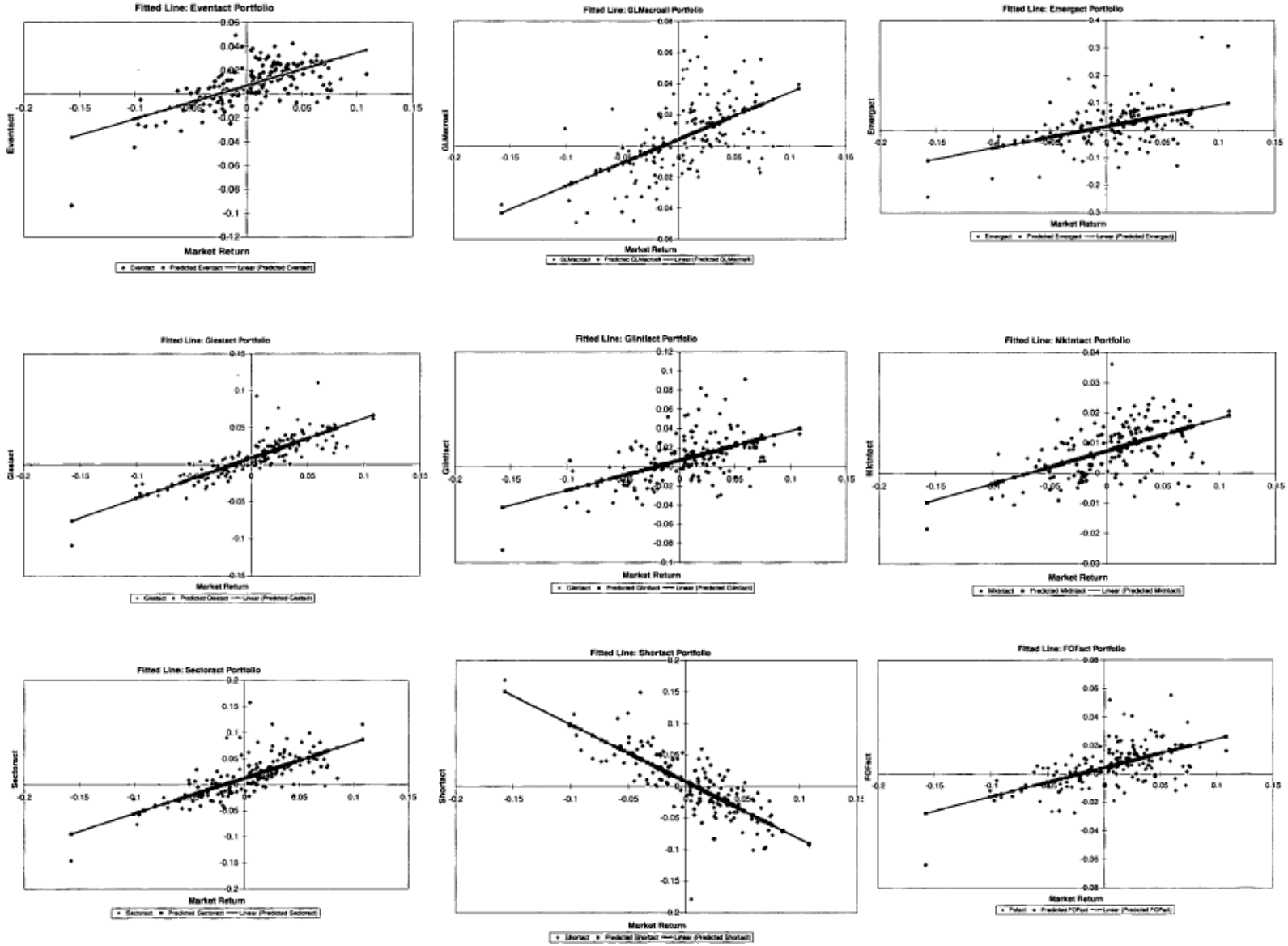
Models of market timing sometimes consider "**curvature**" in the portfolio-market relationship (known as the Treynor-Mazuy approach)…



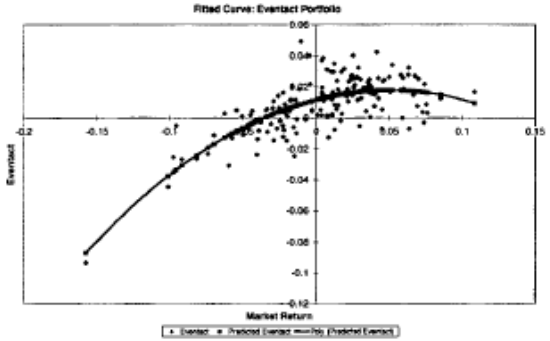
Provides a measure of curvature or market timing

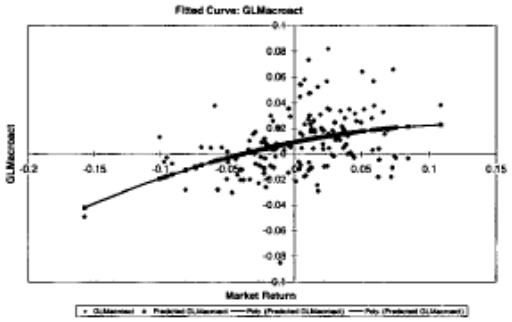
$$R_{HF} - R_{TB} = \alpha_{HF} + \beta_{HF}(R_{SP500} - R_{TB}) + \gamma_{HF}(R_{SP500} - R_{TB})^2 + \varepsilon_{HF}$$

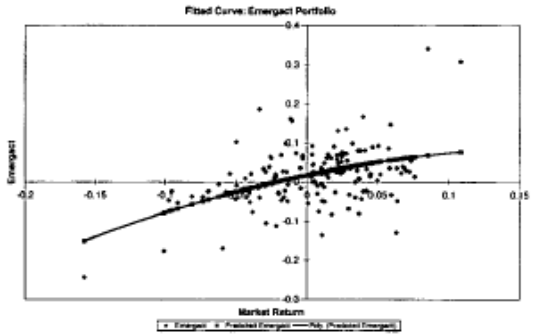
Hedge Funds and Market Timing

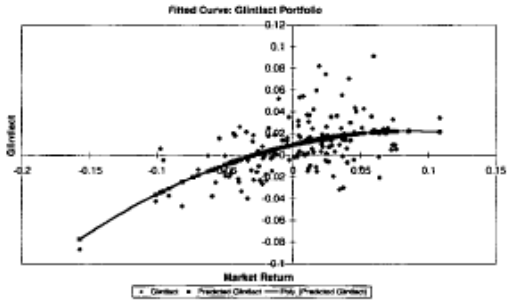


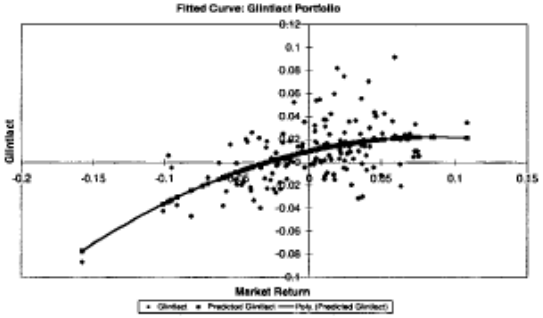
Hedge Funds and Market Timing

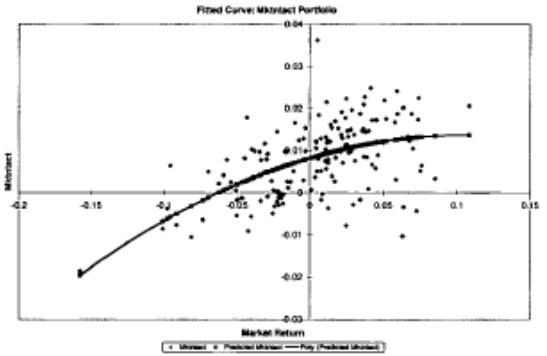


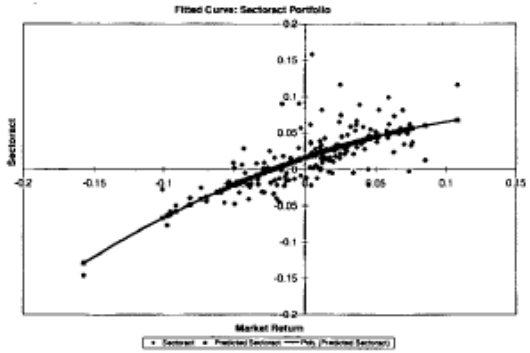


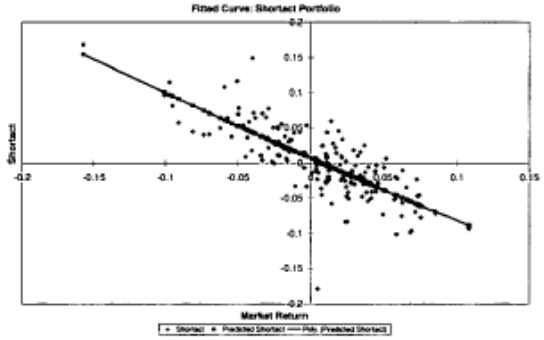


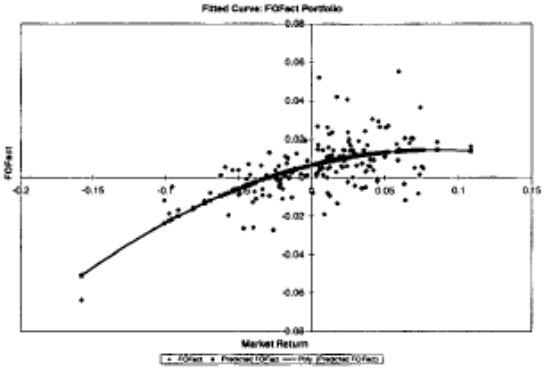






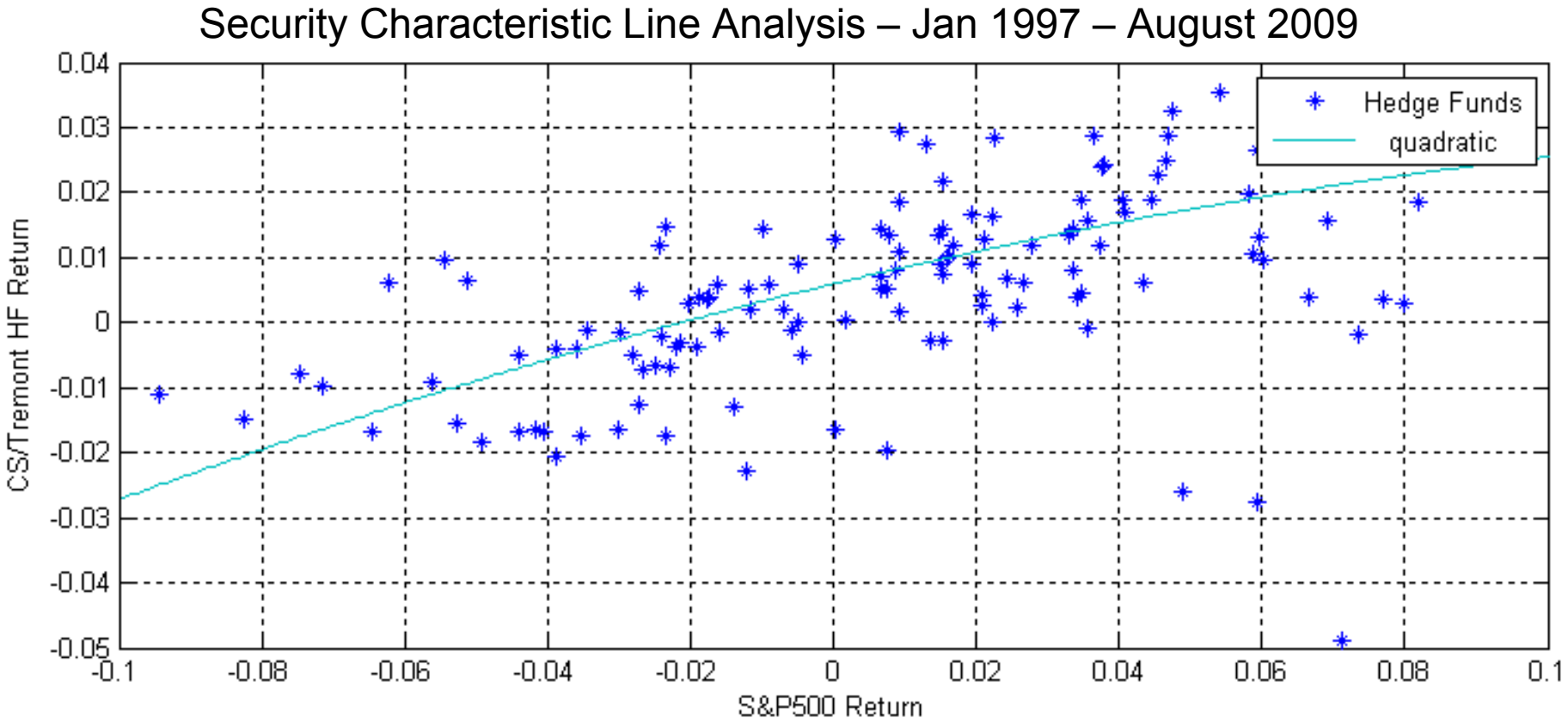






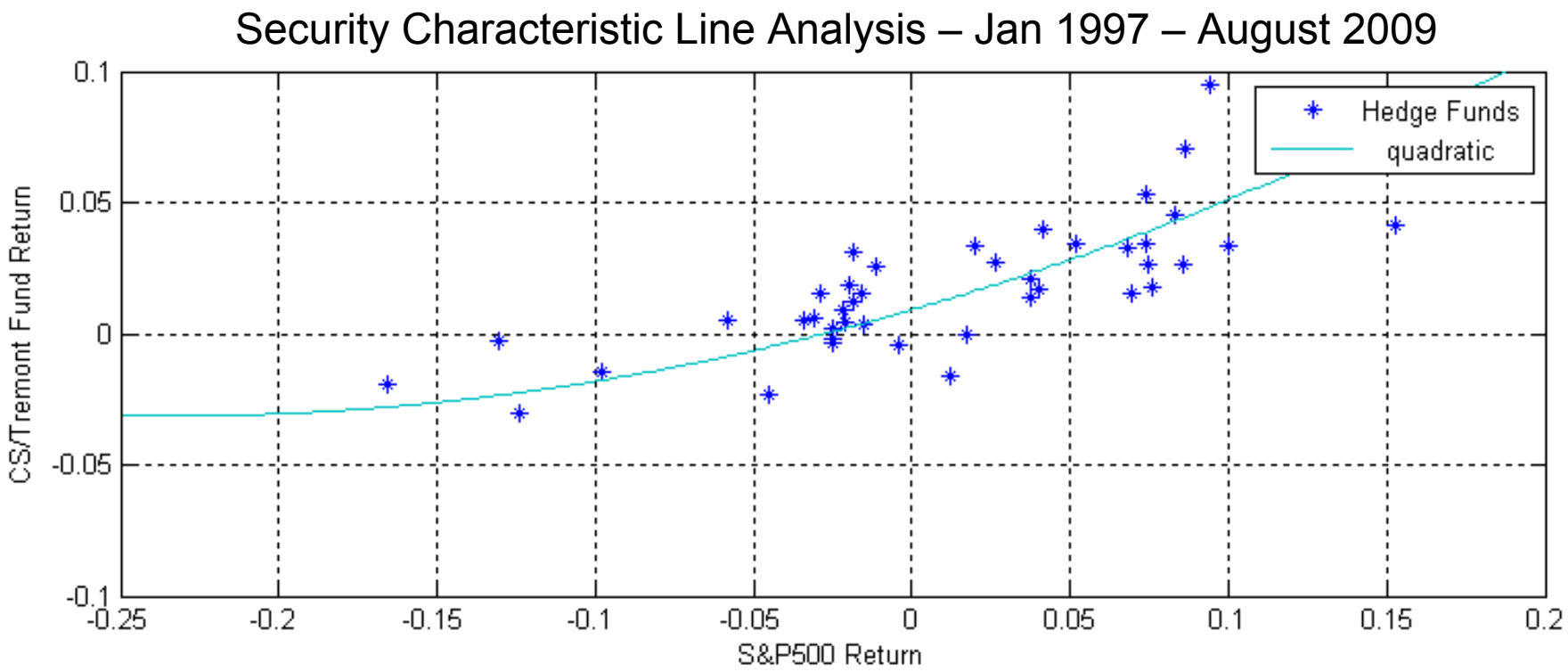
Hedge Funds and Market Timing

Estimating the Curvature – Monthly



Hedge Funds and Market Timing

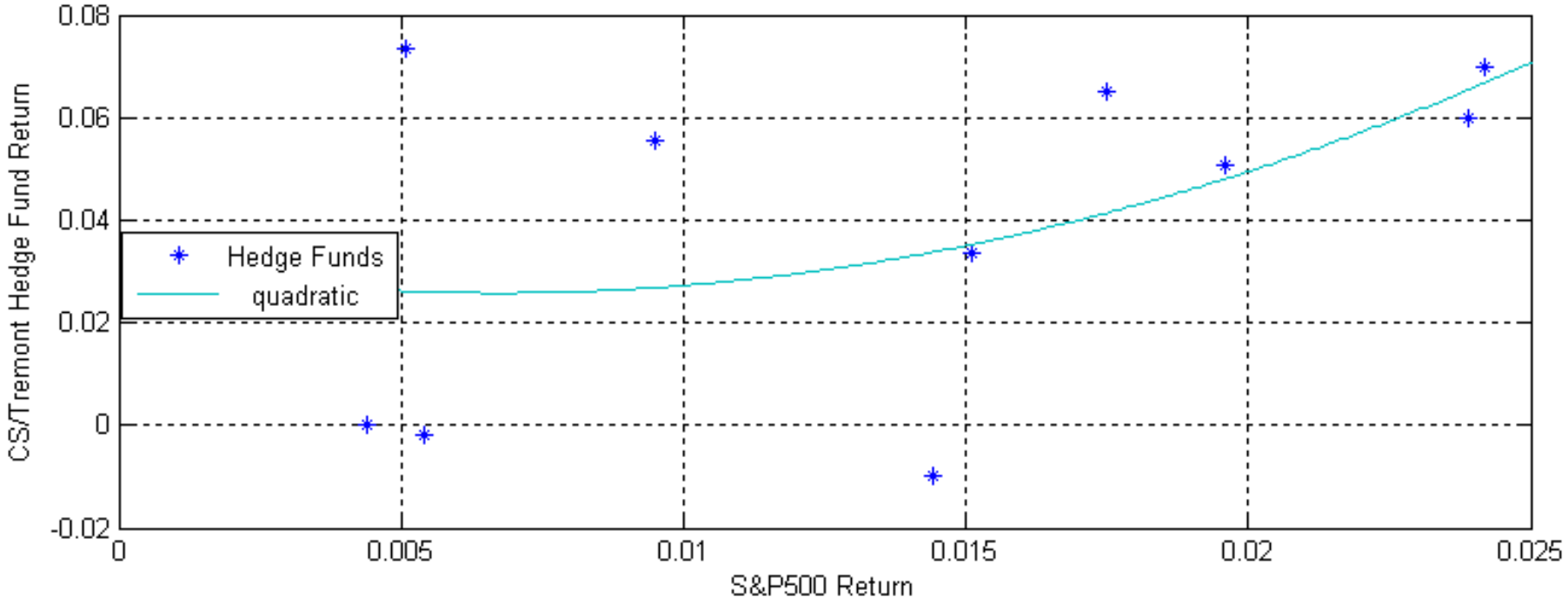
Estimating the Curvature – Quarterly



Hedge Funds and Market Timing

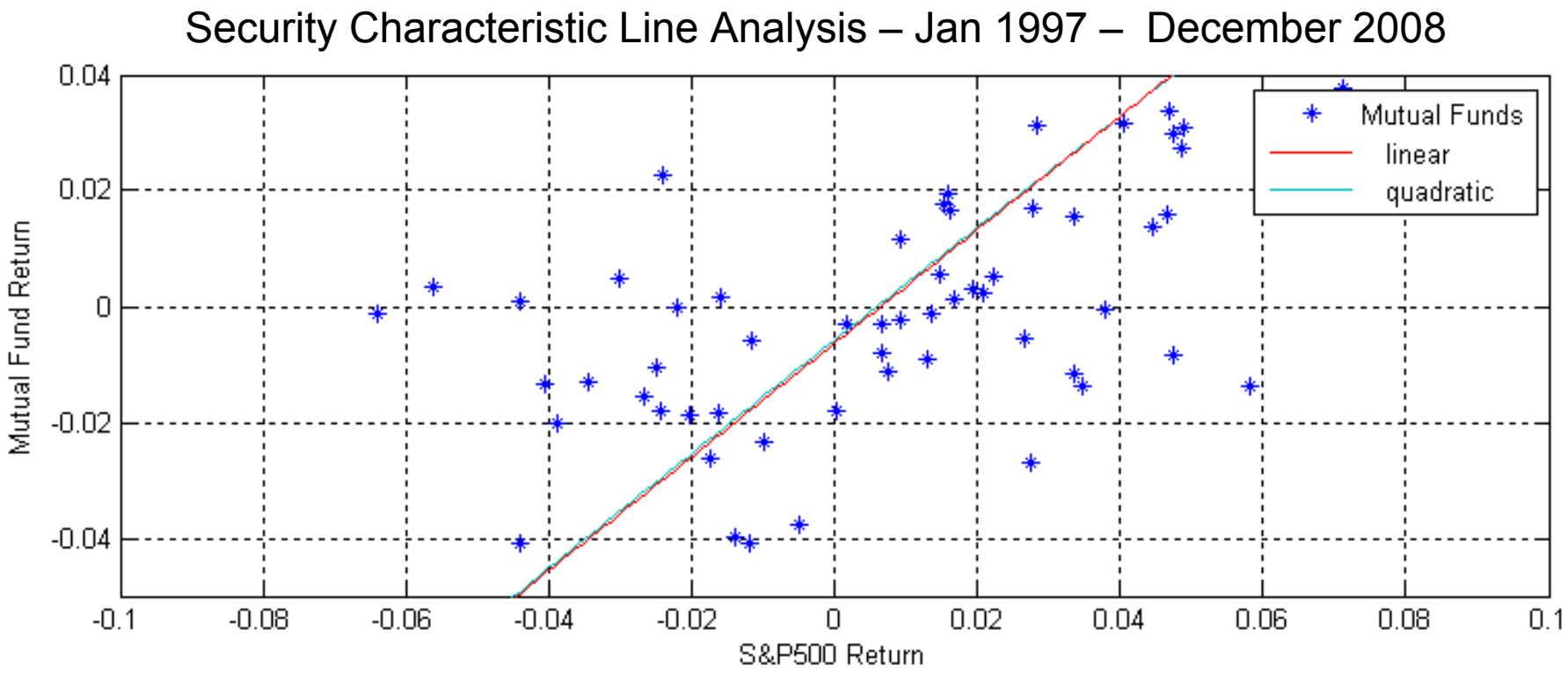
Estimating the Curvature – Half-Yearly

Security Characteristic Line Analysis – Jan 1997 – August 2009



Mutual Funds *and Market Timing*

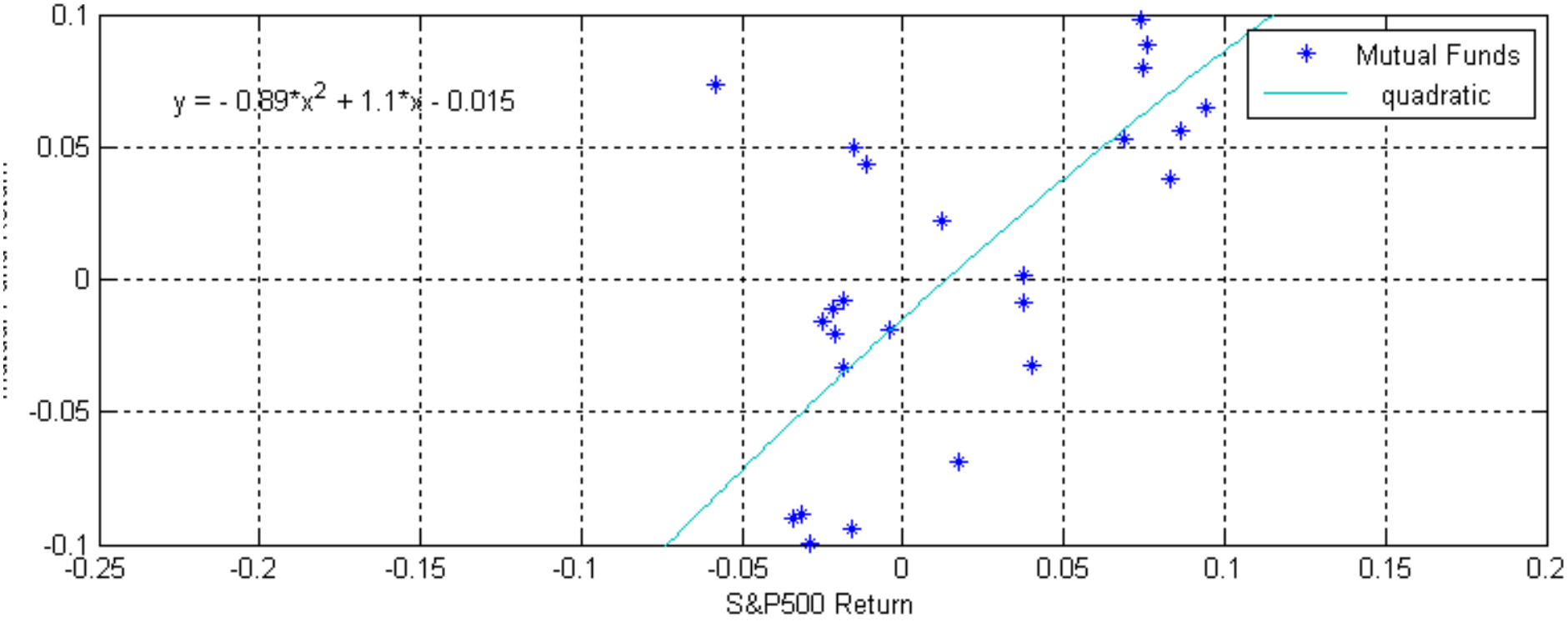
Estimating the Curvature – Monthly (Mutual Funds)



Mutual Funds *and Market Timing*

Estimating the Curvature – Quarterly

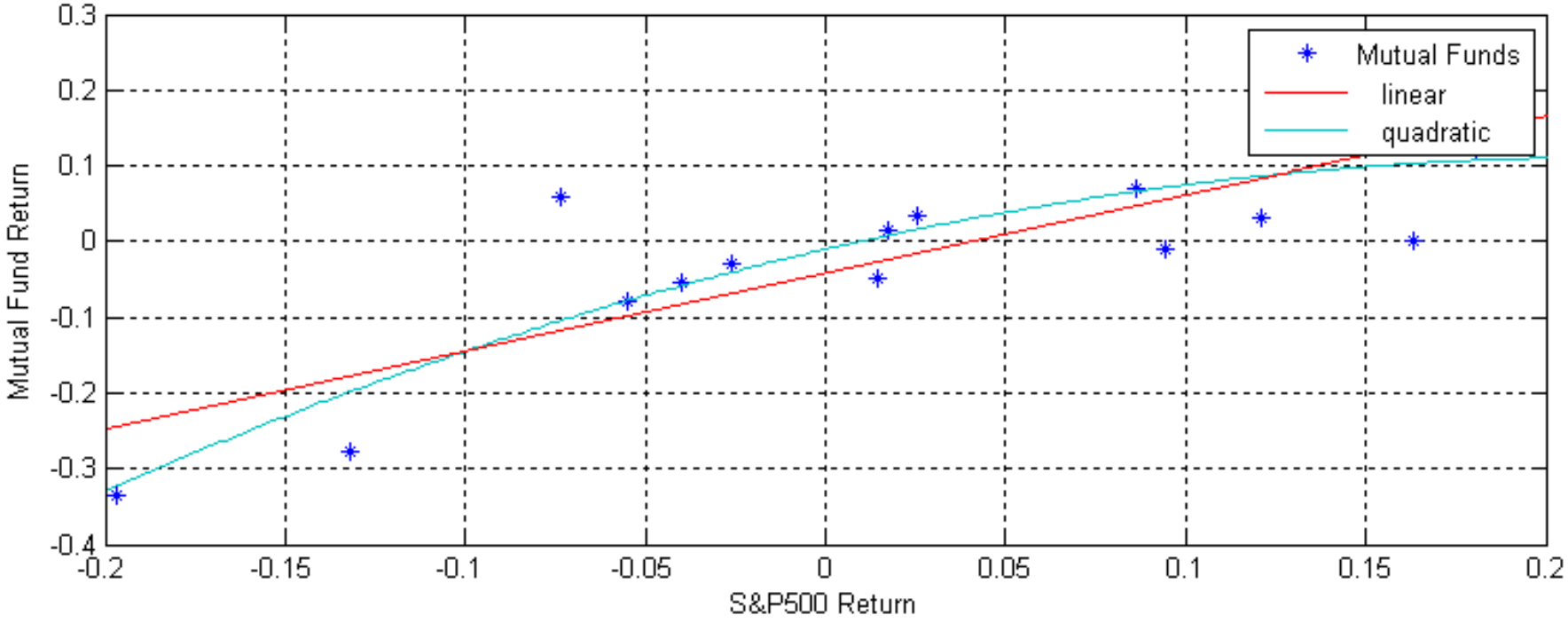
Security Characteristic Line Analysis – Jan 1997 – December 2008



Mutual Funds *and Market Timing*

Estimating the Curvature – Half-Yearly

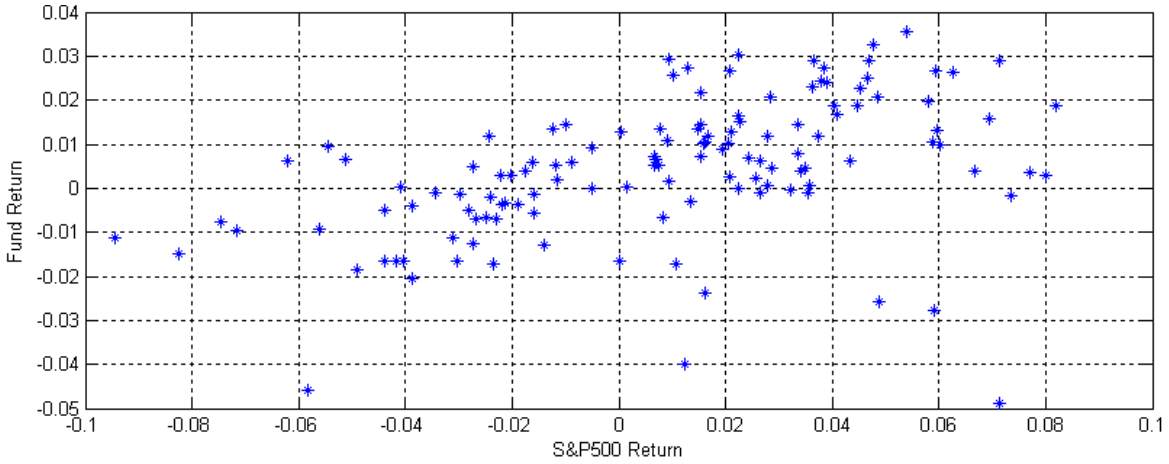
Security Characteristic Line Analysis – Jan 1997 – December 2008



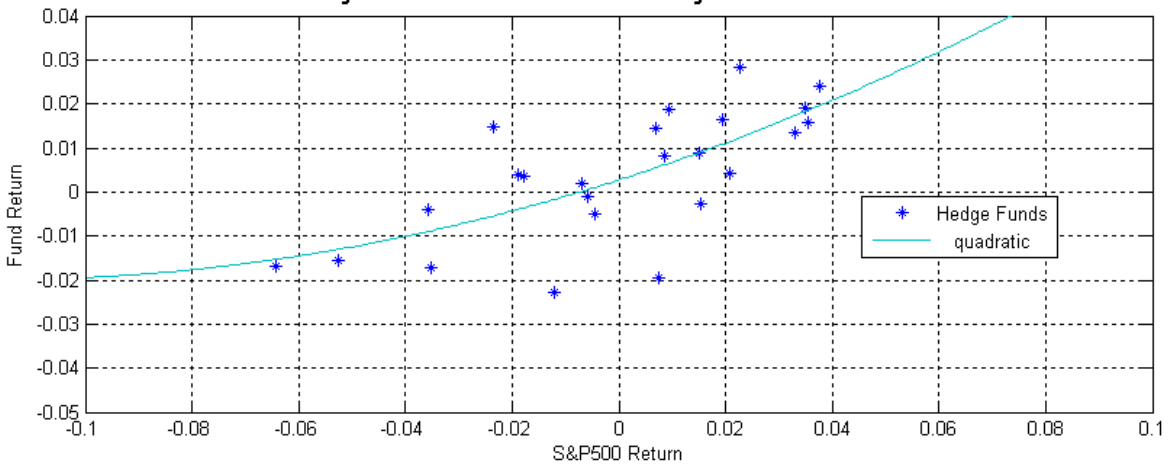
Hedge Funds and Market Timing

Estimating the Curvature – Last 24 Months

Security Characteristic Line Analysis – Jan 1997 – August 2009



Security Characteristic Line Analysis - Last 24 Months



Are Hedge Funds Weathering the Storm?

So there exist some hopeful indications…but it still depends!

- Recent potential increases in betas and correlations have been of great concern and failure rates have increased
- Short-term timing looks negative!
  - If you expect hedge fund managers to be able to turn on a dime, that may be an unrealistic expectation…
- However, over longer horizons, they may have added value in the past in market extremes by being "conditionally" diversified
- Is this market timing?
  - Could be "balance sheet management"
  - Could be "optionality"
  - In any case, it can have strong implications for hedge fund investing!
    - But can *we* "time"?

Hedge Funds and the Future

- Expect to see…

  - **More regulation world-wide**
    - Oversight, registration, monitoring
    - More enforcement of laws on books
    - More Ponzi schemes and other frauds discovered post-Madoff
    - Hopefully NOT restrictions on important functions like short-selling
    - More oversight at the level of prime brokers, counter-parties and risk-aggregators
  - **Greater democratization and availability of hedge fund-like strategies**
    - Hedge funds for the masses in the form of registered funds, funds of funds and related products including hedge fund replicators
  - **Industry will continue to contract in number**
    - Still, survey suggest institutions and individuals alike will continue to allocate to hedge funds, although with more caution than in the past
    - The so-called Endowment Model has lost a bit of luster, but largely due to illiquidity and correlated high-beta bets.
  - **Some fee compression, but likely only at the fund of fund level**
    - Bifurcation in the industry will still see gargantuan fees at the top end
  - **Illiquidity mismatches will be realigned…for at least the short run**
  - **Overlap between private equity and hedge fund strategies will continue**, with a growing preference for the fully invested hedge fund approach (as opposed to the sale of a call option with embedded leverage)
  - **Mark to market rules will make a great deal of difference**, although SFAS 157 in the U.S. is not yet settled
    - It already has made a difference judging from anecdotes; statistical analysis may be too early, but initial investigations suggest changes in risk exposure measurement after implementation date of SFAS 157