Hedge Funds

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Today's Agenda

1) What is a Hedge Fund?

2) The Good Sides of Hedge Funds

3) The Dark Sides of Hedge Funds

4) A New Framework for Understanding Hedge Funds

What Is a Hedge Fund?

An ALTERNATIVE investment strategy that seeks to:

- Generate attractive returns;
- With low correlation to traditional stock and bond markets;
- And less downside ("left tail") risk

Hedge funds differ from other alpha-seeking strategies by employing non-traditional techniques:

- Shorting
- Leverage
- Derivatives

Source: Asness, Clifford. "An Alternative Future," *The Journal of Portfolio Management*, First Quarter 2004.

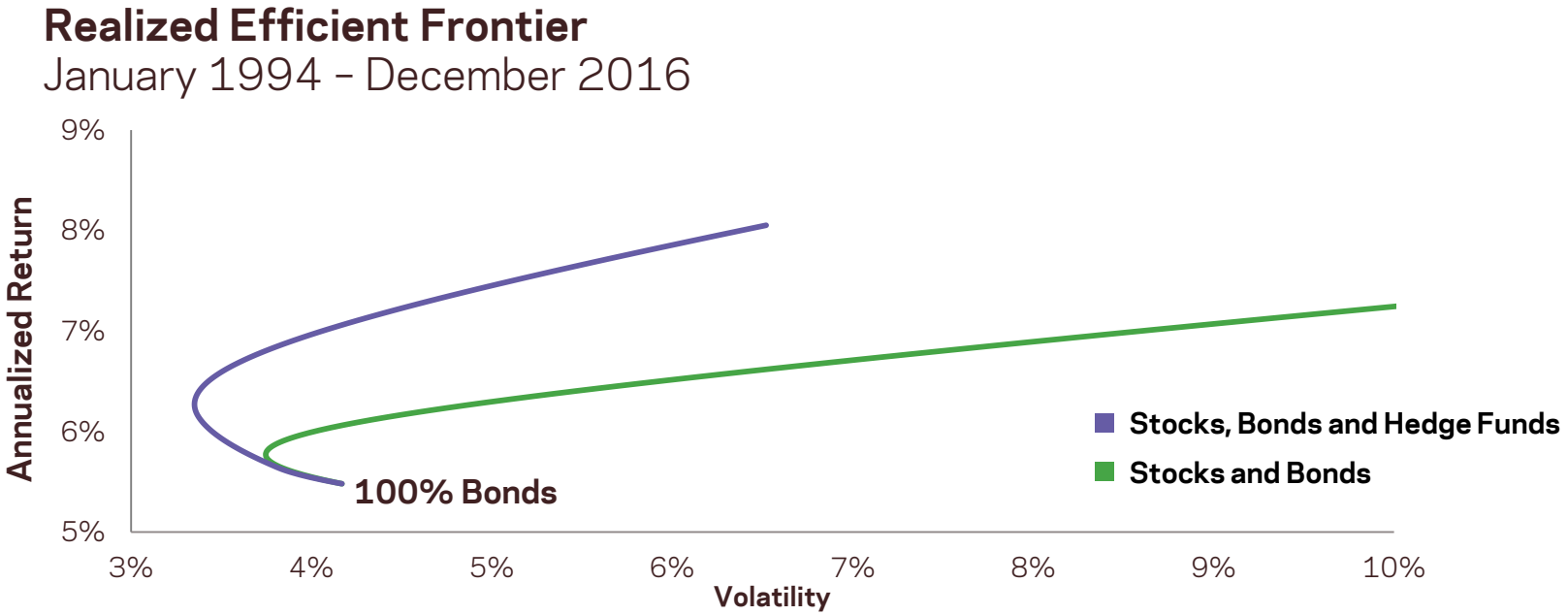
Hedge Fund Styles

Event Driven	Convertible Arbitrage	Global Macro
Fixed Income Arbitrage	Equity Market Neutral	Long/Short Equity
Dedicated Short Bias	Emerging Markets	Managed Futures

Hedge Funds: The Good News

1) Hedge funds offer a diversifying, positive expected return

2) This can improve almost any portfolio's risk-adjusted return



Note: We believe index results are exaggerated by illiquidity and survivorship bias, but are in the right direction

Sources: AQR, Bloomberg, Credit Suisse Hedge Fund Index, and HFRI. For illustrative purposes only. "Hedge Funds" are an average of the Credit Suisse Hedge Fund Index and the HFRI Fund-Weighted Hedge Fund Index, both of which are net of fees. Stocks are defined as the MSCI World Index and Bonds are defined as the Barclays Capital U.S. Government Index. Efficient frontier shows the combination of assets with the lowest volatility for a given average return. Past performance is not a guarantee of future performance.

The "Dark Sides" of Hedge Funds

1) Illiquidity

2) Correlation

3) Leverage

4) Crowded Strategies

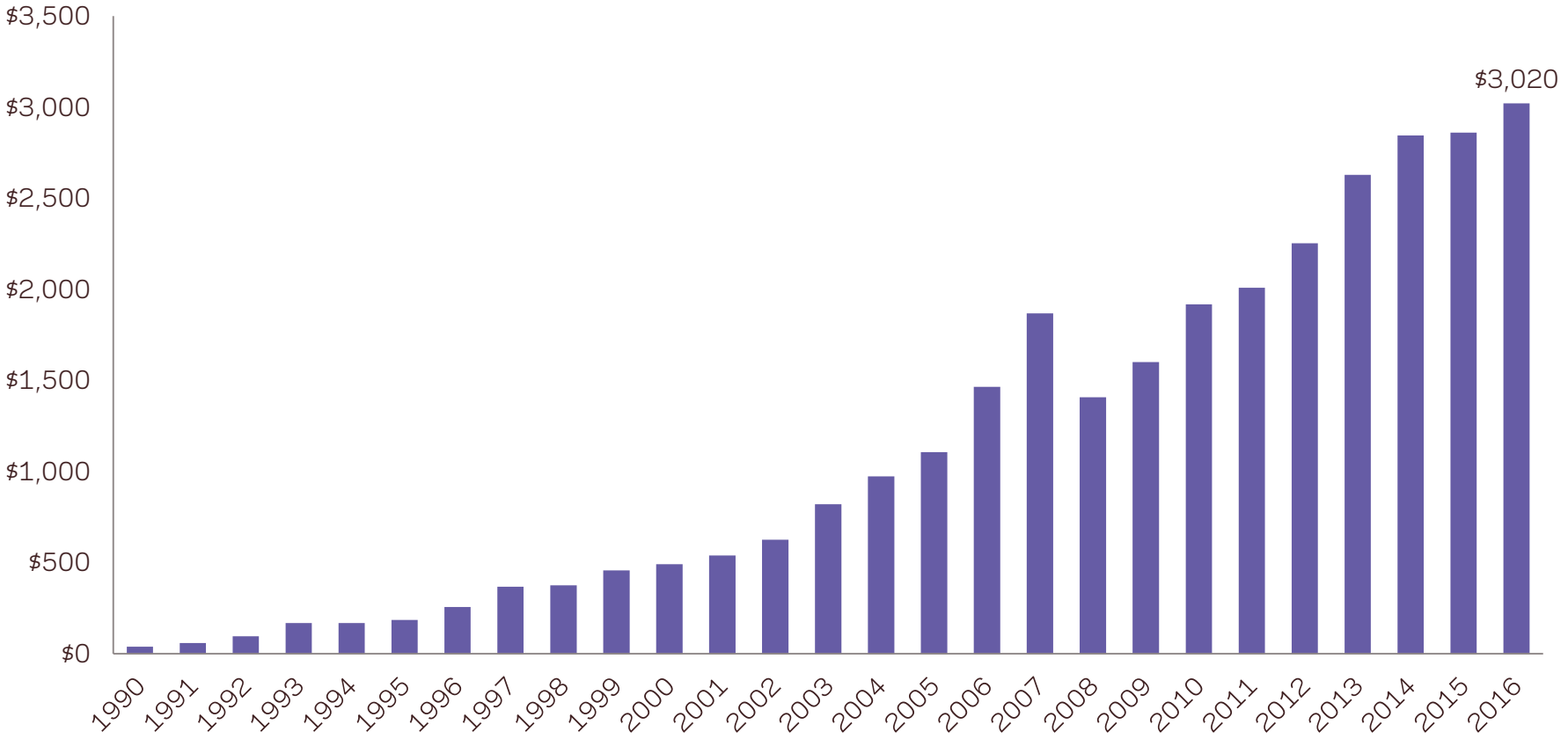
5) (Lack of) Transparency

6) High Fees

Growth of Hedge Fund Assets

Hedge Fund Industry Assets Under Management ($Billions)

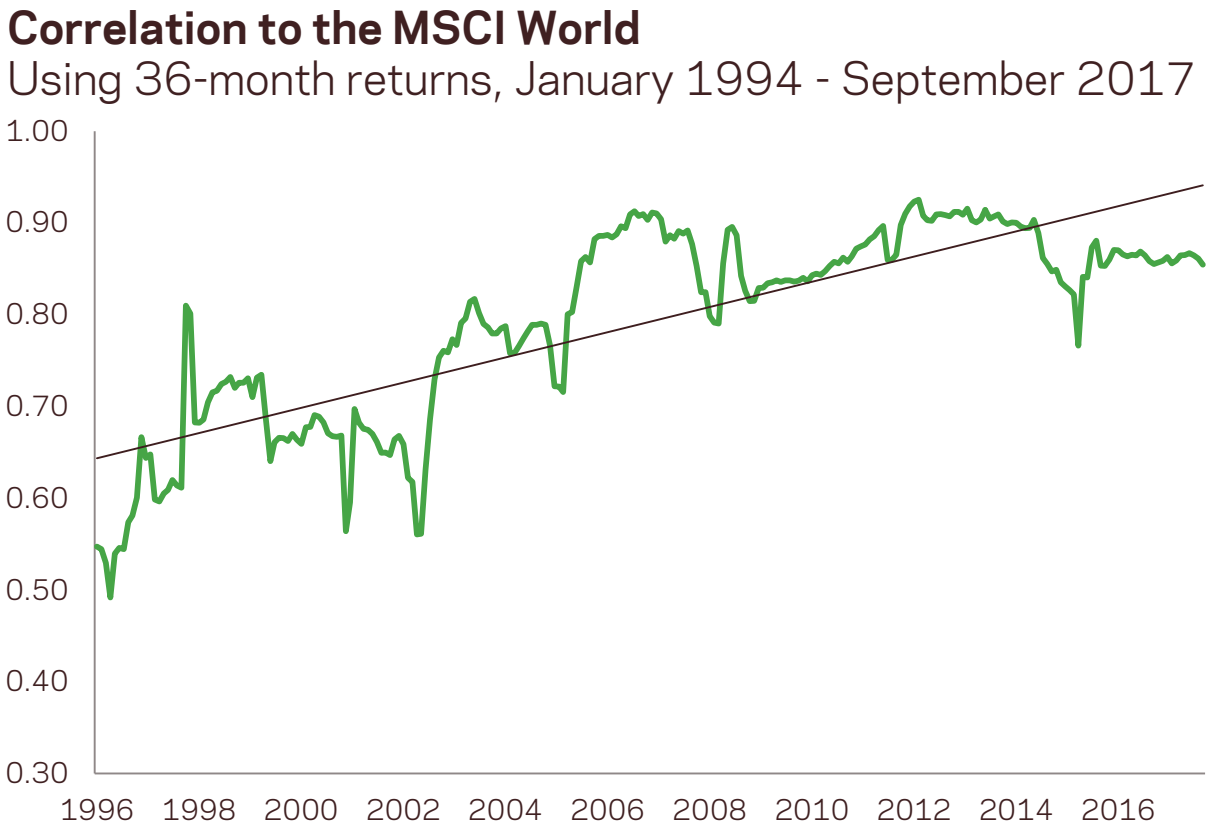
January 1990 – December 2016



Source: Hedge Fund Research Inc.

High & Rising Correlations

Hedge funds have high and increasing levels of passive market exposure

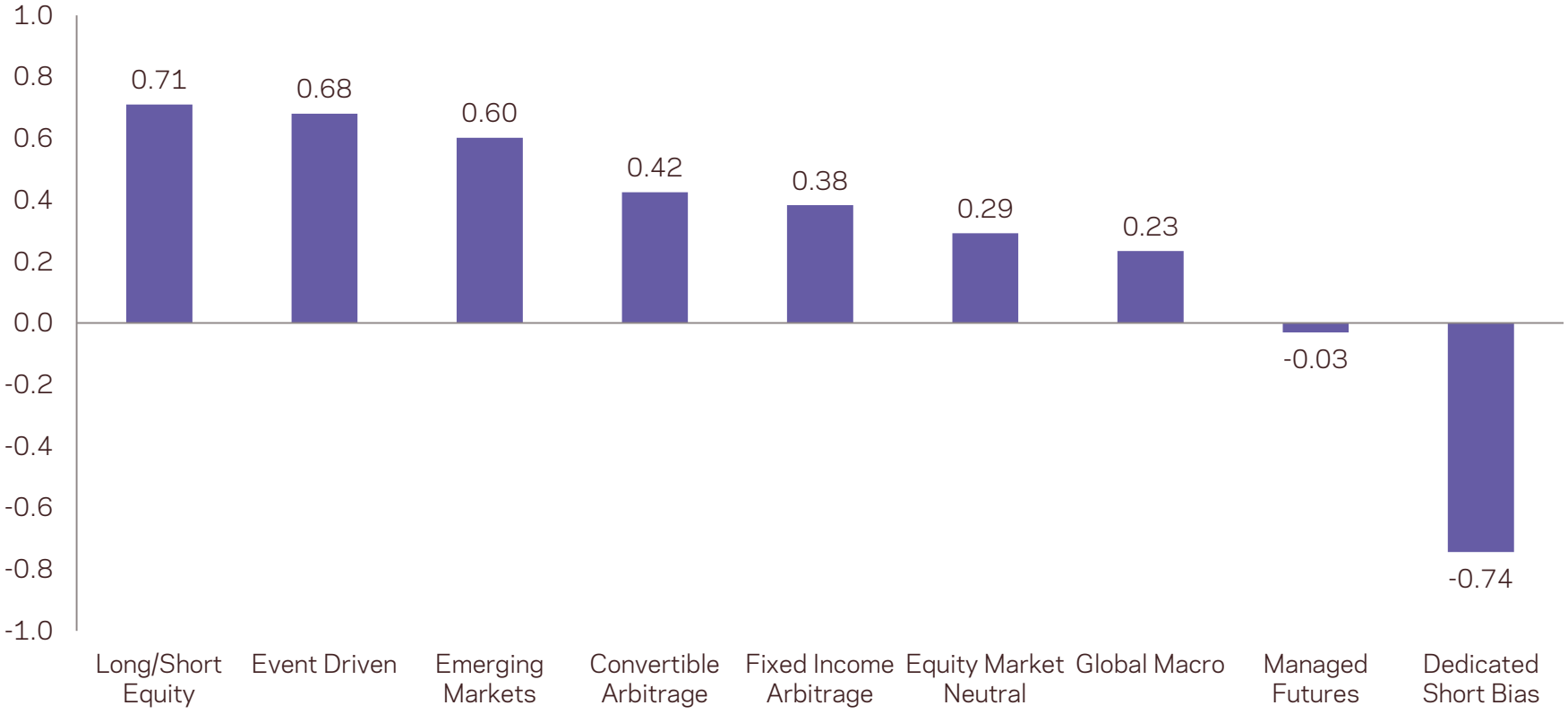


Sources: AQR, Credit Suisse Hedge Fund Index. HFRI Fund Weighted Composite Index. Hedge Funds represented as the average of Credit Suisse Hedge Fund Index and HFRI Fund Weighted Composite Index. Past performance is not a guarantee of future performance.

Full Period Correlations

Correlation to MSCI World

January 1994 - September 2017*



*Note: Dedicated Short Bias Index correlation is only through Jan. 2017, as the index was discontinued after that month. Source: AQR and Credit Suisse Hedge Fund Indices. For illustrative purposes only. Past performance is not an indication of future results.

Illiquidity and Hedge Funds Don't Mix

Hedge funds have increased exposure to illiquid investments over time (distressed assets, loans, structured products, control stakes, etc.)

The Dangers of Illiquid Strategies

- Mismatch of fund/investor liquidity and underlying asset liquidity (redeeming investors can hurt remaining)
- Lags in Mark-to-Market Pricing understate strategy risk/volatility
- Leverage + Illiquidity = toxic combination during crises

Question: should funds with illiquid investments adopt more "private equity" type structures?

- Long lock-up to protect investors
- Performance fees paid at the time gains are realized

Are Hedge Funds Worth It?

Hedge Funds have a role in asset allocation if they:

1) Offer positive expected returns

2) Are uncorrelated to markets, especially equities

3) Are liquid (if not, please call them something else)

4) Are implemented carefully and properly

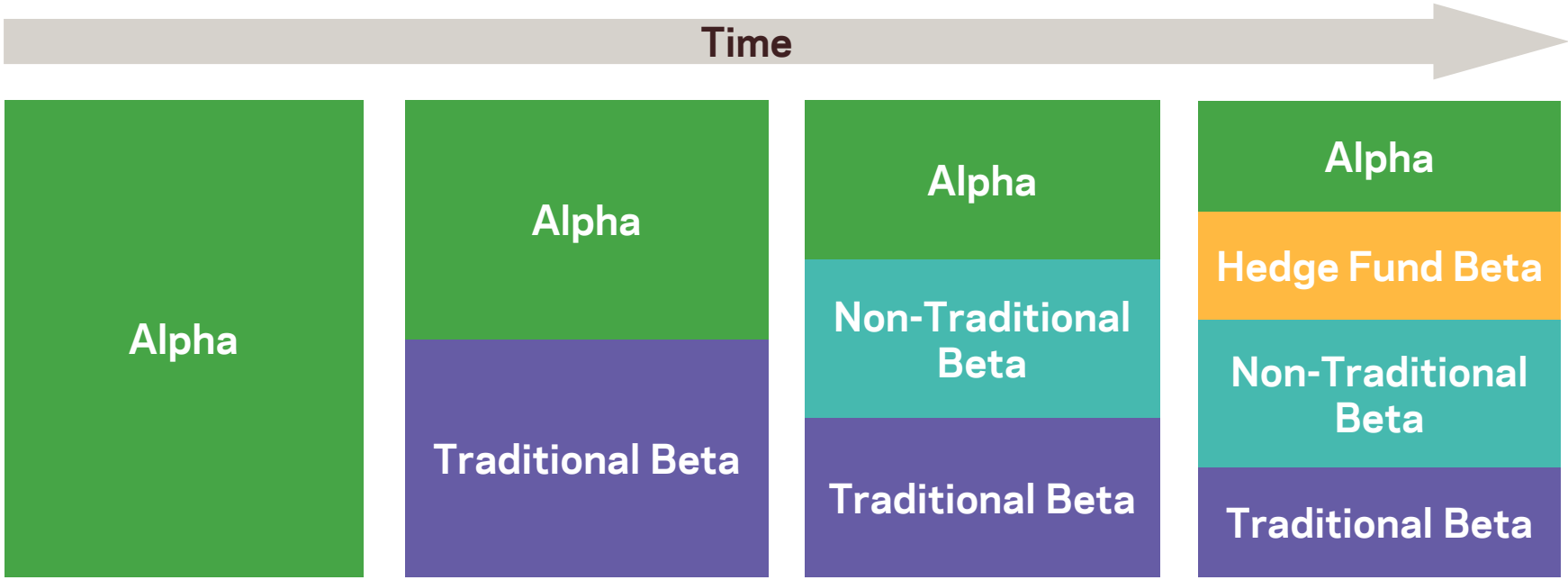
"Alpha" and "Beta"

Alpha	Returns that cannot be explained by any systematic risk factor
Beta	Returns that can be explained by systematic exposure to a risk factor (e.g. equity market risk, interest rate risk)

Beta should be easier to access – and thus cost less

Returns from active management are usually considered Alpha (and priced accordingly)

How Alpha Becomes Beta



Prior to Cap-Weighted Equity Indices
- Returns viewed as "alpha"

Traditional Beta Introduced

Examples:
- S&P 500 Index
- BarCap Aggregate

Non-Traditional Beta Introduced

Examples:
- Commodity Indices
- Real Estate

Hedge Fund Beta Introduced

Examples:
- Merger Arbitrage
- Convertible Arbitrage

Hedge Fund Beta

We think investors can access the core traditional hedge fund strategies through hedge fund betas

Hedge Fund Beta is *the set of exposures common to hedge fund managers pursuing similar strategies*

It can be invested in directly at low cost vs. hedge funds

Potential Advantages of investing in Hedge Fund Beta

- Diversified
- Economically Intuitive
- Lower Cost / Liquid
- Transparent
- Alternative
- Can be run hedged

Hedge Fund Beta Examples

Merger Arbitrage

- Merger arbitrageurs go long the target and, where appropriate, short the acquirer
- In doing so, managers offer insurance and provide liquidity to those who held the target's stock prior to deal announcement
- AQR/CNH built a proprietary dataset of 15,000 mergers (going back to 1963) and has been actively managing a merger arbitrage strategy since 2001
- A portfolio can be created by holding some exposure to each announced merger deal

Convertible Arbitrage

- Convertible arbitrageurs buy convertible bonds, which are sold at a discount due to their illiquidity, short the underlying equity and also often seek to hedge out the specific interest rate and credit risk of each issue
- At maturity, convertible bonds converge to their theoretical value, providing excess returns to owners
- AQR built a proprietary dataset of 700,000 convertible prices (going back to 1985) and has been actively managing a convertible arbitrage strategy since 2003
- A portfolio can be created by holding a broad cross-section of well-hedged convertible issues

Hypothetical Net Returns to Mergers and Converts Using AQR Proprietary Datasets*

					Correlations			
	Annualized Net Return	Annualized Volatility	Sharpe Ratio	Max Drawdown	S&P 500	MSCI World	HFRI Converts	HFRI Mergers
Merger Arbitrage	9.8%	5.8%	1.0	-11.7%	0.4	0.4	0.3	**0.7**
Convertible Arbitrage	10.0%	5.2%	1.1	-7.8%	0.0	-0.1	**0.6**	0.2

*The above Merger Arbitrage and Convertible Arbitrage backtests use AQR/CNH proprietary datasets on merger arbitrage and convertible arbitrage and assumes constant leverage of 1.5:1 and 2:1, respectively. Annual fees for both backtests are 2.0% management fee and 0% performance fee. Annualized returns, annualized volatilities and correlations are calculated using rolling, quarterly observations from January 1990–December 2007. HFRI Converts is the HFRI RV: Fixed Income-Convertible Arbitrage Index and HFRI Mergers is the HFRI ED: Merger Arbitrage Index. Hypothetical data has certain inherent limitations, some of which are disclosed in the Appendix hereto.

Hedge Fund Beta Everywhere

Event Driven	Convertible Arbitrage	Global Macro
Fixed Income Arbitrage	Equity Market Neutral	Long/Short Equity
Dedicated Short Bias	Emerging Markets	Managed Futures

Explanatory Power of Hedge Fund Beta

Simple Study*: use long term index data (20+ years) to determine

- How much of hedge fund and fund of funds' performance can be explained by market betas and hedge fund betas
- The amount of "alpha" (positive or negative) delivered in excess of these market and hedge fund betas

Bottom line:

- Hedge fund betas capture a meaningful portion of the returns of hedge funds and fund of funds
- Market exposure explains most of the rest
- Estimated alpha is negative for the HFR FoF Index, once hedge fund beta returns are included

January 1994 – September 2017

	Dow Jones Credit Suisse Hedge Fund Index		HFR Fund of Funds Composite Index	
	Intercept	**t Stat**	**Intercept**	**t Stat**
Annualized Alpha	0.84%	0.82	-1.09%	-1.45
	Beta	**t Stat**	**Beta**	**t Stat**
Hedge Fund Beta Portfolio	0.29	8.78	0.21	8.63
MSCI World	0.25	12.61	0.23	15.88
MSCI World Lagged 1 Month	0.06	3.25	0.07	5.12
R-Squared	52%		61%	

*FOR ACADEMIC USE ONLY. Analysis based on monthly returns from Hedge Fund Research database and Credit Suisse; publicly available index data; and AQR representative strategy hypothetical net excess returns (used for the Hedge Fund Beta Portfolio). The representative AQR strategy is based on a backtest of the AQR DELTA strategy. This backtest is described in the disclosures section. Please see important disclosures in the Appendix relating to hypothetical performance and risk.

Bottom Line on Hedge Fund Beta

Hedge funds = alpha + beta + hedge fund beta

But:

- Beta is not desirable
- Empirically, alpha seems scarce

Hedge fund betas provide a lot of what investors want from HFs:

- Positive expected returns with low correlation to markets

In a better package:

- Cheaper, more liquid and more transparent

If hedge fund betas allow investors to mitigate hedge fund "dark sides", they offer a new model of alternative investing

Disclosures

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The information in this document, including statements concerning financial market trends, is based on current market conditions, which will fluctuate and may be superseded by subsequent market events or for other reasons. Performance of all cited indices is calculated on a total return basis with dividends reinvested.

Diversification does not eliminate the risk of experiencing investment losses. There is no guarantee, express or implied, that long-term return and/or volatility targets will be achieved. Realized returns and/or volatility may come in higher or lower than expected.

There are many risks associated with convertible securities including but not limited to liquidity risk, equity risk, interest rate risk, and credit risk of the underlying bond. Convertible bond securities may be considered illiquid securities, which cannot be sold or disposed of in the ordinary course of business at approximately the prices at which they are valued. Difficulty in selling securities may also result in a loss or may be costly to the portfolio.

There is a risk of substantial loss associated with trading commodities, futures, options, derivatives and other financial instruments. Before trading, investors should carefully consider their financial position and risk tolerance to determine if the proposed trading style is appropriate. Investors should realize that when trading futures, commodities, options, derivatives and other financial instruments one could lose the full balance of their account. It is also possible to lose more than the initial deposit when trading derivatives or using leverage. All funds committed to such a trading strategy should be purely risk capital.

Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index.

The MSCI World Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets.

The Barclays Capital U.S. Government Index is comprised of the U.S. Treasury and U.S. Agency Indices. The U.S. Government Index includes Treasuries (public obligations of the U.S. Treasury that have remaining maturities of more than one year) and U.S. agency debentures (publicly issued debt of U.S. Government agencies, quasi-federal corporations and corporate or foreign debt guaranteed by the U.S. Government). The U.S. Government Index is a component of the U.S. Government/Credit Index and the U.S. Aggregate Index.

The HFRI Fund Weighted Composite is designed to measure the broad hedge fund universe. It is asset-weighted and uses net of fee returns.

The Credit Suisse Hedge Fund Index is designed to measure the performance of the largest hedge funds across strategies. It is asset-weighted and uses net of fee returns.

Disclosures

AQR DELTA Strategy Backtest Methodology

The AQR DELTA backtest targets 10% annualized volatility, is based on monthly returns and is heavily discounted to reflect uncertainty in historical costs and opportunities. The backtest implements a risk-balanced exposure to nine broad strategies as described below and aims to maintain market neutrality.

Equity Market Neutral: Seeks to achieve a market neutral portfolio of US, European and Japanese equities, and targets market neutrality at all times by balancing long and short positions.

Long/Short Equity: Seeks relative value and timing opportunities in US, European, and Japanese equity markets by combining individual stock selection (long and short positions), industry rotation, and an equity market timing strategy.

Dedicated Short Bias: Seeks long and short exposure in US, European and Japanese equities aimed at taking advantage of stocks whose returns are likely to go down in the future.

Global Macro: Seeks to exploit price differentials between assets using both relative value and directional timing strategies between asset classes (stocks/bonds/cash). Assets include developed equity indices, developed currencies, fixed income futures, interest rate futures, and commodities.

Managed Futures: Seeks to take advantage of short-, medium- and long-term trends while limiting exposure to trends that may have become overextended. Assets include equity indices, developed bond futures, interest rate futures, currencies, and commodities.

Fixed Income Relative Value: Seeks to exploit price differentials in fixed income securities, and includes long/short relative value positions in developed market bonds and currencies, as well as a directional credit market timing strategy. Assets include bond futures, interest rate futures, developed currencies, high yield credit, and corporate credit.

Event Driven: Has a focus on merger arbitrage. Seeks to hedge by shorting shares of the acquirer in mergers with a stock payment component and, when appropriate, using a broad market hedge. The strategy also invests in corporate events (spin-offs, split-offs, and corporate structure trades).

Convertible Arbitrage: Seeks to capture the discount between the current price of convertible bonds and their fundamental value as a bond plus an equity call option.

Emerging Markets: Aims to use both relative value and directional emerging market strategies. Assets include emerging equity indices, emerging currencies, emerging stocks, emerging sovereign credit, and emerging government bonds.

The strategies are denominated in USD and their benchmark is the Merrill Lynch 3 Month Treasury Bill Index. If returns are shown excess of cash, cash is the Merrill Lynch 3 Month Treasury Bill Index.