



The Fund Manager Perspective

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AQR Capital Management

SUERF Wien 2015

Asset-liability management with ultra-low interest rates

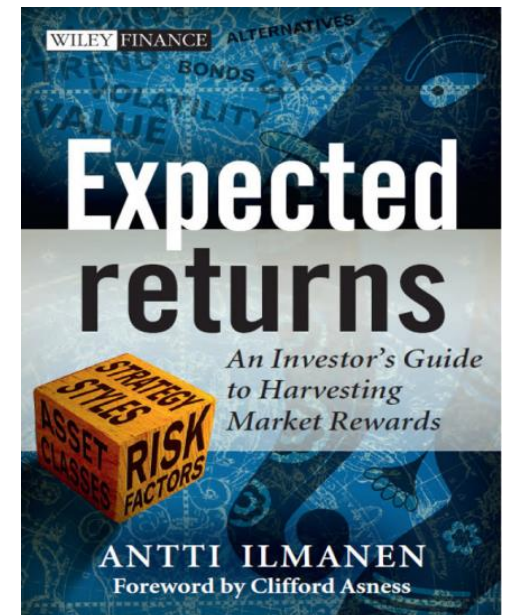
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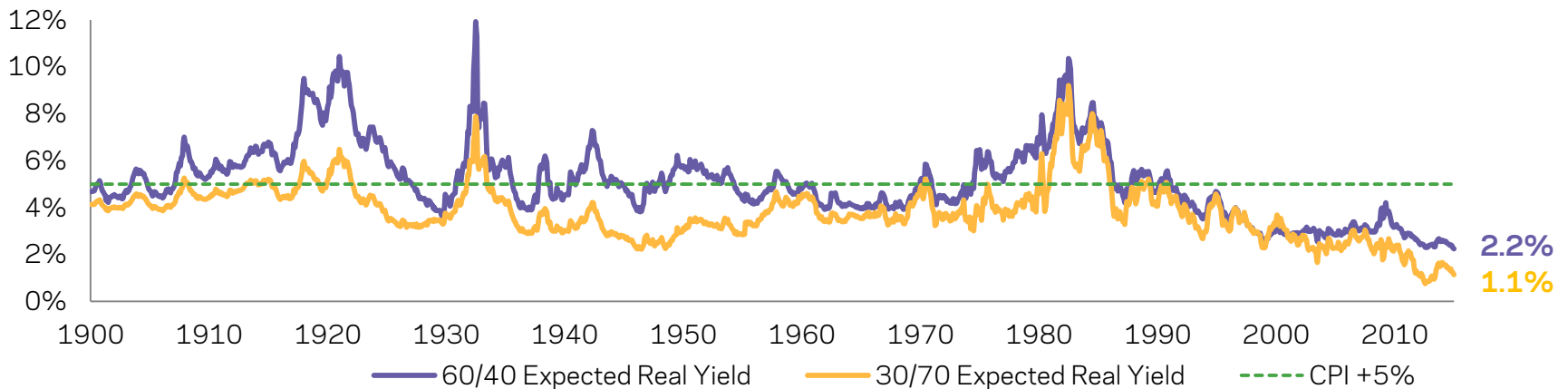
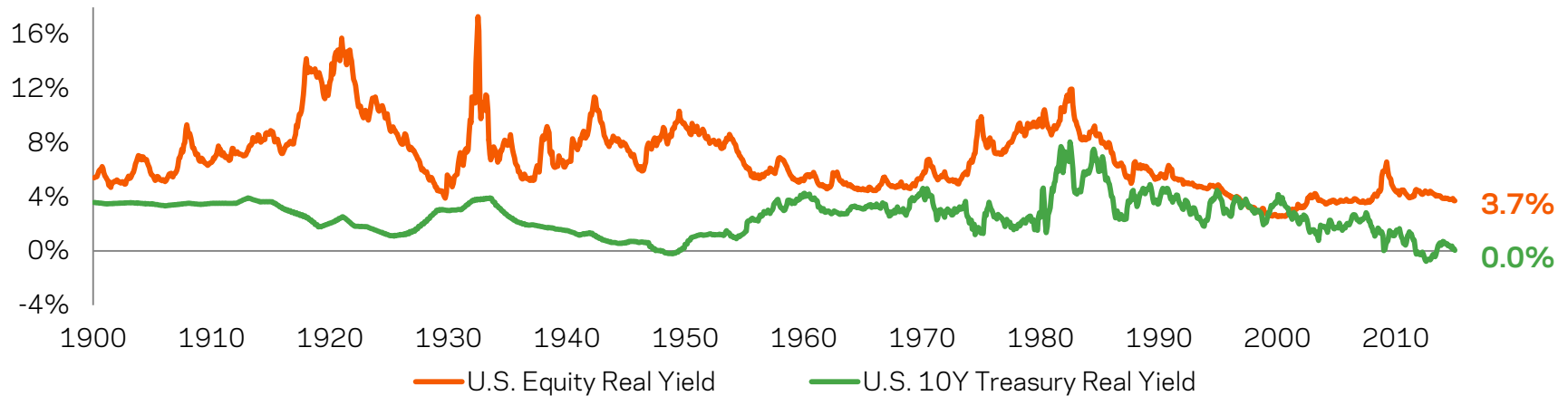


21st Century: A World of Low Expected Returns

Forward-Looking Real Returns Are Low For Both Main Asset Classes

Expected Real Return of U.S. Stocks, Bonds and Example Portfolios

January 1900–December 2014



Sources: AQR, Robert Shiller's web site, Kozicki-Tinsley (2006), Federal Reserve Bank of Philadelphia, Blue Chip Economic Indicators, Consensus Economics. Stocks are represented by the Standard & Poor's 500 Index since 1957, and Bonds are represented by long-dated Treasuries. The 60/40 and 30/70 Expected Real Yield are represented by Stocks/Bonds. The equity yield is a 50/50 mix of two measures: 50% Shiller E/P * 1.075 and 50% Dividend/Price + 1.5%. Bond yield is 10 year real Treasury Yield over 10 year inflation forecast as in Ilmanen (2011). Scalars are used to account for long term real Earnings Per Share (EPS) Growth. 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. Past performance is not a guarantee of future performance. Please read important disclosures in the Appendix.

Also Equities Have Low Expected Returns Today

How Do We Estimate Real Returns for Equities?

We believe useful 5-10 year equity market expectations can be built using some basic measures

Prospective real returns remain near 4% in the U.S.; higher in Europe and Emerging Markets; little change from previous year. For bonds, these estimates are near zero.

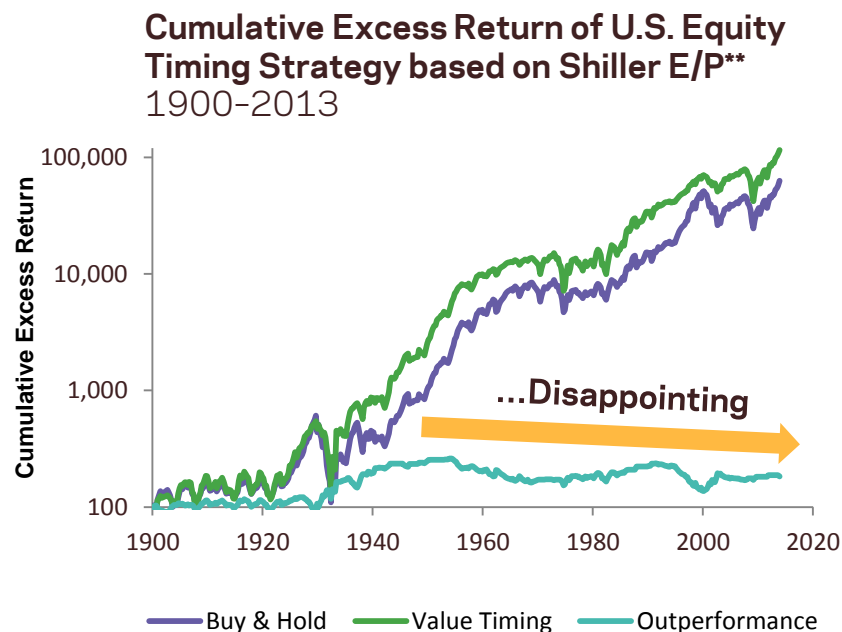
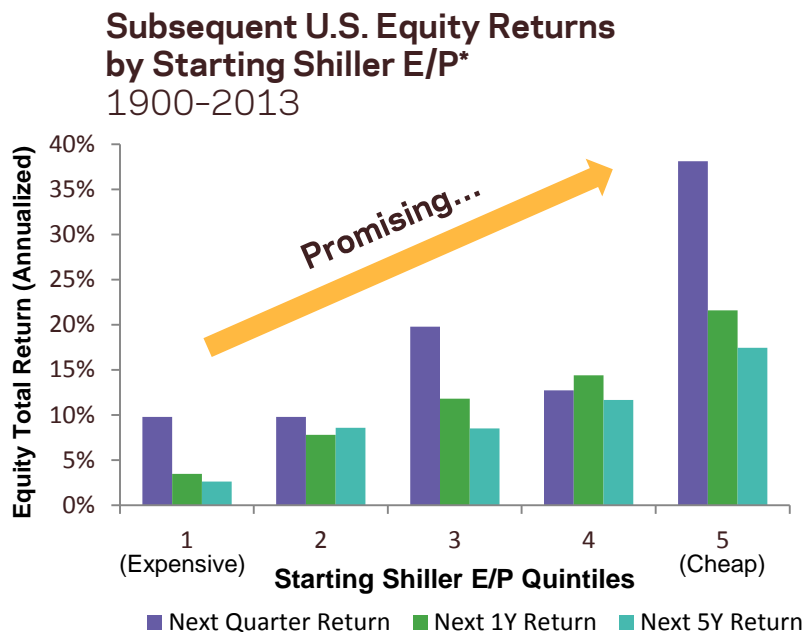
	Shiller-Based	Dividend Discount-Based		Combination	
	Adj. Shiller Earnings Yield	Dividend Yield	+	Earnings Growth Estimate	Real Equity Yield
U.S.	4.0%	1.7%	+	1.8%	3.8%
U.K.	7.2%	3.6%	+	1.6%	6.2%
Euro-5	6.8%	2.8%	+	1.5%	5.5%
Japan	4.2%	1.5%	+	1.4%	3.5%
Emerging Mkts	7.8%	3.0%	+	2.5%	6.6%

Source: AQR. Data as of 12/31/2014. Data description: The real equity yield is an average of two approaches - the Shiller earnings yield (using 10- year earnings) scaled by 1.075 (embedding an annual real EPS growth of 1.5%), and the sum of dividend yield plus an estimate of long-term real growth of earnings-per-share. U.S. is based on the S&P 500; U.K. on the FTSE 100; "Euro-5" is a GDP-weighted average of large-cap indices in Germany, France, Italy, the Netherlands and Spain; Japan is based on the Nikkei; and "Emerging Mkts" is based on the MSCI Emerging Markets Index. Past performance is not a guarantee of future results. Please read important disclosures in the Appendix.



Contrarian Timing Looks Promising But is Difficult in Practice

Contrarian Investors May Go To Cash Too Early (“Early = Wrong”)



- Simple quintile analysis implies hindsight bias
- Out-of-sample contrarian strategies tend to linger on extreme signals
- E/P generally trended lower since 1950s, causing the strategy to be underinvested on average

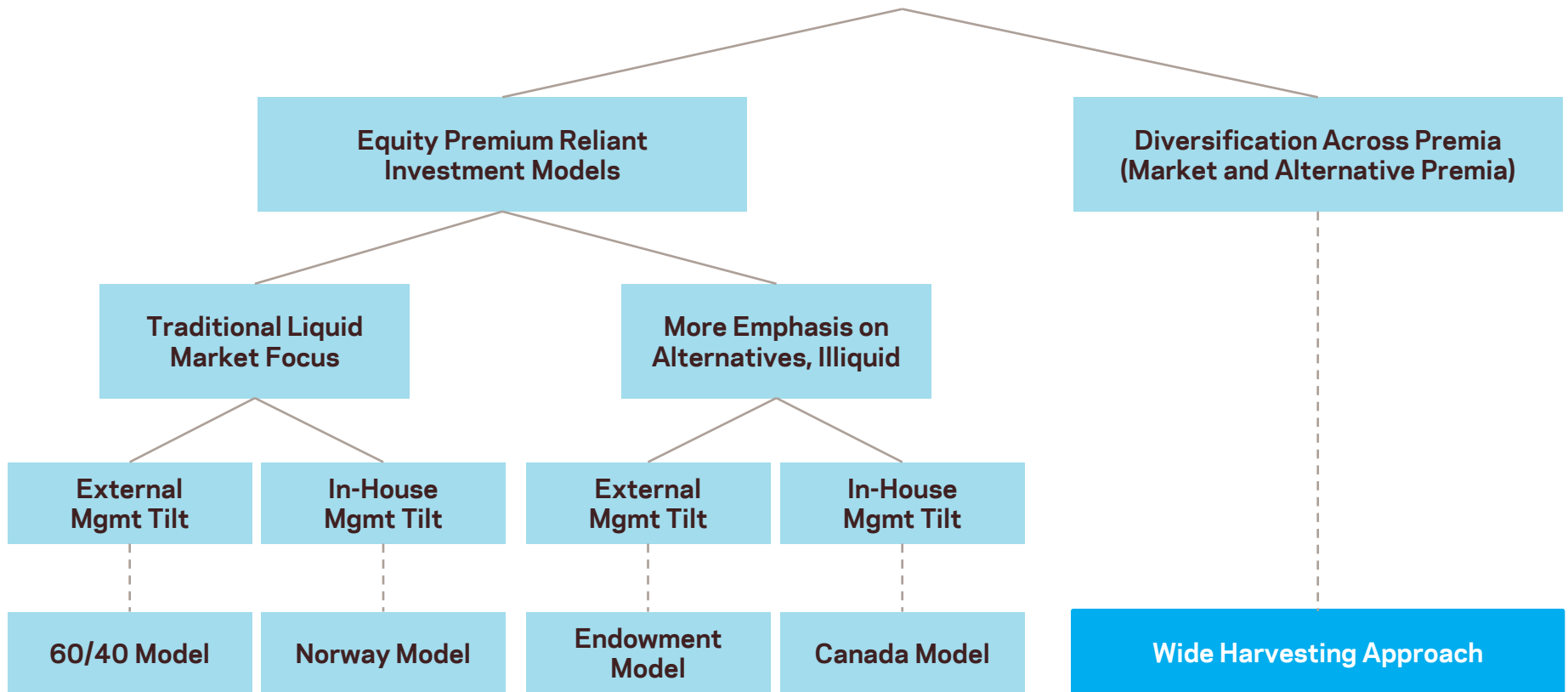


Sources: * Smoothed earnings yield from Robert Shiller’s website. U.S. equity market returns from Global Financial Data (GFD), Ibbotson/Morningstar and Datastream. Realized equity return calculations from AQR. ** Hypothetical U.S. equity timing strategy rebalances each quarter, applying a tactical weight of 0.5, 0.75, 1.0, 1.25 or 1.5 depending on latest Shiller E/P quintile, based on a rolling 30-year sample. Returns are gross of transaction costs and fees.

Past performance is not a guarantee of future performance. These are not the returns of actual portfolios and are for illustrative purposes only. Hypothetical performance results have certain inherent limitations, some of which are disclosed in the Appendix hereto.

Different Investment Models To Tackle The Challenge

Main Investment Models Are Different ... and Yet All so Directional



Source: AQR. Chart is provided for illustrative purposes only.



A Prescription: Harvesting Diverse Return Sources

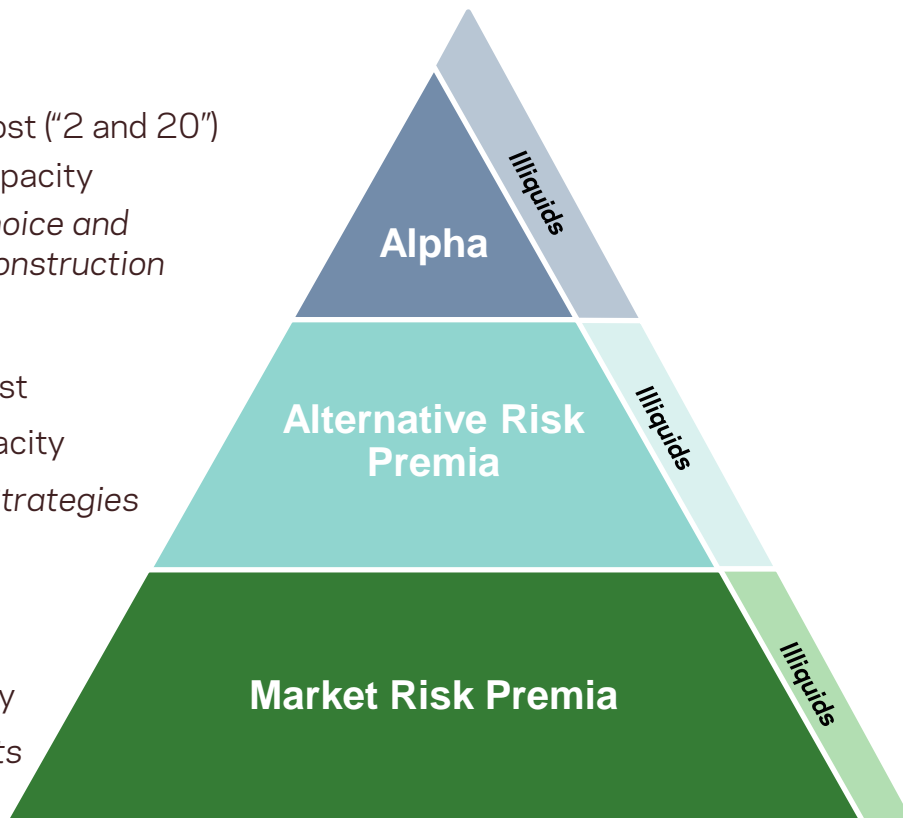
Investors Can Also Diversify Beyond Market Risk Premia

Seek to harvest many market and alternative risk premia in a balanced way. We believe tactical timing, illiquid investments, and “star” managers are secondary to these core return sources.

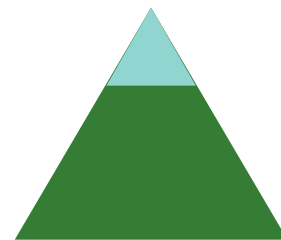
- Highest Cost (“2 and 20”)
- Lowest Capacity
- *In asset choice and portfolio construction*

- Moderate Cost
- Medium Capacity
- *Long/Short Strategies*

- Lowest Cost
- Highest Capacity
- *Long-Only Assets*



What do you get from many active managers and long-only smart beta portfolios?
Mainly market risk premia



Alternative risk premia are also sometimes referred to as exotic or smart beta premia



Style Perspective on Alternative Risk Premia

Which Style Premia Warrant Strategic Risk Allocations?

We have identified 4-5 styles that have historically generated positive long-run returns across a variety of asset groups and we think deserve meaningful strategic allocations in investor portfolios*

4 Market-Neutral Styles

Value	The tendency for relatively cheap assets to outperform relatively expensive ones
Momentum	The tendency for an asset's recent relative performance to continue in the near future
Carry	The tendency for higher-yielding assets to provide higher returns than lower-yielding assets
Defensive	The tendency for lower-risk and higher-quality assets to generate higher risk-adjusted returns

May Add 1 Directional Style

Trend	The tendency for an asset's recent performance to continue in the near future
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Sources: AQR and Ilmanen (2011). *Please see upcoming slides for further details. Past performance is not a guarantee of future performance. Please read important disclosures in the Appendix.

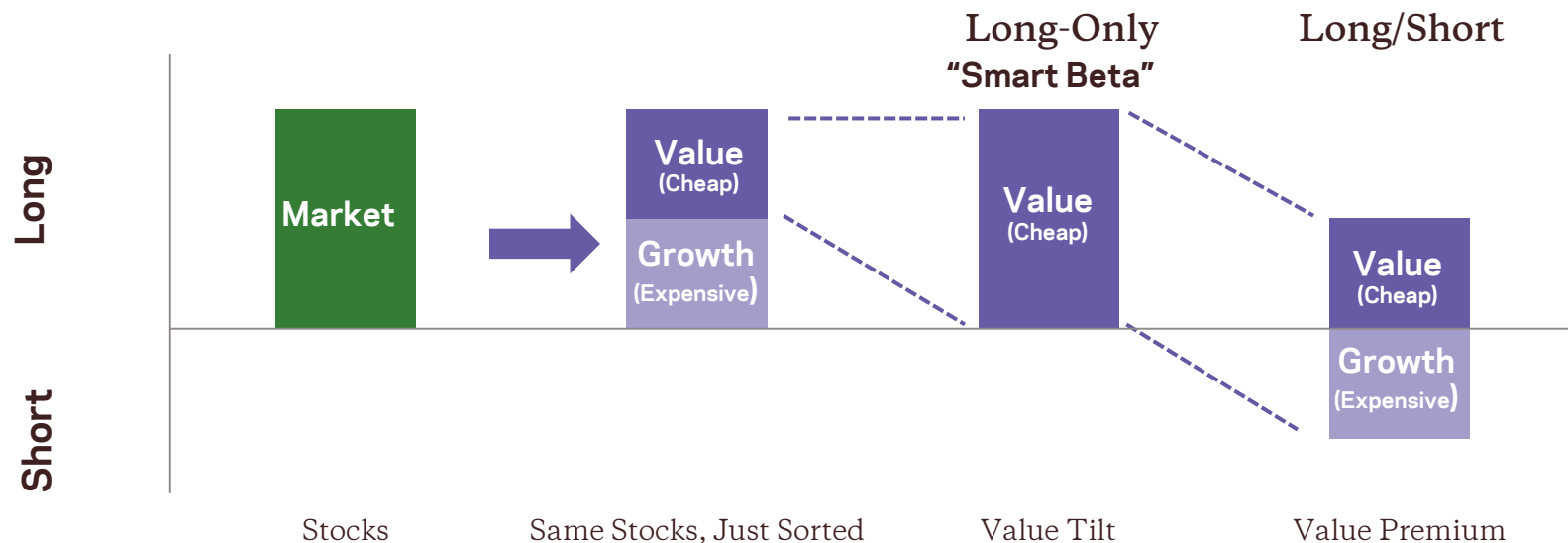
How to Harvest Style Premia - Design Decisions (A)

Long-Only Tilts or Long/Short Strategies?

Style exposures are used by many active managers to improve **long-only** portfolios, but we believe investors can maximize style benefits using **long/short strategies**:

- **Efficiency** Long-only portfolios seek to capture only part of the return source
- **Impact** Long-only portfolios are dominated by market beta; offer less active style exposure
- **Breadth** Long/short style strategies can be applied to a broader range of asset groups

However, various **constraints** may keep long-only the preferred approach for many investors.



Source: AQR. For illustrative purposes only.



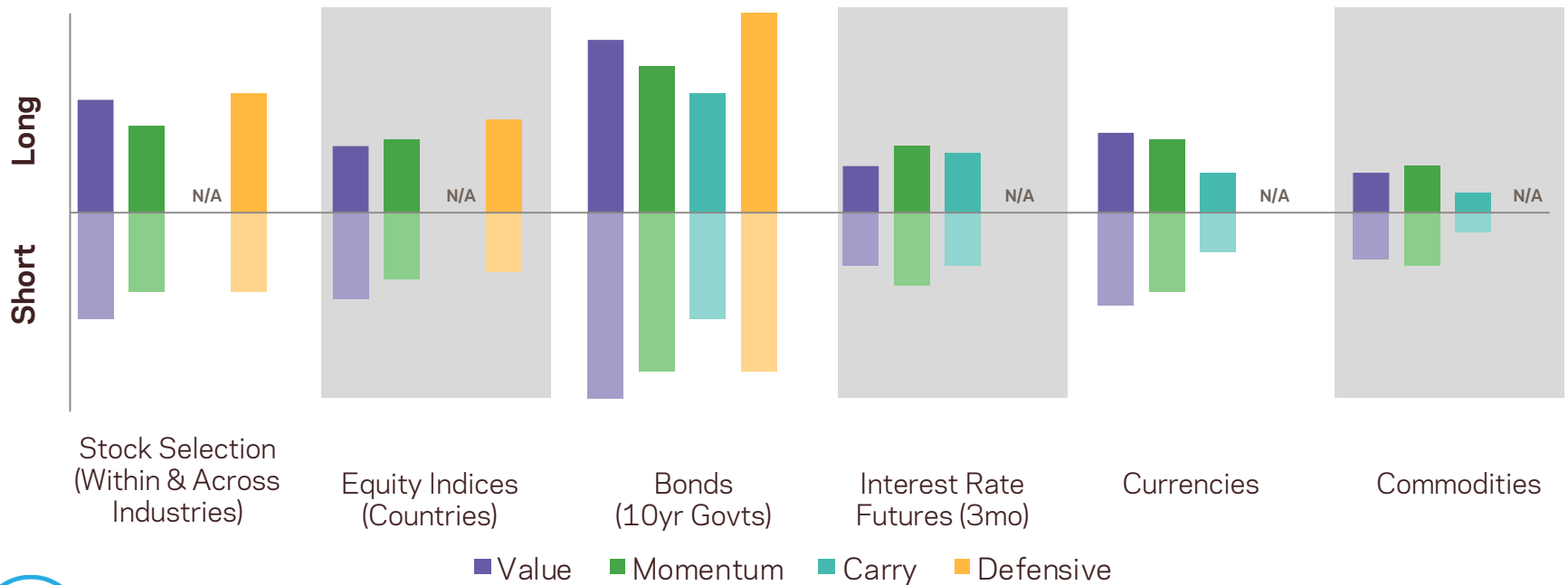
How to Harvest Style Premia - Design Decisions (B)

From Single Styles in One Asset Class to Multi-Styles in Many Asset Classes

We believe a multi-style approach has several benefits over a single-style approach (diversification, t-cost netting, promoting patience)

Moreover, harvesting long/short style premia in many asset classes can further enhance diversification

Finally, we again believe more in strategic than tactical allocations. Style timing is even harder than market timing - and the bar is higher (given the greater loss of diversification).

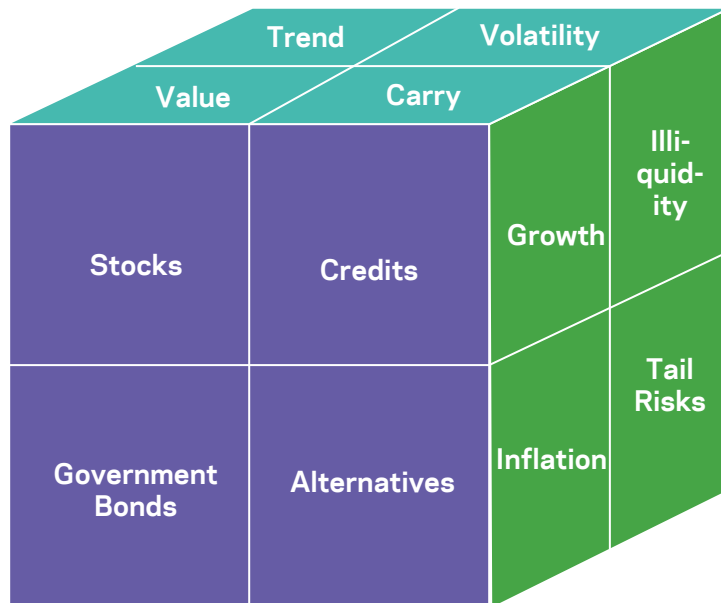


Source: AQR. Graphic above is stylized and for illustrative purposes only. Stock/Equity Carry is N/A due to the high correlation with Value. Defensive style is N/A in the last three asset classes due to lack of natural definitions in these macro assets. Diversification does not eliminate the risk of experiencing investment losses.

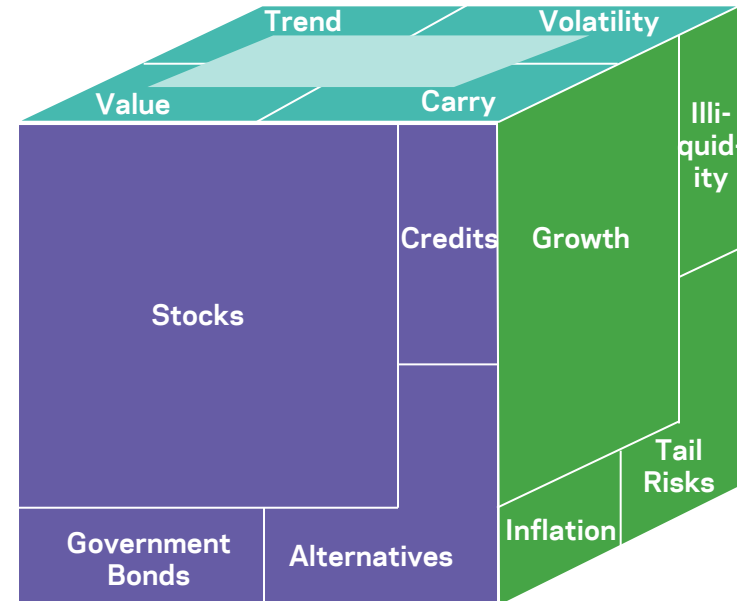
The Cube: Three Complementary Perspectives on a Portfolio

From Each Side Can Ask if Portfolio Has Balance (or Desired Imbalance)

The Cube: **Asset Class**, **Strategy Style** and **Underlying Risk Factor** Perspectives to Investing



Many Institutional Portfolios Imply a Lopsided Cube



Source: AQR. Provided for illustrative purposes only.



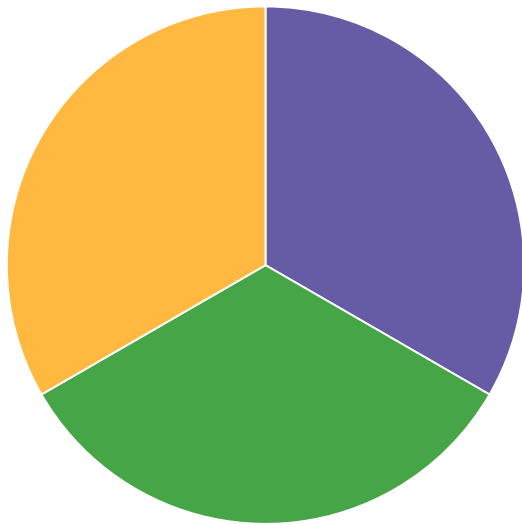
1. Asset Class Diversification: Long-Only Market Risk Premia

Evidence on All Three Sides of the Cube, First Between Asset Classes

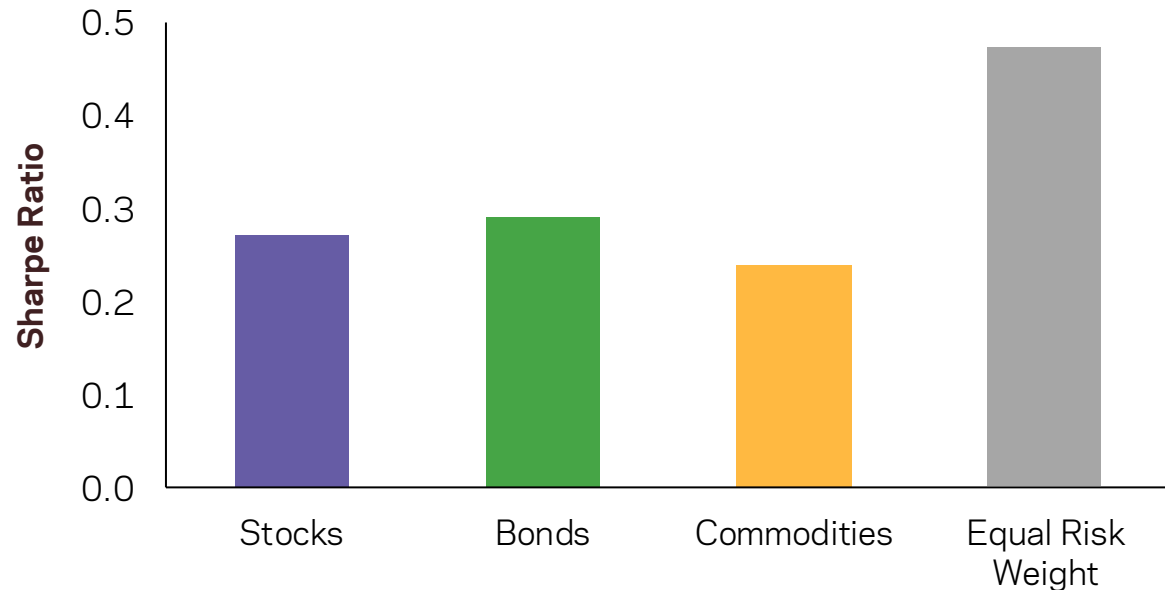
Avoiding equity concentration via risk parity can give a good strategic base for long-only investing

Diversification can boost portfolio Sharpe ratio - though leverage needed to reach 10% volatility

Risk Allocation in Risk Parity...



... Is Supported by Long-Run Evidence
1971-2013



Source: AQR. Data from January 1971–December 2013. Inflation risk historical Sharpe ratio is calculated using commodities return data as Inflation-Protected Securities were not available for the majority of the observation period. The *Equal Risk Weight Strategy* is a simulated portfolio, constructed by AQR by allocating risk equally across three asset classes: stocks, bonds and commodities, using the following indices in strategy construction: MSCI World Index (stocks), Barclays Capital U.S. Government Index and Ibbotson Government Index (before 1976) [bonds], and S&P 500 GSCI Index (commodities). The simulated portfolio targets an equal amount of volatility from each asset class every month. Realized Sharpe Ratios are based on each asset class/index gross monthly returns in excess of the 3 month T-bill. 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. Charts are for illustrative purposes only and are based on AQR volatility and correlation estimates. Exposures are subject to change without notice. Please read important disclosures in the Appendix.

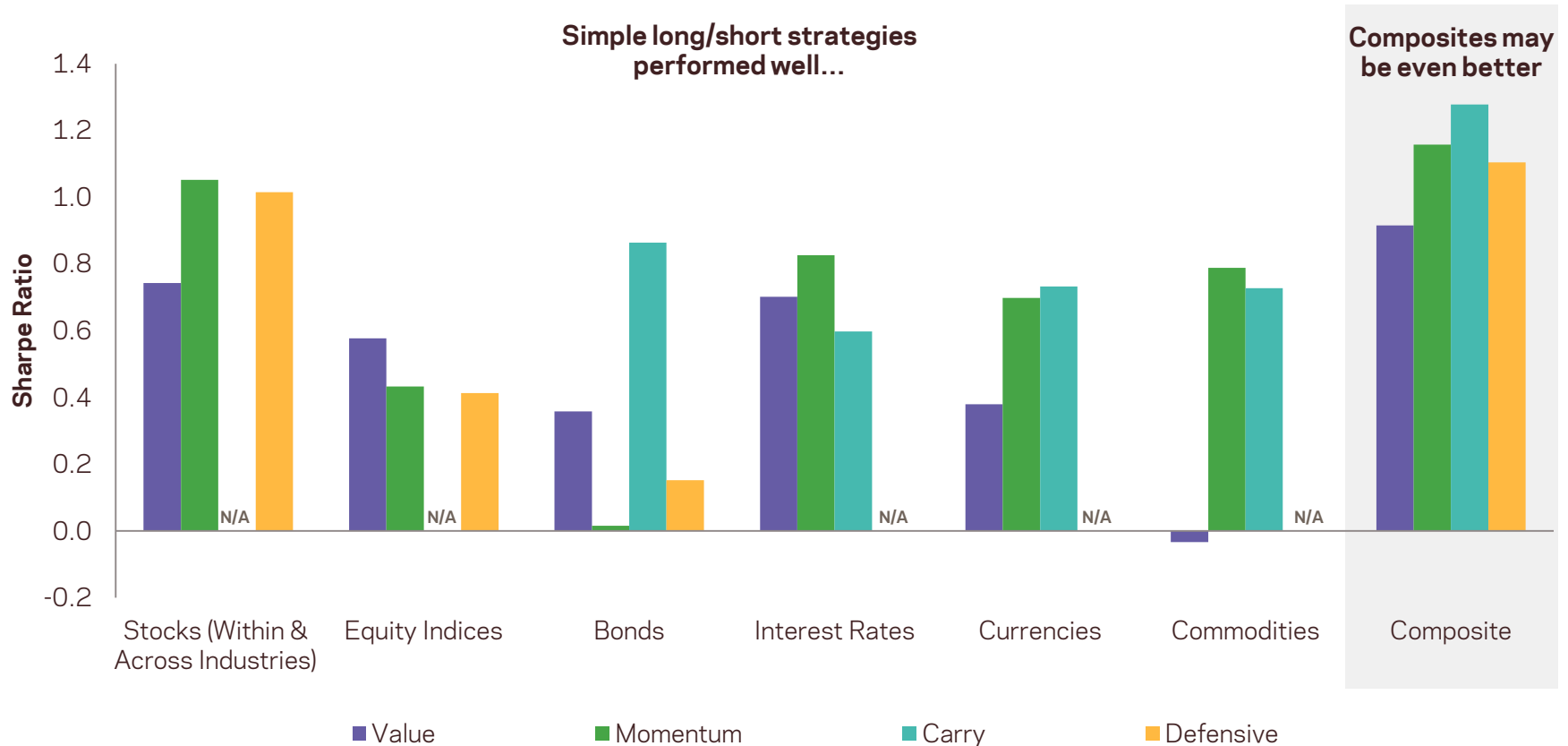


2. Alternative Risk Premia Diversification: Style Perspective

Style Premia Have Given Long-Run Tailwinds in Many Asset Groups

Hypothetical Gross Sharpe Ratios of Long/Short Style Components Across Asset Groups*

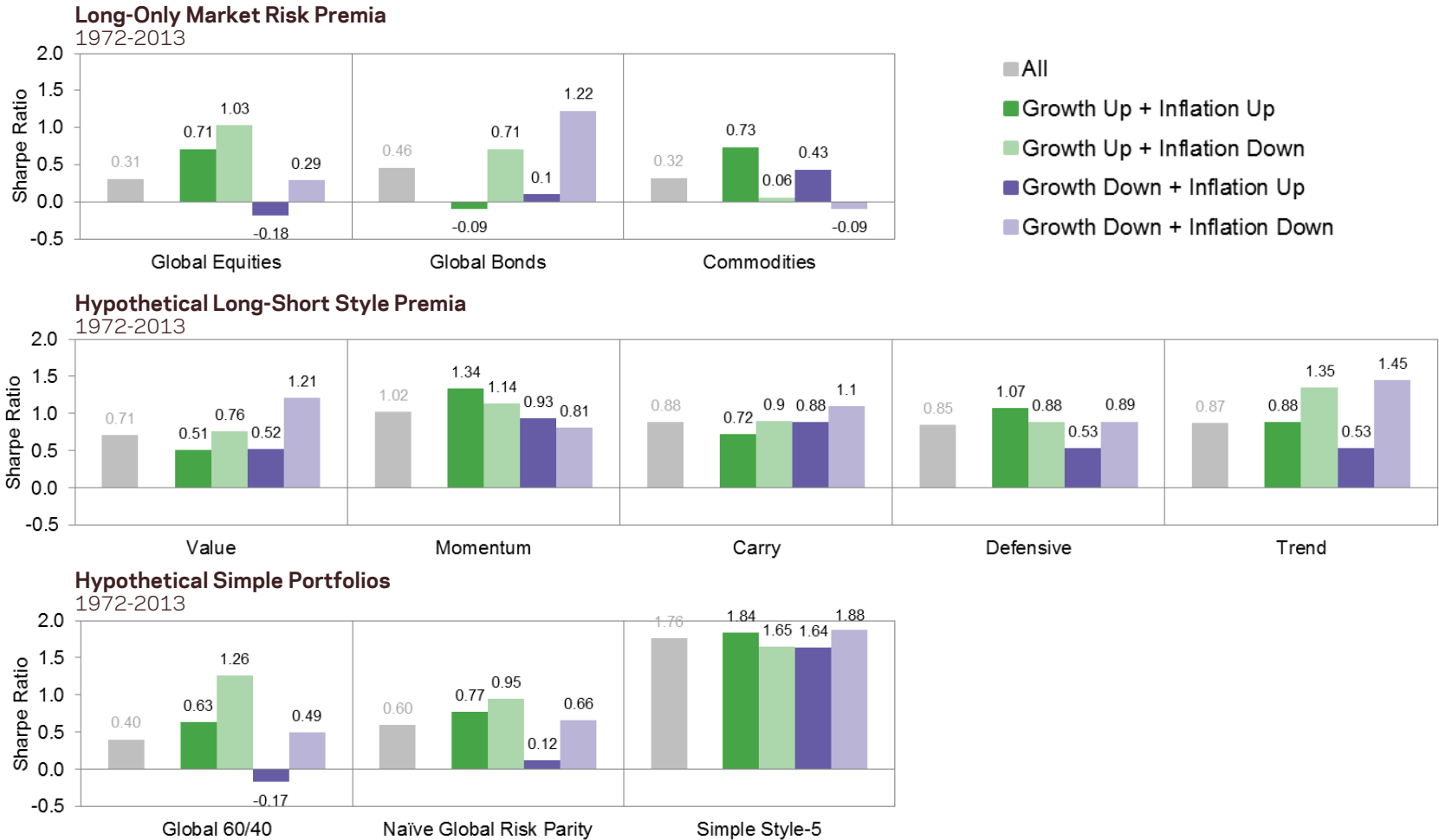
January 1990-December 2013



Source: AQR. Above analysis reflects a backtest theoretical long/short style components based on AQR definitions across identified asset groups, and is for illustrative purposes only and is not based on an actual portfolio AQR manages. The results shown do not include advisory fees or transaction costs; if such fees and expenses were deducted the Sharpe ratios would be lower. Please see the Appendix for further details on the investment universe and the allocation methodology used to construct the backtests and Composite. Hypothetical data has certain inherent limitations, some of which are disclosed in the Appendix hereto.

3. Macro Diversification: Mapping Investments to Macro Risks

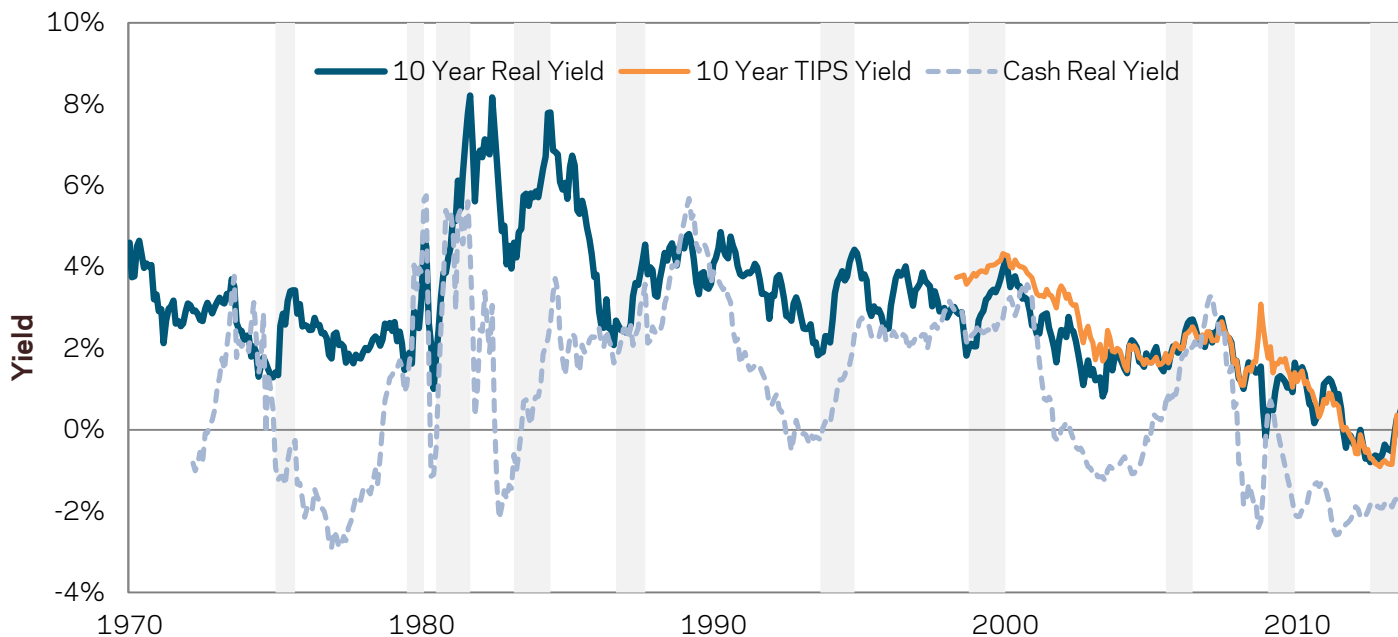
Hypothetical Performance Across Growth and Inflation Environments



Source: Data from January 1972- June 2013. Bloomberg, AQR. Global Equities is the MSCI World index. Global Bonds is a GDP weighted composite of Australian, German, Canadian, Japanese, U.K. and U.S. 10-year government bonds. Commodities is an equal dollar-weighted index of 24 commodities. Long-Short Style Premia are backtests of style premia as described herein. Global 60/40 takes 60% Global Equities and 40% Global Bonds. Naïve Global Risk Parity uses trailing 12-month volatility and long-term correlation assumptions to target equal risk-contributions from a portfolio of Global Equities, Global Bonds and Commodities. Simple Style-5 is an equal weighted composite of the five long/short style premia. Please see Appendix for more details on the construction of the return series and macroeconomic environmental indicators. The analysis is based on hypothetical returns gross of trading costs and fees. Hypothetical performance results have certain inherent limitations, some of which are disclosed in the Appendix hereto. Past performance is not a guarantee of performance.

How About the Tail Risk of Sharply Rising Real Bond Yields?

Ten Episodes of Sharply Rising Real Yields



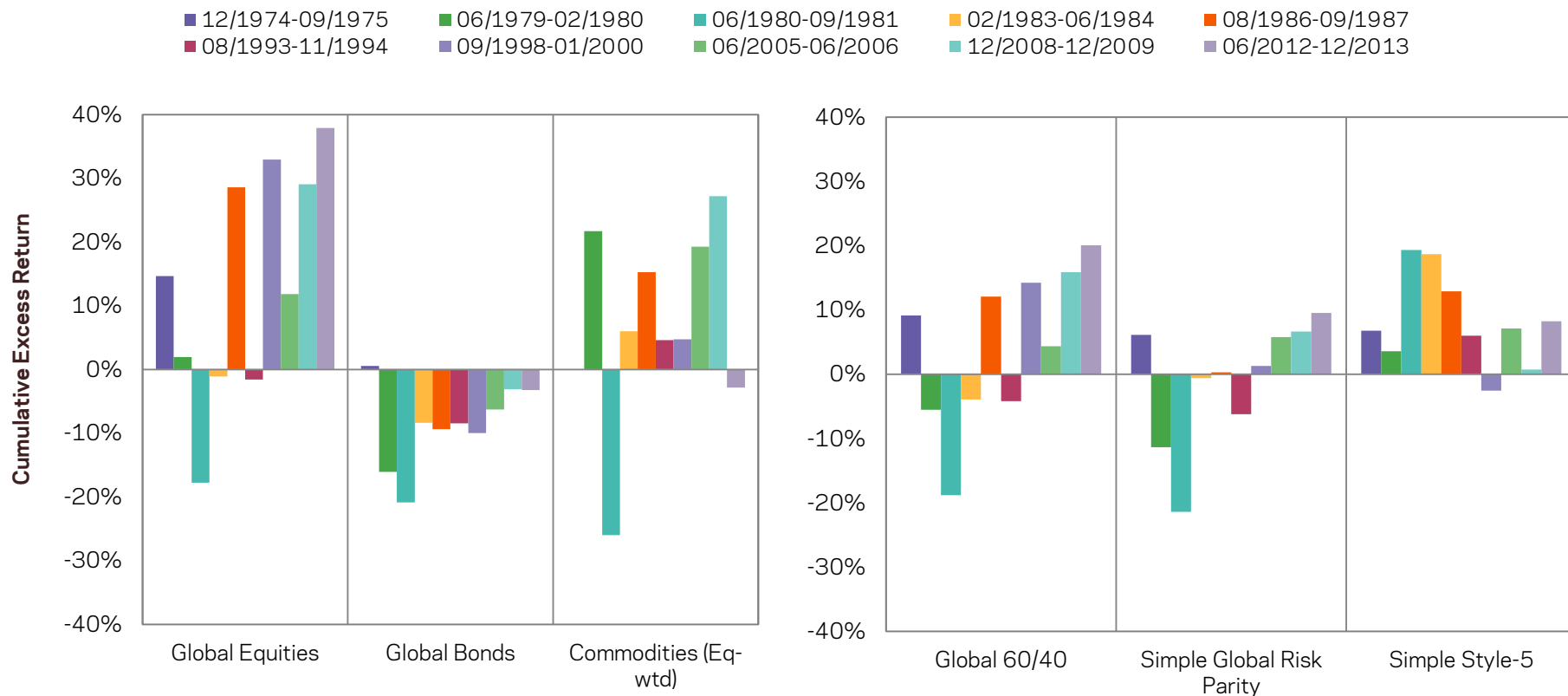
Episode	1	2	3	4	5	6	7	8	9	10
Years	12/74-09/75	06/79-02/80	06/80-09/81	02/83-06/84	08/86-09/87	08/93-11/94	09/98-01/00	06/05-06/06	12/08-12/09	06/12-12/13
Monetary Policy Change in Fed Tightness	-1.2%	3.0%	2.8%	1.4%	0.4%	1.4%	0.0%	1.1%	-1.8%	-0.5%
Growth: Change in CFNAI (Z-score)	4.31	-0.24	2.27	0.92	0.56	0.68	0.37	-0.45	2.76	0.54
Inflation Change in CPI YoY	-4.4%	3.3%	-3.4%	0.7%	2.8%	-0.1%	1.3%	1.8%	2.6%	-0.2%
Change in Real Yields	+2.1%	+3.3%	+7.2%	+3.8%	+2.5%	+2.6%	+2.3%	+1.3%	+1.8%	+1.4%
Number of Months	9	8	15	16	13	15	16	12	12	18



Sources: AQR, Bloomberg. Ex-ante real yield is 10-year bond yield minus survey-based measure of expected inflation over following 10 years. Past performance is not a guarantee of future performance.

Long/Short Portfolios May Be More Resilient When Yields Rise

Combination of Styles Has Held Up Well in Rising Real Yield Episodes



Source: AQR. See Alternative Thinking, October 2013, or the AQR white paper Exploring Macroeconomic Sensitivities (2013) for details of how these strategies are constructed. Briefly, Global Equities is the MSCI World index net dividends. U.S. Equities is the S&P 500. Global Bonds is a GDP-weighted composite of Australian, German, Canadian, Japanese, U.K. and U.S. 10-year government bonds. U.S. Bonds are US 10-year Government Bonds. Commodities is an equal-dollar-weighted index of 24 commodity futures. Commodities (GSCI) is the GSCI Commodities Index. Details for Value, Momentum, Carry and Defensive can be found at the end of this paper. Global 60/40 takes 60% Global Equities and 40% Global Bonds. Simple Global Risk Parity uses trailing 12-month volatility and long-term correlation assumptions to target equal risk-contributions from a portfolio of Global Equities, Global Bonds and Commodities. Simple Style-5 is an equal-weighted composite of five long/short style premia (value, momentum, carry, defensive, trend) harvested in many asset classes. The analysis is based on hypothetical returns gross of trading costs and fees. Hypothetical data has certain inherent limitations, some of which are disclosed in the Appendix hereto. 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.



Smart Harvesting Matters as Much as Return Sources

Pay Attention to Every Step of the Investment Process



← What Investors Seek

What They Miss



Source: Penrose, Colorado, Chamber of Commerce. <http://www.penrosechamber.com/LocalInformation/History.aspx>

Today's Presenter

Antti Ilmanen, Principal, Portfolio Solutions Group

Antti Ilmanen, a Principal at AQR, manages the Portfolio Solutions Group, which advises institutional investors and sovereign wealth funds, and develops AQR's broad investment ideas. Before AQR, Antti spent seven years as a senior portfolio manager at Brevan Howard, a macro hedge fund, and a decade in a variety of roles at Salomon Brothers/Citigroup. He began his career as a central bank portfolio manager in Finland. Antti earned a Ph.D. in finance from the University of Chicago and M.Sc. degrees in economics and law from the University of Helsinki. Over the years, he has advised many institutional investors, including Norway's Government Pension Fund Global and the Government of Singapore Investment Corporation. Antti has published extensively in finance and investment journals and has received the Graham and Dodd award and the Bernstein Fabozzi/Jacobs Levy award for his articles. His book *Expected Returns* (Wiley, 2011) is a broad synthesis of the central issue in investing. Antti recently scored a rare double in winning the best-paper and runner-up award for best articles published in 2012 in the *Journal of Portfolio Management* (coauthored articles "The Death of Diversification Has Been Greatly Exaggerated" and "The Norway Model").



A1. Building Macro Indicators / Investment Return Series

Macro Indicators

Our first choice was to decide which macro dimensions are most relevant. We chose economic growth, inflation, real yields, volatility, and illiquidity. Monetary policy was another candidate; it is closely related to real yields. We choose to construct macro indicators, or risk factors, mainly based on fundamental economic data, and not based on asset market returns (which are “too close” to the patterns we try to explain). For example, potential market-based proxies of economic growth include equity market returns, the relative performance of cyclical industries, dividend swaps, and estimates from cross-sectional regressions of asset returns on growth surprises. This choice brings its own problems, notably timing challenges as macroeconomic data are backward-looking, published with lags and later revised, while asset prices are clearly forward-looking. The impact of publication lags and the mismatch between backward- and forward-looking perspectives can be mitigated by using longer windows. Thus, we use contemporaneous annual economic data and asset returns through our analysis (past-year data with quarterly overlapping observations). Arguably composite growth surprise indices are the best proxies of economic growth news, but such composites are available at best going back to 1990s. Forecast changes in economist surveys as well as business and consumer confidence surveys may be the next best choices because they are reasonably forward-looking and timely. In a globalized world, it is not clear whether we should focus only on domestic macro developments, but data constraints make us focus on U.S. data. Finally, it is not clear how real economic growth ties to expected corporate cash flow growth (e.g., earnings per share) that influence stock prices or to real yields that influence all asset prices but especially those of bonds.

Each of our macro indicators combines two series, which are first normalized to Z-scores: that is, we subtract a historical mean from each observation and divide by a historical volatility. We use rolling 10-year windows for means and volatilities when normalizing the last three macro indicators. However, for growth and inflation indicators we use in-sample 1972-2013 means and volatilities because we do not have long histories of economist forecasts needed to construct the surprise series below. This choice does not seem to change any major results. When we classify our quarterly 12-month periods into, say, ‘growth up’ and ‘growth down’ periods, we compare actual observations to the median so as to have an equal number of up and down observations (because we are not trying to create an investable strategy where data should be available for investors in real time, we use the full sample median).

The underlying series for our growth indicator are the Chicago Fed National Activity Index (CFNAI) and the “surprise” in industrial production growth over the past year. Since there is no uniquely correct proxy way to capture “growth”; averaging may make the results more robust and signals appropriate humility. CFNAI takes this averaging idea to extremes as it combines 85 monthly indicators of U.S. economic activity. The other series – the difference between actual annual growth in industrial production and the consensus economist forecast a year earlier – is narrower but more directly captures the surprise effect in economic developments. We use median forecasts from the Survey of Professional Forecasters data as published by the Philadelphia Fed. While data surprises a priori have a zero mean, this series has exhibited a downward trend in recent decades, reflecting the (partly unexpected) relative decline of the U.S. manufacturing sector.

Our inflation indicator is also an average of two normalized series. One series measures the de-trended level of inflation (CPIYOY minus its mean, divided by volatility), while the other measures the surprise element in realized inflation (CPIYOY minus consensus economist forecast a year earlier).

Investment Return Series

The investment return series we study include both asset class premia and style premia. The former are long-only returns but expressed in excess returns over the Treasury bill rate. The latter are long-short returns and scaled to target or realize 10% annual volatility. We subtract no trading costs or fees, which makes a bigger difference for the long-short strategies.

The main asset class premia we focus on are U.S. equities (proxied by the S&P500 index), U.S. Treasuries (proxied by the constant-maturity 10-year return), and commodities (proxied by the S&P GSCI index). For robustness, we also studied global equities (MSCI World), global bonds (GDP-weighted average of 10-year government bonds in six countries), and an equal-weighted composite of 24 commodity futures. In addition, we studied the credit excess returns of investment-grade corporates over duration-matched Treasuries (Barclays index data since 1973) and TIPS returns (using an in-house proxy for inflation-linked bond performance; the series begins already in 1980, well before the first TIPS were issued in 1997).

Style premia series are more difficult to compile, especially because we apply these premia in numerous asset classes. To start histories back in 1972, we splice together different series. Since 1990, we use value, momentum, carry and defensive style premia as described in “Investing With Style” (AQR white paper, 2012) Available upon request. The intuition in the four styles is to buy assets that are cheap, or recently outperforming, or high-yielding, or boring (low risk) – while selling assets with opposite characteristics. We apply these styles in stock selection, industry allocation, country allocation in equity, fixed income and currency markets, as well as in commodities.

Briefly, we construct market-neutral long-short portfolios in several asset classes (stocks, bonds, currencies, commodities) based on a few indicators in each style. Besides the broadest style composites, we also construct separate style premia for global stock selection (GSS) and global asset allocation (GAA). When we create the composite GAA style premia, we use the same relative risk weights for asset classes as “Investing With Style” (33% equity country allocation, 25% fixed income, 25% currencies, 17% commodities). However, for GSS we use 50/50 risk weights between stock selection within industries and across industries (to be in line with the common but arguably inefficient practice of letting across-industry positions matter as much as within-industry positions), and we also use 50/50 risk weights when we combine GSS and GAA style composites. For 1972-1989, we source value and momentum style returns from “Value and Momentum Everywhere” (*Journal of Finance*, 2013), defensive style returns from “Betting Against Beta” (forthcoming in *Journal of Financial Economics*, 2013), and GSS carry style premium from dividend yield strategy returns in Ken French’s data library. We construct the GAA carry style premia before 1990 as well as some early histories of GAA value, momentum and defensive styles with AQR in-house backtests.

In addition to the market-neutral “big four” style premia, we use market-directional premia. Trend style applies 12-month trend-following strategy in liquid investments in four major asset classes (GAA). While the style is nearly uncorrelated with equity markets in the long run, at any point in time it can be directionally long or short. We source trend style premia from “Time Series Momentum” (*Journal of Financial Economics*, 2012) and in-house data extension before 1985.

While the GSS style premia proxies we use since 1990 are market (beta) neutral, the value and momentum premia before 1990, and the carry premium throughout, are ‘only’ dollar-neutral and may contain moderate empirical beta exposures. The defensive style premia are beta-neutral through the whole sample (we buy larger amounts of low-risk investments than we sell high-risk investments), which means that they are actually not as defensive as the dollar-neutral quality style. (The general lesson is that we need to be precise in understanding strategy designs. Just as corporate bond positions will have very different market exposures depending on whether they are duration-hedged with Treasuries, market exposures of style premia will depend on the degree of hedging).



A2. Performance Disclosures

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Gross performance results do not reflect the deduction of investment advisory fees, which would reduce an investor's actual return.



A2. Performance Disclosures

AQR backtests of Value, Momentum, Carry and Defensive theoretical long/short style components are based on monthly returns, undiscounted, gross of fees and transaction costs, excess of a cash rate proxied by the Merrill Lynch 3-Month T-Bill Index, and scaled to 12% annualized volatility. Each strategy is designed to take long positions in the assets with the strongest style attributes and short positions in the assets with the weakest style attributes, while seeking to ensure the portfolio is market-neutral. The Composite is based on an allocation to the asset group components based on their liquidity and breadth. Please see below for a description of the Universe selection.

Stock and Industry Selection: approximately 1,500 stocks across Europe, Japan, U.K. and U.S. **Country Equity Indices:** Developed Markets: Australia, Canada, Eurozone, Hong Kong, Japan, Sweden, Switzerland, U.K., U.S. Within Europe: Italy, France, Germany, Netherlands, Spain. Emerging Markets: Brazil, China, India, Russia, South Africa, South Korea, Taiwan. **Bond Futures:** Australia, Canada, Germany, Japan, U.K., U.S. **Interest Rate Futures:** Australia, Canada, Europe (Euribor), U.K. and U.S. **Currencies:** Developed Markets: Australia, Canada, Euro, Japan, New Zealand, Norway, Sweden, Switzerland, U.K., U.S. Emerging Markets: Brazil, India, Mexico, Poland, Russia, Singapore, South Korea, Taiwan, Turkey. **Commodity Selection:** Silver, Copper, Gold, Crude, Brent Oil, Natural Gas, Corn, Soybeans.

The Time Series Momentum (Trend) Strategy was constructed with an equal-weighted combination of 1-month, 3-month, and 12-month time series momentum strategies for 59 markets across 4 major asset classes - 24 commodities, 11 equity indices, 15 bond markets, and 9 currency pairs - from January 1903 to December 2013. Since not all markets have return data going back to 1903, we construct the strategies using the largest number of assets for which return data exist at each point in time. We use futures returns when they are available. Prior to the availability of futures data, we rely on cash index returns financed at local short rates for each country.

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.

