Deutsche Bank

Re-thinking Asset Allocation - The Role of Risk Factor Diversification

(A Primer on Process-Driven, Evidence-Based Investing)

September 2011

Passion to Perform

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Part I.

The Empirical (and Philosophical) Case for Rethinking Asset Allocation and Risk Management

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A One Minute Synopsis on Robustness and Diversification

Portfolio Construction – Some Insights from Biology …

- A lack of diversity and failure to adapt to a changing environment have been key contributors to extinction in the animal kingdom. Bacteria are arguably the best exponents of adaptability and diversification – they have outlived Dinosaurs by a factor of 24:1!
- Like many investment strategies, Dinosaurs were perfectly calibrated to a rigid set of initial conditions but were not robust – they could not cope once the environment changed. Risk factor momentum is one promising concept capable of adapting to regime shifts
- Keynes was perhaps the pioneer of a hybrid value / carry / momentum approach when opining that 'enterprise yield' and 'speculative yield' were the key drivers of asset returns
- Strict adherence to one particular investment style (traditional or alternative beta), even if it has generated a long-term risk premium, is likely to be inferior as the optimal investment opportunity set is highly time-varying and regime-dependent (think value dispersion, etc.)
- Robustness is a function of factor diversity – allocating capital across asset classes and investment styles represents superficial diversification if payoffs are exposed to the same set of risk factors. For instance a 60/40 equity/bond portfolio is 100% exposed to unexpected inflation or sovereign risk, while fourteen different HF strategies (all effectively short liquidity risk) had their worst ever drawdown in the 2008/09 crisis
- The construction of portfolios of factor risk premia does not require superior crystal ball gazing – in contrast to 'beta timing' which requires forecasting the next batch of economic data surprises (there is no evidence we can consistently/accurately forecast surprises!)

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Risk Factors as Return Sources

Rethinking Diversification (… and Defence Against Drawdowns)

- In the long run, investment success (otherwise known in quant circles as the Fundamental Law of Active Management) reduces to two factors: i.) manager skill, and ii.) the breadth and independence of the investment opportunity set
- Put another way, constraints on either of these two factors (ie. imposing tight tracking error on a market-cap weighted benchmark) will almost guarantee suboptimal results (risk is not tracking error, but rather the threat of permanent impairment of capital !)
- The robustness of a strategy can only be assessed over a full cycle – ie. selling naked 'catastrophe insurance' can give the (misleading) appearance of smooth, reliable returns
- Process vs. Outcome – investing is a probabilistic exercise, meaning that in the short run, good processes can be followed by poor outcomes (professional athletes tend to understand and handle this 'paradox' particularly well)
- The only insurance against short-term randomness, black swans, the peso (small sample) problem and drawdowns is to seek out multiple sources of risk premia across a host of asset classes and geographies (ie. a large number of small, uncorrelated exposures)
- *Bottom Line* – sources of risk premia that have a positive expectancy, can be sustained by behavioural, economic and institutional factors, and are uncorrelated vs. traditional beta returns and growth/inflation/liquidity regimes, are highly valuable additions to any portfolio

Moving Beyond Standard Economic Risk Factors

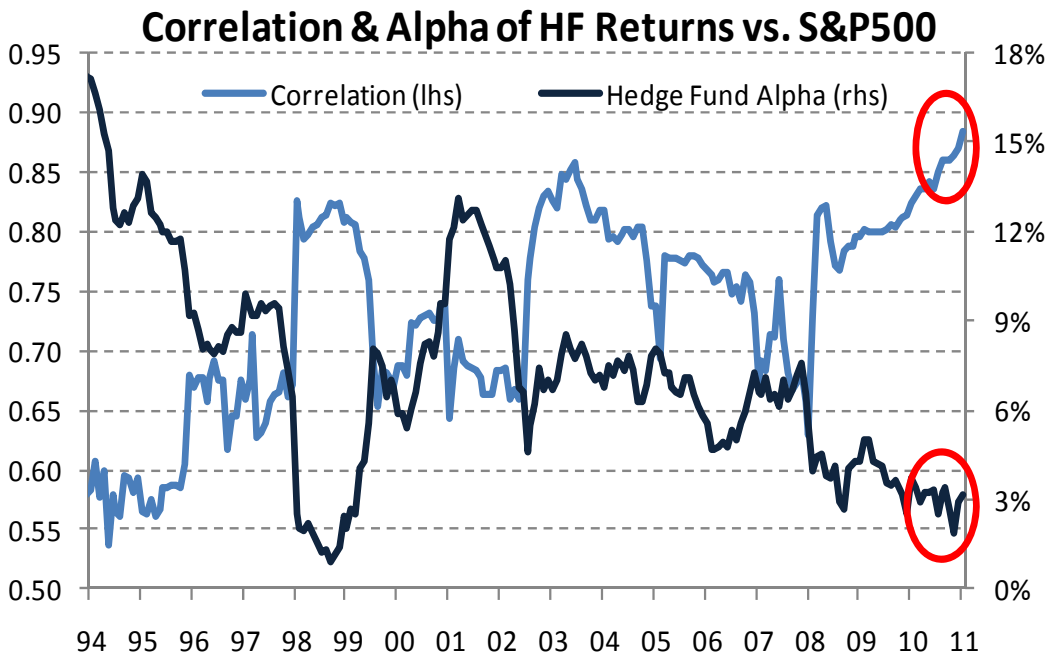
Some Limitations with the Traditional Beta-Timing Approach…

- Building an Asset Allocation framework on the basis of a matrix of possible growth/inflation/liquidity outcomes is a reasonable starting point and has been standard fare for a long time, but its effectiveness is constrained by a number of factors:
  - As the size of financial markets grow ever larger vis-à-vis the size of economies, causality is increasingly running from asset prices to the economy (not the other way around) and then generating a self-reinforcing positive feedback loop (ie. reflexivity)
  - At times it can reduce to a beta-timing exercise, yet there is little/no evidence we can consistently and reliably forecast economic data surprises or turning points in real time (ie. the "third, fourth or higher degrees" in Keynes's beauty contest) – consensus forecasts for US GDP growth have shown economists incapable of predicting even one of the past seven recessions (a year in advance) back to the late 1960s!
  - It ignores asset valuations (as does the risk parity approach) – the key determinant of long-term asset returns (US stock prices fell 3x more in the 2001 recession vs. the 1991 recession of similar intensity, as equity valuations were entirely different)
  - It can require historical economic relationships to hold in the future – it is short a regime shift (beware the time-varying correlations of bond and stock returns)

Caveat Emptor – Your HF Portfolio May Not Be a Hedge!

Liquidity Risk Can Derail HF Strategies Built on "Convergence"

HF Returns – rapidly disappearing alpha



Source: DB Global Markets Research, HFRI, Bloomberg. Regression intercept (shown above as annualized alpha, dark blue line) and correlations are based on a rolling 3yr window of monthly total returns for the S&P500 and HFRI Weighted Composite Indices. Correlations and alpha measured over shorter lookback windows (such as rolling 18mths) depict the same recent patterns.

14 of 18 "Convergent" HF strategies had their worst drawdown during the liquidity crisis

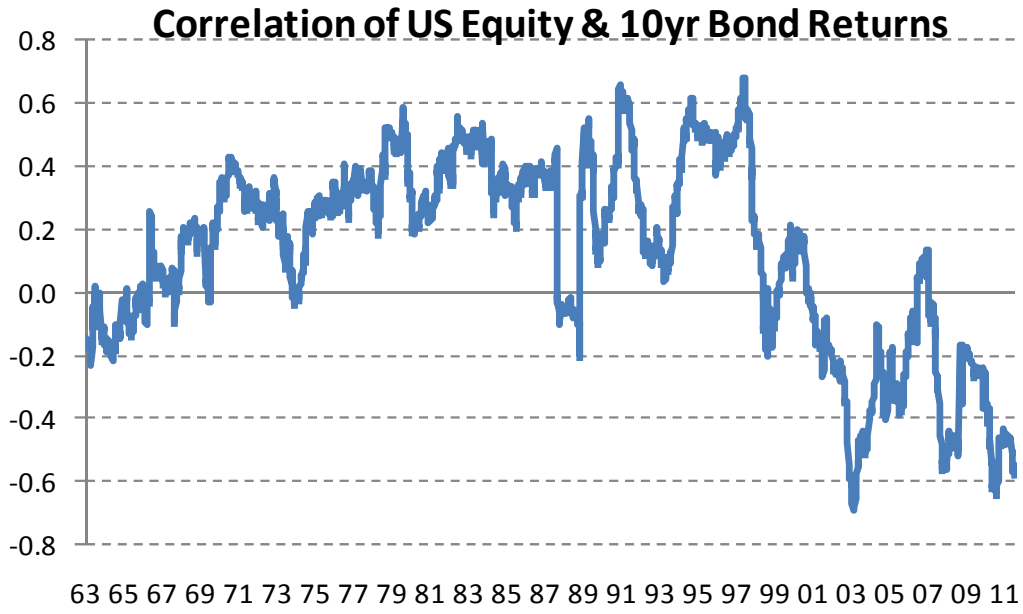
	Max Drawdown	Date of Peak Drawdown
Short Bias	-52%	Feb-00
EM	-43%	Sep-98
Convert Arb	-35%	Nov-08
Equity Hedge	-31%	Feb-09
Equity Quant	-31%	Feb-09
Fixed Income	-28%	Dec-08
Distressed	-27%	Mar-09
Event Driven	-25%	Feb-09
Fund of Funds	-22%	Dec-08
FoF Diversified	-22%	Dec-08
Multi-Strategy	-21%	Dec-08
HF Weighted Composite	-21%	Feb-09
FoF Conservative	-20%	Dec-08
RV	-18%	Dec-08
Macro	-11%	Apr-94
Equity Mkt Neutral	-9%	Apr-09
Merger Arb	-8%	Nov-08
Systematic Macro	-5.8%	Jan-10

Source: DB Global Markets Research, HFRI, Bloomberg. Figures in gray depict strategies where max drawdowns occurred during the 2008/09 financial crisis. "Convergent" strategies are predicated on mean reversion (ie. stat arb) and typically perform best when liquidity conditions are benign, while "Divergent" strategies (CTA's, Macro) tend to exploit the "mean-fleeing" or self-reinforcing behavior of asset prices, often during periods where liquidity conditions are poor and volatility is high.

Caveat Emptor (Part II) – A 60/40 Portfolio is not a Hedge!

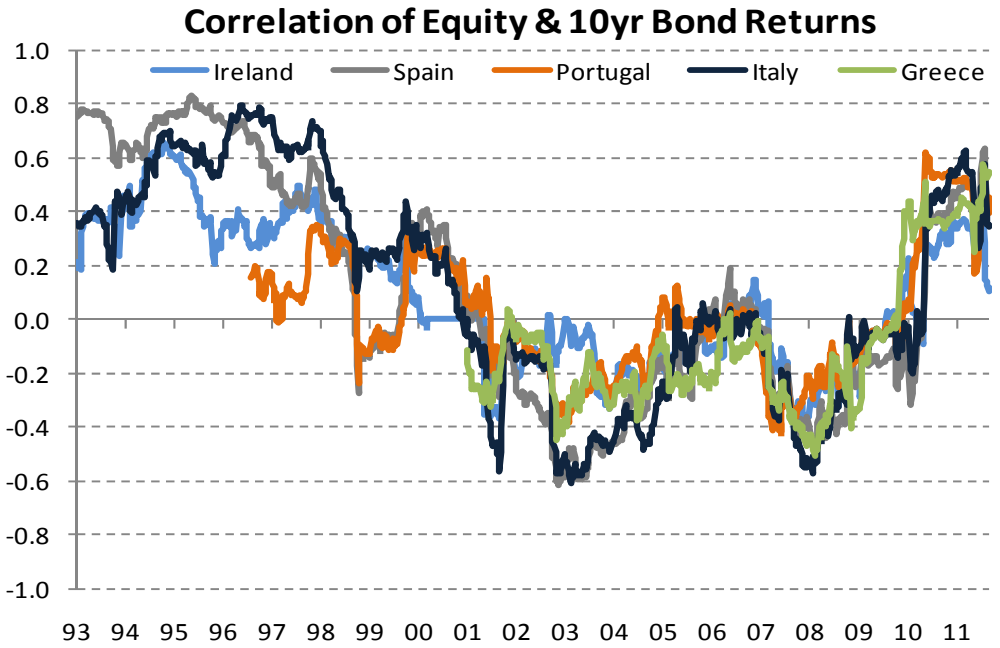
A Conventional Equity-Bond Portfolio is 100% Exposed to Unexpected Inflation or Sovereign Risk Premia

The past decade of US equity & bond return correlations has been historically unusual



Source: DB Global Markets Research, Bloomberg.
Correlation of weekly returns over rolling 52-week window.

Once sovereign or inflation risk premia emerge, stocks and bonds do not diversify!



Source: DB Global Markets Research, Bloomberg.
Correlation of weekly returns over rolling 52-week window.

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Can We Exploit the Limitations of Textbook Asset Allocation?

If it's Broken, Fix it !

Classic Portfolio Theory	Reality
Investors are rational	Behavioral biases overwhelm analytical decision making (esp when uncertainty is high)
Investors maximize utility	Investors engage in 'satisficing' (we take shortcuts - near enough is good enough)
Investors have uniform risk tolerances	Risk tolerances differ across objectives, age, and beginning wealth levels
Investors view losses mathematically and smoothly	Financial losses are processed in the same area of the brain as mortal danger!
Investors care largely about end-of-period wealth	Intra-horizon path dependency dramatically impacts investor behavior
Returns are normally distributed	Almost all asset classes and securities exhibit signficiant skew and fat tails
Standard deviation defines the risk of a portfolio	Risk can include liquidity, solvency, vulnerability to extreme or permanent loss; Volatility in the left tail is perceived differently from volatility in the right tail
Expected returns, volatility and correlations are static	Return distribution parameters are dramatically time-varying and regime-dependent

Source: DB Global Markets Research

Sources of Alternative (Beta-Neutral) Risk Premia

Sustained by Behavioural, Economic and Institutional Factors

Possible Explanations	Source of Risk Premia/Inefficiency/"Alternative Beta"			
	Value	Carry	Momentum	Volatility
Behavioural	*Heuristics result in investors overpaying for and extrapolating recent growth; *Deep value investing demands separating one-self from the herd (a response interpreted by the brain as dangerous);	* Producers/hedgers in FX and commodity markets pay a premium for certainty and depress forwards (exploited by speculators)	* Initial under-reaction to news followed by overreaction to recent returns, extrapolation and overconfidence; *Release of oxytocin associated with feelings of safety/trust when travelling in herds	*Short Vol - after a shock, investors overpay for tail insurance; *Long Vol - Investors prefer strategies that payoff regularly, while buying insurance tends to payoff infrequently (black swan/peso problem);
Economic	* Value stocks are at higher risk of financial distress, often materializing during liquidity crises; * Value premium is concentrated mostly in small caps; * Bond value premium is most marked during crises	*Forward rates are a function of mathematics, not optimal forecasts; *Carry trades are vulnerable to sharp negative skew at the worst times (akin to selling financial catastrophe insurance); *Peso Problem - persistent positive returns with low vol attracts capital until over-valuation & blow-up results; High DY stocks are relatively volatile	* Trends in the business cycle drive trends in asset prices (and vice versa) - positive consumption risk; *Most pronounced in small caps on the short-side (not implementable); *Requires high turnover/trans. costs	*Short Vol - exposed to large drawdowns at the worst times (selling catastrophe insurance); *Long Straddles - barriers are priced off volatility and forwards, but drift out-runs them both in the long-run
Institutional	* The FX and equity value premium is typically borne out only over long-periods (vs. short-term appraisal periods, esp for HFs); *As volatility rises, assets cheapen, but VaR prevents investors from accessing the value premium	* For much of the cycle, high interest rates can attract just enough capital to keep spot away from forwards;	* Investment managers minimize career risk by sticking close to mkt-cap weighted benchmarks which have an embedded momentum bias	*Tail events happen so infrequently that institutions/investors usually choose to ignore them; *Many investors cannot use derivatives

Source: DB Global Markets Research

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The Value Risk Premium – Across Asset Classes

	Global Value Portfolio	Currency	Rates	Commods	World Equity Indices	US Stocks	Japan Stocks	AxJ Stocks
Average Annual (Geometric) Return	13.6%	0.0%	3.2%	12.6%	6.6%	10.0%	15.3%	18.0%
Std Deviation	7.8%	7.7%	6.5%	21.6%	13.1%	12.7%	10.0%	17.1%
Information Ratio	1.75	0.00	0.49	0.58	0.51	0.79	1.53	1.05
Sortino Ratio	3.87	0.00	0.64	1.08	0.83	1.39	2.81	1.64
Maximum Drawdown	-11.9%	-30.1%	-16.3%	-33.5%	-37.8%	-26.1%	-20.9%	-24.7%
Calmar Ratio	1.14	0.00	0.20	0.38	0.18	0.38	0.73	0.73
Duration of Max Drawdown (Yrs)	1.8	11.8	3.8	2.7	3.9	2.4	2.1	1.8
% Up Months	73%	46%	58%	59%	57%	65%	66%	65%
Monthly Return Skew	0.5	1.2	-0.7	0.0	0.3	1.1	0.5	0.4
Best Month	8%	9%	5%	20%	13%	22%	13%	23%
Worst Month	-5%	-5%	-7%	-15%	-11%	-8%	-8%	-13%
Best Calendar Year	37%	17%	15%	61%	44%	63%	59%	81%
Worst Calendar Year	-4%	-12%	-11%	-12%	-20%	-15%	-17%	-6%
Ave Mthly Return when World Equities < -5%	0.0%	0.9%	-1.2%	-0.3%	-0.5%	0.1%	1.6%	1.3%
… Worst Month	-3.3%	-3.8%	-7.4%	-7.2%	-5.4%	-7.5%	-4.8%	-11.4%
… Best Month	5.8%	7.5%	3.1%	13.1%	8.7%	11.1%	6.3%	9.5%
Correlation vs. MSCI World Equities	0.20	-0.18	0.47	0.01	0.02	0.20	-0.05	0.08
Correlation vs. Citi World Govt Bonds	0.09	0.07	-0.04	0.00	0.09	0.04	0.10	0.09
Correlation vs. S&P/GS Commodities	0.17	-0.22	0.26	0.22	0.19	-0.01	0.07	-0.01
Correlation vs. SDR (FX Beta)	0.00	-0.42	0.46	0.03	0.01	0.07	0.01	-0.09
Correlation vs. HFR Composite (HF Beta)	0.11	-0.20	0.46	0.06	0.03	0.06	-0.17	0.05
Alpha (Regressing Returns on Traditional Beta's)	14.3%							
Adj R-sq	3.9%							

Source: DB GMR, Bloomberg. All data are monthly total returns since 1995 , in USD terms, excluding transaction costs. Global Value Portfolio results are based on scaling individual value strategies to equal (15%) volatility (using trailing 12mth volatility). Alpha is annualized and statistically significant at 1% after regressing returns on traditional beta sources. Currency value – long/short quintile portfolios are based on equally-weighted z-scores of i.) % deviation from 7yr average real effective exchange rate, and ii) current account as % GDP. Rates value – long/short portfolios are based on equally-weighted z-scores of i.) fundamentals (budget balance as % GDP, public debt as % GDP, current account deficit as % GDP), and ii.) real interest rates (using trailing realized headline inflation). Commodities value – long/short quintile portfolios based on the magnitude of backwardated (long) or contangoed (short) futures curves. Equity value – long/short quintile portfolios based on equally-weighted z-scores across the following metrics: Trailing price/book, trailing and forward P/E, trailing cashflow yield, trailing dividend yield, trailing shareholder yield, trailing free cashflow yield, trailing price/sales, EV/EBITDA, EV/sales, and EV/cashflow. Results for "World Equity Indices" are based on 43 MSCI country indices. Single stock results are sector-neutral , based on the largest 1000 stocks, and incorporate survivorship bias. Past performance is no guarantee of future performance.

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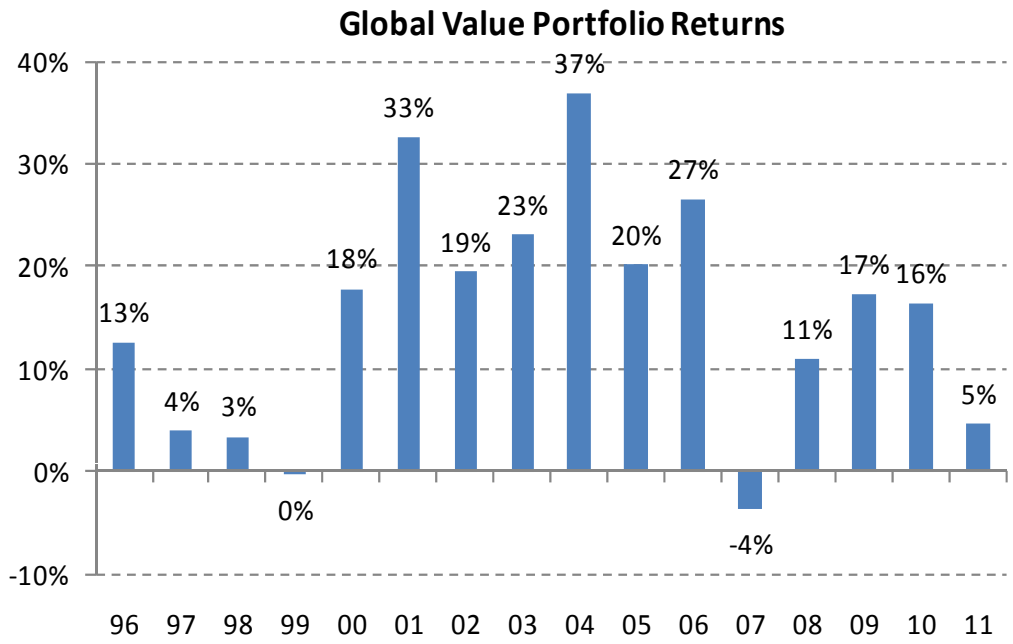
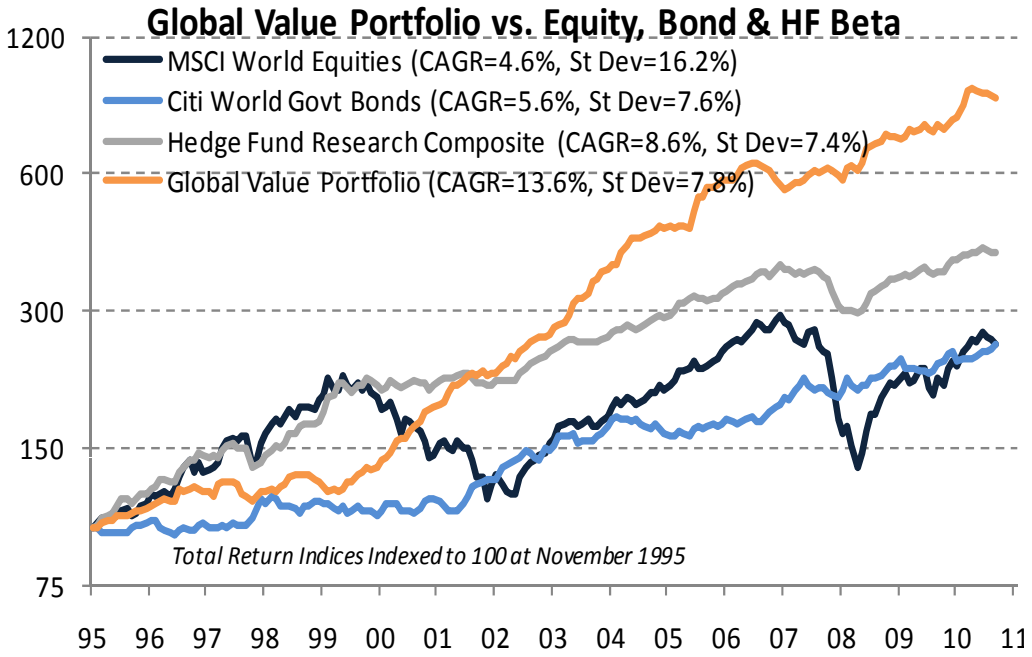
The Value Risk Premia Portfolio

Uncorrelated Outperformance Through the Cycle





Source: DB Global Markets Research, HFRI, Bloomberg. Global Value Portfolio returns are based on scaling individual value strategy returns to 15% volatility. 2011 returns are as at end-July. All returns in USD. Past performance does not constitute any guarantee of future performance.

The Carry Risk Premium – Across Asset Classes

	Global Carry Portfolio	Currency	Rates	Commods	World Equity Indices	US Stocks	Japan Stocks	AxJ Stocks
Average Annual (Geometric) Return	12.9%	9.0%	3.1%	6.7%	-4.0%	0.7%	15.5%	13.5%
Std Deviation	7.5%	9.8%	4.0%	4.2%	11.4%	8.8%	12.1%	18.4%
Information Ratio	1.73	0.91	0.78	1.58	-0.35	0.08	1.28	0.73
Sortino Ratio	2.83	1.03	1.37	2.06	-0.53	0.13	1.89	1.46
Maximum Drawdown	-12.7%	-26.9%	-5.9%	-9.6%	-44.1%	-20.0%	-31.7%	-43.0%
Calmar Ratio	1.01	0.33	0.53	0.70	-0.09	0.03	0.49	0.31
Duration of Max Drawdown (Yrs)	1.2	3.0	3.1	1.9	15.4	9.3	3.6	3.6
% Up Months	74%	69%	61%	71%	46%	49%	70%	62%
Monthly Return Skew	0.2	-1.3	0.1	-0.5	-0.2	0.4	0.7	2.4
Best Month	9%	9%	5%	4%	9%	10%	20%	41%
Worst Month	-6%	-14%	-3%	-6%	-11%	-8%	-10%	-13%
Best Calendar Year	32%	30%	9%	19%	28%	37%	51%	96%
Worst Calendar Year	-5%	-23%	-2%	-8%	-30%	-8%	-30%	-18%
Ave Mthly Return when World Equities < -5%	1.3%	-2.0%	0.4%	0.2%	1.2%	-0.5%	2.5%	4.0%
… Worst Month	-1.3%	-14.5%	-1.4%	-1.5%	-5.0%	-8.3%	-5.7%	-5.8%
… Best Month	7.3%	3.6%	4.5%	2.1%	6.8%	10.0%	9.9%	12.9%
Correlation vs. MSCI World Equities	-0.10	0.46	-0.08	0.07	-0.25	-0.05	-0.05	-0.13
Correlation vs. Citi World Govt Bonds	0.06	-0.22	0.14	0.00	0.12	-0.03	0.09	0.07
Correlation vs. S&P/GS Commodities	-0.18	0.28	-0.09	-0.13	-0.14	-0.21	0.06	-0.09
Correlation vs. SDR (FX Beta)	0.14	0.54	0.09	0.08	-0.21	0.08	-0.02	-0.13
Correlation vs. HFR Composite (HF Beta)	-0.18	0.43	-0.05	0.06	-0.36	-0.15	-0.07	-0.14
Alpha (Regressing Returns on Traditional Beta's)	12.1%							
Adj R-sq	7.6%							

Source: DB GMR, Bloomberg, JPM. All data are monthly total returns since 1995 , in USD terms, excluding transaction costs.. Global Carry Portfolio results are based on scaling individual carry strategies to equal (15%) volatility (using trailing 12mth volatility). Alpha is annualized and statistically significant at 1% after regressing returns on traditional beta sources. Currency carry – DB's Harvest Balanced Index, based on ranking the 20 liquid currencies by 3m LIBOR (G10 currencies must constitute at least 2 of both the long and short positions). Rates carry – JPMorgan CarryMax Index, based on G-10 interest rate swap markets, where long (short) positions are taken in the two markets with the steepest (flattest) yield curves. Commodity carry – JPMorgan commodity carry index, which takes long positions in the same commodities as those in the S&P/GSCI, but identifies the part of the futures curve with the steepest backwardation or flattest contango, and then hedges spot risk by shorting the S&P/GSCI Index. Equity carry – long/short quintile portfolios based on trailing dividend yields (ranking on the basis of shareholder yield generates better results but data are not available for the full sample). Results for "World Equity Indices" are based on 43 MSCI country indices. Single stock results are sector-neutral, based on the largest 1000 stocks by mkt cap, and incorporate survivorship bias. Past performance does not guarantee of future performance.

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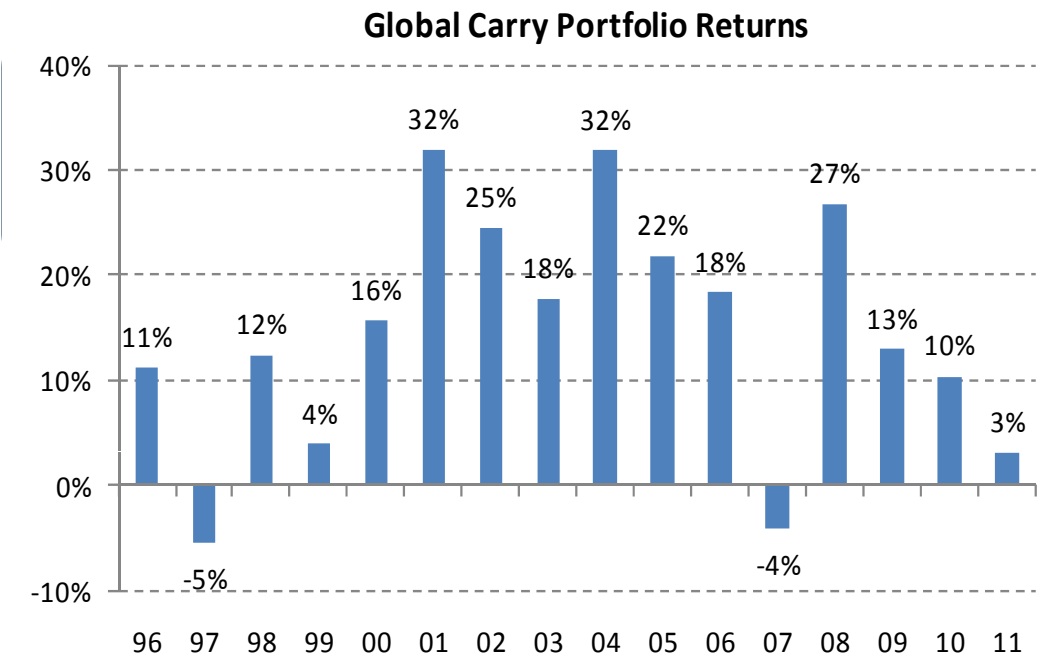
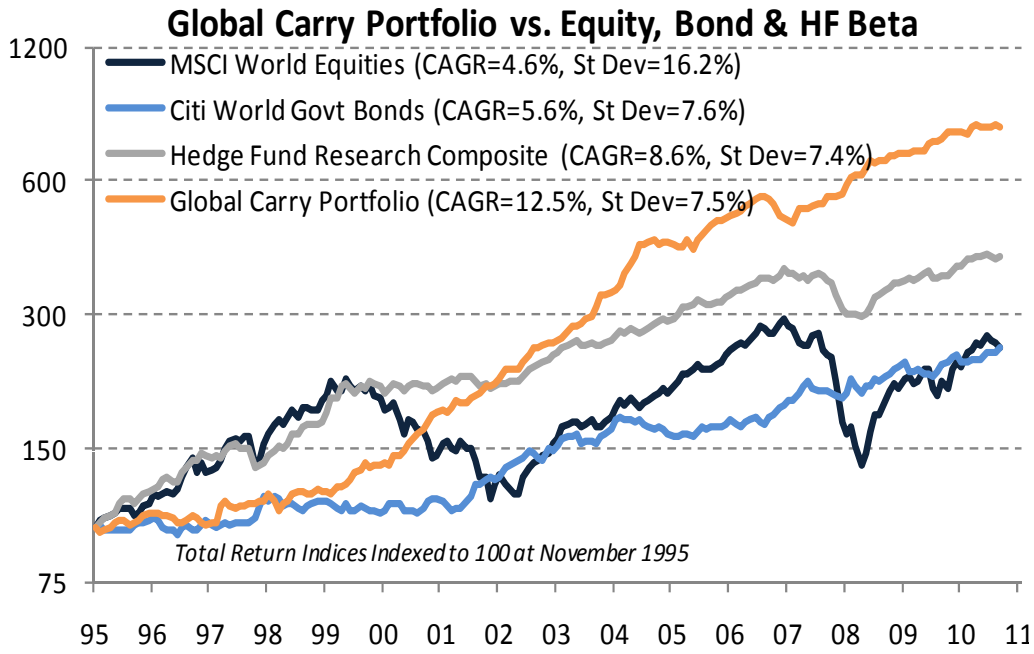
The Carry Risk Premia Portfolio

Two Modest Down Years, Twelve Years of Double-Digit Returns





Source: DB Global Markets Research, Bloomberg. Global Carry Portfolio returns are based on scaling individual value strategy returns to 15% volatility. 2011 returns are as at end-July. All returns in USD. Past performance does not constitute any guarantee of future performance.

The Momentum Risk Premium – Across Asset Classes

	Global Momentum Portfolio	Currency	Rates	Commods	World Equity Indices	US Stocks	Japan Stocks	AxJ Stocks
Average Annual (Geometric) Return	8.3%	2.4%	3.2%	4.4%	11.6%	1.6%	-3.1%	3.6%
Std Deviation	9.6%	8.2%	8.5%	22.8%	16.5%	13.1%	14.0%	20.1%
Information Ratio	0.87	0.29	0.38	0.19	0.70	0.13	-0.22	0.18
Sortino Ratio	1.44	0.47	0.69	0.35	1.02	0.14	-0.26	0.22
Maximum Drawdown	-18.6%	-23.2%	-20.2%	-43.8%	-33.3%	-35.6%	-56.6%	-52.7%
Calmar Ratio	0.45	0.10	0.16	0.10	0.35	0.05	-0.05	0.07
Duration of Max Drawdown (Yrs)	2.8	5.4	5.4	5.9	1.8	5.0	13.6	9.3
% Up Months	65%	56%	53%	50%	65%	59%	53%	58%
Monthly Return Skew	-0.2	-0.1	0.3	0.3	-0.2	-1.4	-0.9	-0.7
Best Month	8%	7%	8%	20%	13%	10%	16%	24%
Worst Month	-7%	-7%	-6%	-22%	-15%	-20%	-23%	-31%
Best Calendar Year	40%	15%	21%	87%	72%	25%	60%	112%
Worst Calendar Year	-12%	-10%	-18%	-27%	-2%	-28%	-34%	-40%
Ave Mthly Return when World Equities < -5%	1.2%	0.9%	0.6%	-0.8%	1.9%	2.8%	0.2%	0.9%
… Worst Month	-6.6%	-4.1%	-4.0%	-7.9%	-6.3%	-7.3%	-7.0%	-13.0%
… Best Month	6.6%	6.8%	8.3%	13.4%	11.0%	9.7%	5.8%	24.4%
Correlation vs. MSCI World Equities	-0.18	-0.19	-0.17	0.10	-0.05	-0.40	-0.14	-0.07
Correlation vs. Citi World Govt Bonds	-0.15	-0.22	-0.14	-0.02	0.05	0.01	-0.04	-0.13
Correlation vs. S&P/GS Commodities	0.02	-0.08	-0.13	0.28	0.10	-0.03	-0.07	-0.01
Correlation vs. SDR (FX Beta)	0.21	0.33	0.35	0.03	0.07	-0.06	0.00	0.08
Correlation vs. HFR Composite (HF Beta)	0.00	-0.06	-0.04	0.21	0.07	-0.27	-0.06	0.03
Alpha (Regressing Returns on Traditional Beta's)	3.9%							
Adj R-sq	11.6%							

Source: DB GMR, Bloomberg. All data are monthly total returns since 1995 , in USD terms, excluding transaction costs. Global Momentum Portfolio results are based on scaling individual momentum strategies to equal (15%) volatility (using trailing 12mth volatility). Alpha is annualized but statistically significant only at 16% after regressing returns on traditional beta sources. Currency momentum – long/short quintile portfolios are based on the trailing 9-mth Sharpe ratio across global currencies (initially G-10, but expanding to 31 currencies by 2005). Rates momentum – long/short portfolios are based on trailing 9-mth Sharpe ratios of 2yr and 10yr government bond returns across an eventual sample of 26 countries .Commodity momentum – long/short quintile portfolios based on trailing 9mth Sharpe ratios across 22 commodities (energy, precious metals, industrial metals, agriculture, livestock). Equity momentum – long/short quintile portfolios based on trailing 9-mth Sharpe ratio. Results for "World Equity Indices" are based on 43 MSCI country indices. Single stock results are sector-neutral, based on the largest 1000 stocks by market cap, and incorporate survivorship bias. Past performance is no guarantee of future performance.

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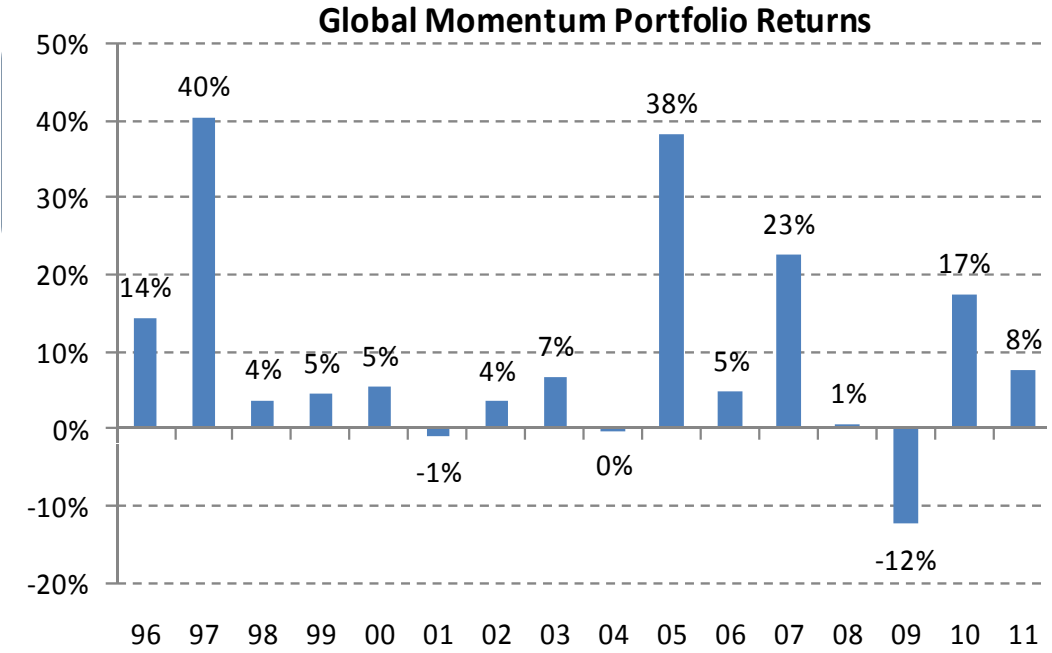
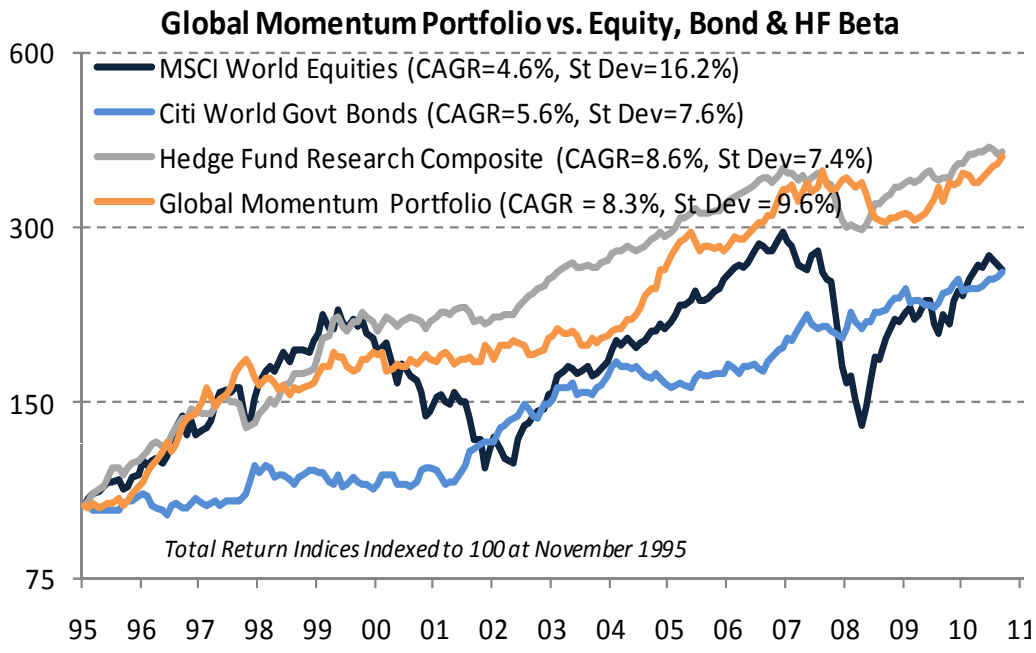
The Momentum Risk Premia Portfolio

Lumpy, Uncorrelated Returns



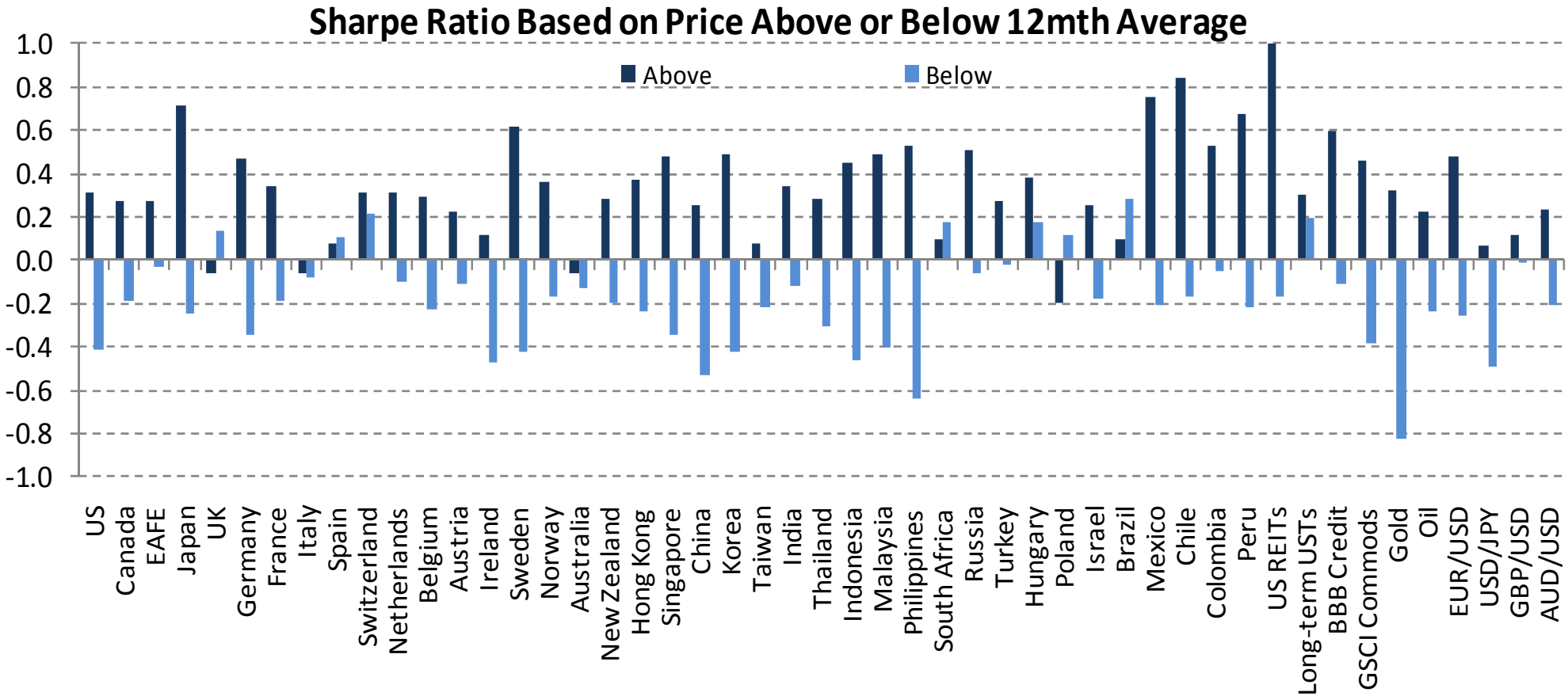


Source: DB Global Markets Research, Bloomberg. Global Momentum Portfolio returns are based on scaling individual value strategy returns to 15% volatility. 2011 returns are as at end-July. All returns in USD. Past performance does not constitute any guarantee of future performance.

Momentum – A Ubiquitous Source of Return

Don't Be Ashamed of it!

The momentum effect is robust across time, geographies and asset classes



Source: DB Global Markets Research, Bloomberg

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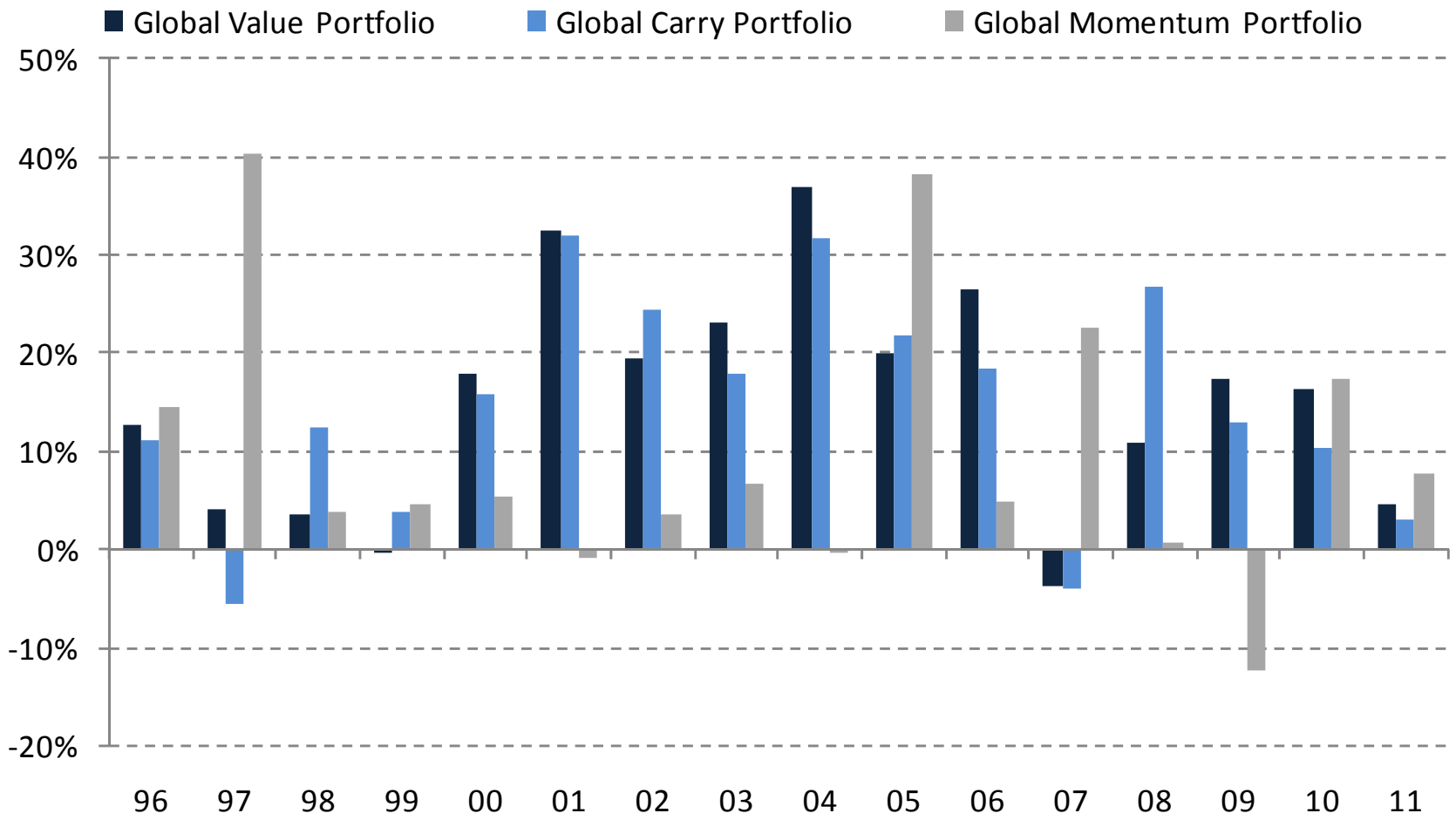
Portfolios of Alternative Risk Premia

As Value & Carry Struggled in 1997 & 2007, Momentum Surged



Source: DB Global Markets Research, Bloomberg. Global Momentum Portfolio returns are based on scaling individual value strategy returns to 15% volatility. 2011 returns are as at end-July. All returns in USD. Past performance does not constitute any guarantee of future performance.

Alternative Risk Premia – Bona Fide Diversification

Just Two Strategies Have Correlations >0.5; Half are Negative!

Monthly Return Correlations Since 1995

		VALUE							CARRY							MOMENTUM						
		FX	Rates	Comm	World Equity Indices	US Stocks	Japan Stocks	AxJ Stocks	FX	Rates	Comm	World Equity Indices	US Stocks	Japan Stocks	AxJ Stocks	FX	Rates	Comm	World Equity Indices	US Stocks	Japan Stocks	AxJ Stocks
VALUE	FX	1.00	-0.48	-0.02	-0.02	0.00	0.01	0.17	-0.51	-0.11	-0.05	0.21	0.00	-0.01	0.19	-0.26	-0.17	-0.02	-0.17	-0.04	0.02	-0.01
	Rates		1.00	-0.01	0.11	0.19	-0.05	-0.05	0.49	-0.01	0.08	-0.20	0.06	0.05	-0.05	0.03	0.04	0.02	0.06	-0.17	-0.07	0.06
	Commods			1.00	0.03	-0.06	-0.07	0.05	0.06	-0.04	-0.11	0.06	-0.03	-0.03	-0.01	0.00	-0.04	0.50	0.14	0.10	0.07	-0.09
	World Equity Indices				1.00	0.22	0.22	0.21	0.14	0.04	0.03	0.41	0.14	0.13	0.18	-0.08	-0.16	-0.01	-0.38	-0.13	-0.05	-0.05
	US Stocks					1.00	0.28	0.22	0.13	-0.02	0.10	0.14	0.47	0.18	0.09	-0.16	-0.16	-0.12	-0.24	-0.67	-0.28	-0.12
	Japan Stocks						1.00	0.21	-0.03	0.15	0.06	0.25	0.05	0.78	0.24	-0.14	-0.19	-0.01	-0.25	-0.21	-0.54	-0.21
	AxJ Stocks							1.00	-0.10	0.00	-0.02	0.25	0.12	0.19	0.48	-0.14	-0.08	-0.07	-0.24	-0.23	-0.27	-0.29
CARRY	FX								1.00	0.03	0.10	-0.17	0.02	-0.06	-0.12	0.17	-0.01	0.06	0.05	-0.29	-0.12	0.01
	Rates									1.00	0.04	0.08	-0.13	0.08	0.08	0.12	0.08	0.07	-0.07	0.09	0.00	0.04
	Commods										1.00	-0.05	0.06	0.02	-0.10	0.00	0.00	-0.09	-0.07	-0.17	-0.10	-0.08
	World Equity Indices											1.00	0.11	0.27	0.47	-0.16	-0.14	-0.03	-0.54	-0.10	-0.13	-0.23
	US Stocks												1.00	0.08	0.02	-0.06	0.02	-0.17	-0.11	-0.40	-0.11	-0.12
	Japan Stocks													1.00	0.27	-0.22	-0.14	0.01	-0.24	-0.14	-0.66	-0.31
	AxJ Stocks														1.00	-0.09	0.01	-0.01	-0.31	-0.14	-0.24	-0.27
MOMENTUM	FX															1.00	0.59	0.03	0.19	0.18	0.22	0.19
	Rates																1.00	0.05	0.22	0.21	0.12	0.04
	Commods																	1.00	0.19	0.11	0.04	0.01
	World Equity Indices																		1.00	0.33	0.27	0.31
	US Stocks																			1.00	0.40	0.25
	Japan Stocks																				1.00	0.37
	AxJ Stocks																					1.00

Source: DB Global Markets Research. Negative monthly return correlations are depicted in green. Correlations greater than +0.5 are shown in red. Past performance does not constitute any guarantee of future performance.

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A Portfolio of Alternative Risk Premia

Putting it all Together …

	Global Risk Premia Portfolio
Average Annual (Geometric) Return	11.9%
Std Deviation	4.0%
Information Ratio	2.97
Sortino Ratio	6.81
Maximum Drawdown	-4.1%
Calmar Ratio	2.88
Duration of Max Drawdown (Yrs)	0.8
% Up Months	79%
Monthly Return Skew	0.37
Best Month	4.3%
Worst Month	-2.2%
Best Calendar Year	26.5%
Worst Calendar Year	2.7%
Ave Mthly Return when World Equities < -5%	0.8%
… Worst Month	-0.7%
… Best Month	2.2%
Correlation vs. MSCI World Equities	-0.08
Correlation vs. Citi World Govt Bonds	-0.03
Correlation vs. S&P/GS Commodities	0.01
Correlation vs. SDR (FX Beta)	0.26
Correlation vs. HFR Composite (HF Beta)	-0.03
Alpha (Regressing Returns on Traditional Beta's)	10.1%
Adj R-sq	6.7%

Source: DB GMR, All data are monthly total returns since 1995 , in USD terms, excluding transaction costs. Global Risk Premia Portfolio results are based on scaling the 21 individual strategies (seven implementations of value, carry and momentum portfolios) to equal (15%) volatility (using trailing 12mth volatility). Alpha is annualized and statistically significant at 1% after regressing returns on the traditional beta sources. 2011 returns are as at end-July. Past performance does not constitute any guarantee of future performance.

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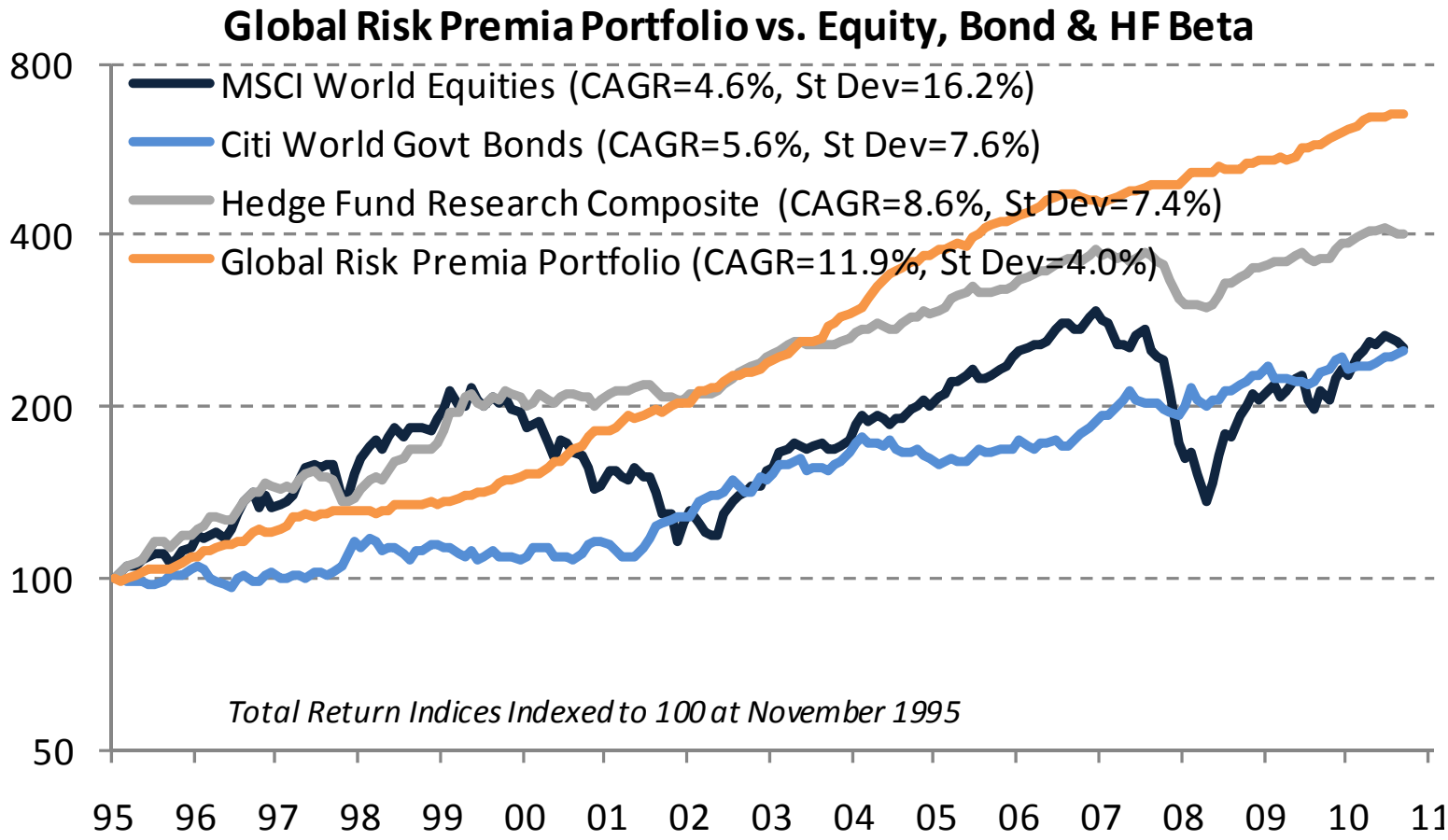
The Alternative Risk Premia Portfolio

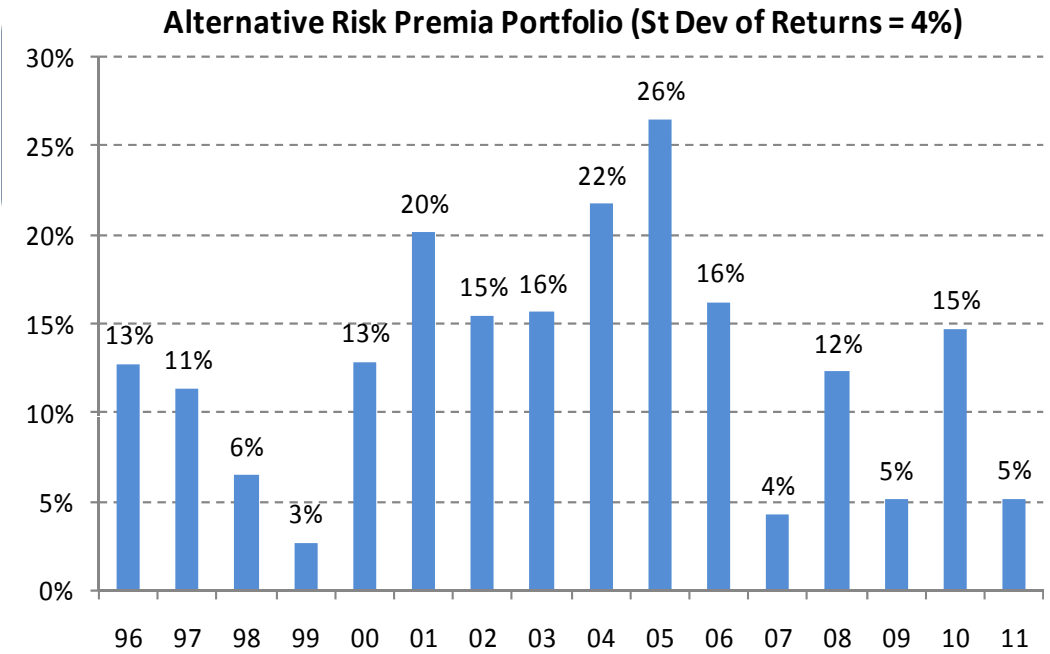
The Stability of Uncorrelated, Beta-Neutral Risk Factor Exposures

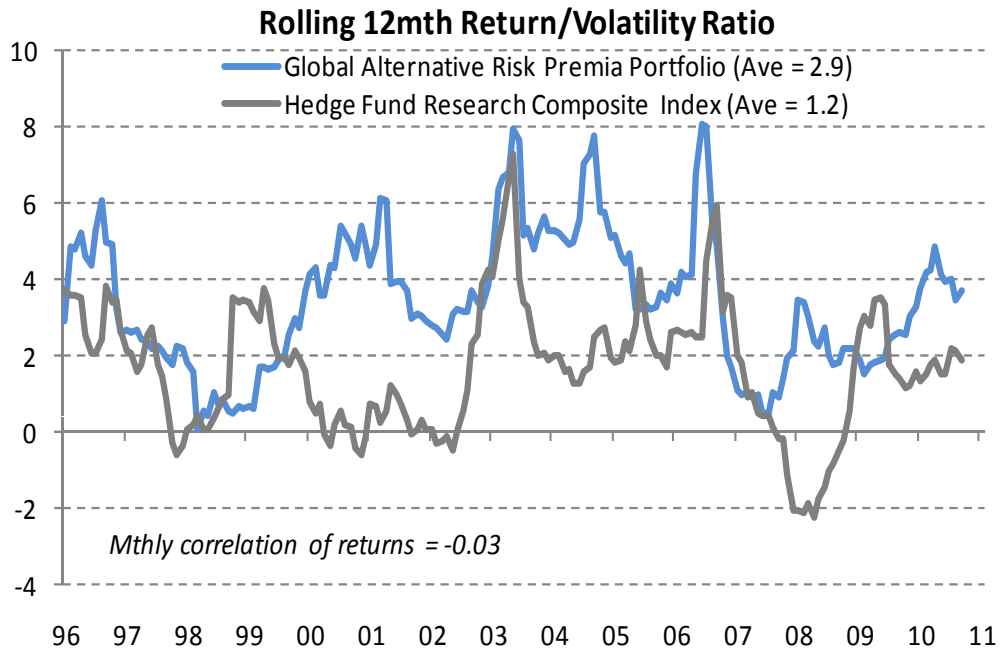


Source: DB GMR, All data are monthly total returns since 1995 , in USD terms, excluding transaction costs. Global Risk Premia Portfolio results are based on scaling the 21 individual strategies (seven implementations of three alternative risk factors) to equal (15%) volatility (using trailing 12mth volatility). Alpha is annualized and statistically significant at 1% after regressing returns on traditional beta sources. 2011 returns are as at end-July. Past performance does not constitute any guarantee of future performance.

The Alternative Risk Premia Portfolio

The Stability of Uncorrelated, Beta-Neutral Risk Factor Exposures





Source: DB GMR, HFR, Bloomberg. Global Alternative Risk Premia Portfolio data reflect monthly total returns since 1995 , in USD terms, excluding transaction costs. 2011 returns are as at end-July. Global Alternative Risk Premia Portfolio results are based on scaling the 21 individual strategies (seven implementations of three alternative risk factors) to equal (15%) volatility (using trailing 12mth vol). Alpha is annualized and statistically significant at 1% after regressing returns on traditional beta sources. Past performance does not guarantee future performance.

Two Tweaks in Harvesting Alternative Risk Premia

Is Constant Exposure to Risk Premia the Best We Can Do?

- Like traditional stock or bond risk premia, the ex-ante opportunity set across alternative risk premia is highly time-varying – if this time-variation is not completely random, we may have a shot at improving on a constant/passive exposure to alternative risk premia

1. *Exploit Factor Momentum* – condition factor exposure on a rolling performance window:
   - Assumes asset returns are regime dependent and time-varying
   - Assumes there is persistence in regimes – long waves of factor outperformance are subsequently followed by long waves of 'factor decay' (the biology of capitalism)
   - Assumes turning points/regime shifts in returns to factors cannot be reliably predicted (ie. who knows when dividend yield will work again – but when/if it does, we will use it)

2. *Take Factor Tilts* – on the basis of conditional information which identifies the richness of the opportunity set, ex-ante:
   - Also assumes asset returns are regime dependent and time-varying
   - But assumes we can reliably measure the ex-ante opportunity set (ie. future value outperformance is conditional on high current valuation dispersion across stocks)
   - Assumes we have some ability in timing turning points in factor returns (be careful – this is easier done for some factors than others!)

Factor Tilts – Some Examples

Can Factor Exposure be "Conditioned", Without Forecasting?

- The returns to value investing in equity markets tend to be higher than usual when:
  - Initial valuation dispersion between cheap and expensive stocks is unusually large
  - This dispersion cannot be explained away by long-term earnings projections
  - Liquidity risk is low (this helps to neutralize the bankruptcy/financial distress risk sometimes associated with cheap stocks, but can change quickly)
  - Note these initial conditions all held in 2000 – after which value significantly outperformed (around the world) for seven straight years

- The returns to carry trades in the currency market tend to be abnormally high when:
  - Currencies comprising the high (low) yielders are fundamentally cheap (expensive)
  - There is large dispersion in interest rate differentials across countries
  - High real rates in the higher yielding basket of currencies reflect strong domestic economic growth conditions (ie. monetary policy), and are not risk premiums reflecting elevated current account deficits, inflation or general sovereign risk
  - Broad global liquidity conditions are benign (incentivizing investors to write "financial catastrophe insurance" by participating in strategies with a high probability of steady returns, but a low probability of disaster)

Some Signs of Momentum/Persistence in Factor Returns

An Adaptive, Forecast Free Approach – Use What's Working

Next month's Information Ratio conditional on whether the factor has worked in the past 12mths

Past 12mth Information Ratio:

	Currency	Rates	Commodities	World Equity Indices	US Stocks	Japan Stocks	AxJ Stocks	Average Across Asset Classes
Value Strategies:								
Positive IR	0.19	0.60	0.37	1.33	1.20	2.12	0.98	0.97
Negative IR	0.00	-0.05	0.84	-0.44	0.32	0.26	1.63	0.37
Carry Strategies:								
Positive IR	0.87	0.91	1.84	-0.20	-0.12	2.10	1.34	0.96
Negative IR	0.59	0.04	0.51	-0.45	0.37	0.06	-0.37	0.11
Momentum Strategies:								
Positive IR	0.18	0.16	0.08	0.66	0.15	0.05	0.37	0.24
Negative IR	0.41	0.44	0.41	1.35	0.00	-0.44	-0.36	0.26

Source: DB GMR. All data are monthly total returns since 1995 , in USD terms, excluding transaction costs. Figures highlighted in green depict instances with the relatively higher Information Ratio. Past performance does not constitute any guarantee of future performance.

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Part II.

Factor Risk Premia Today – The Opportunity Set

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Global Fund Flows in 2011(including ETFs)

Out of Money Mkts and LatAm Equities, into Japanese Equities and EM Debt

Fund Category	2004	2005	2006	2007	2008	2009	2010	2011 YTD
Total Equity Funds	4%	3%	3%	1%	-3%	2%	2%	0%
Total Developed Market Equity Funds	4%	2%	2%	-1%	-3%	-1%	0%	1%
International Equity Funds	8%	6%	7%	6%	-4%	4%	1%	2%
US Equity Funds	1%	-1%	-1%	0%	0%	-4%	0%	0%
Western Europe Equity Funds	1%	-1%	7%	-13%	-12%	1%	-3%	1%
Japan Equity Funds	52%	44%	0%	-27%	-18%	-19%	-3%	12%
Pacific Equity Funds	7%	-3%	12%	-1%	-16%	17%	8%	-6%
Total Emerging Market Equity Funds	3%	16%	11%	12%	-7%	27%	16%	-2%
Global Emerging Market Equity Funds	-10%	3%	4%	10%	-4%	32%	23%	-1%
EMEA Equity funds	27%	40%	-6%	-2%	-8%	11%	20%	-1%
Latin America Equity Funds	10%	81%	27%	46%	-12%	48%	4%	-7%
Asia Pacific Ex-Japan Funds	21%	22%	27%	14%	-9%	21%	10%	-3%
Total Bond Funds	13%	4%	8%	-1%	-10%	24%	17%	3%
International Bond Funds	12%	12%	10%	-2%	-24%	25%	23%	6%
Corporate High Yield Bond Funds	NA	-18%	-2%	-4%	-5%	40%	15%	0%
US Bond Funds	NA	NA	NA	NA	-2%	23%	10%	1%
Emerging Markets Debt Funds	12%	24%	18%	9%	-21%	19%	54%	10%
Money Market Funds	NA	NA	NA	NA	31%	-17%	-15%	-7%

Colour Legend:

>10%	5% to 10%	0% to 5%	-5% to 0%	-10% to -5%	<-10%

Source: DB GMR, EPFR

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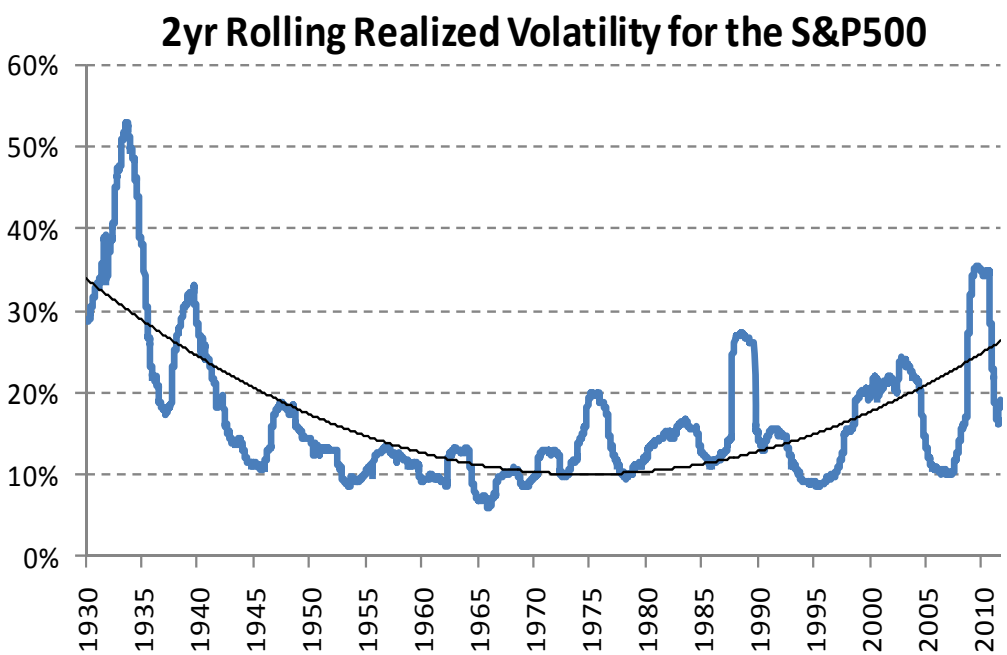
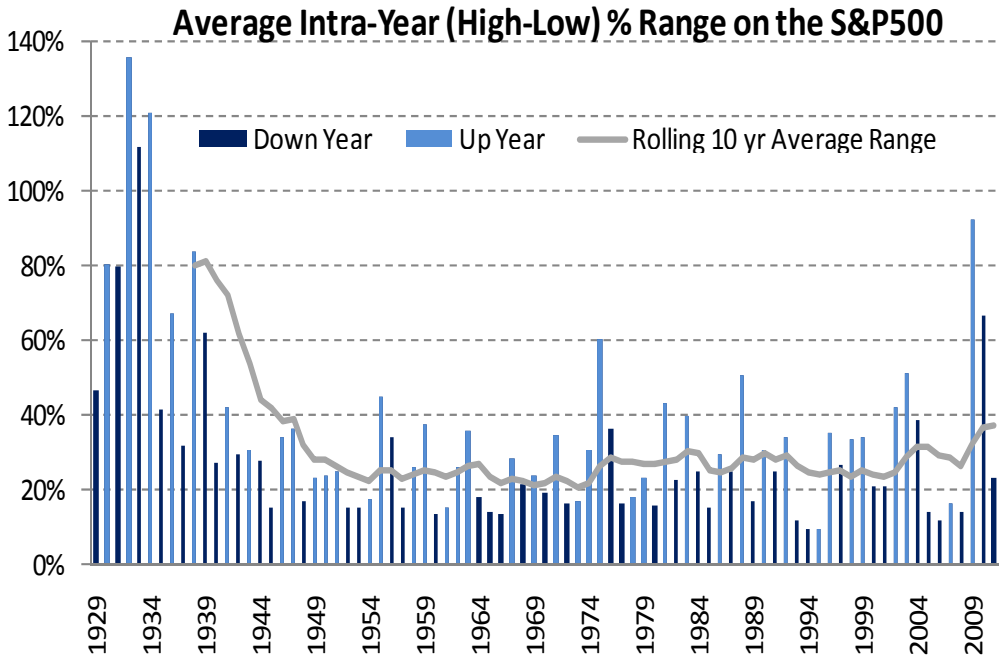
Equity Volatility – A Regime Shift (Buy the Dips in Vol!)

Volatility Will Still Mean Revert, but Around a Higher Mean

The success of short vol strategies from 2003-07 is highly unlikely to be repeated
- Protect tail risk (opportunistically)





Source: DB GMR, Bloomberg.

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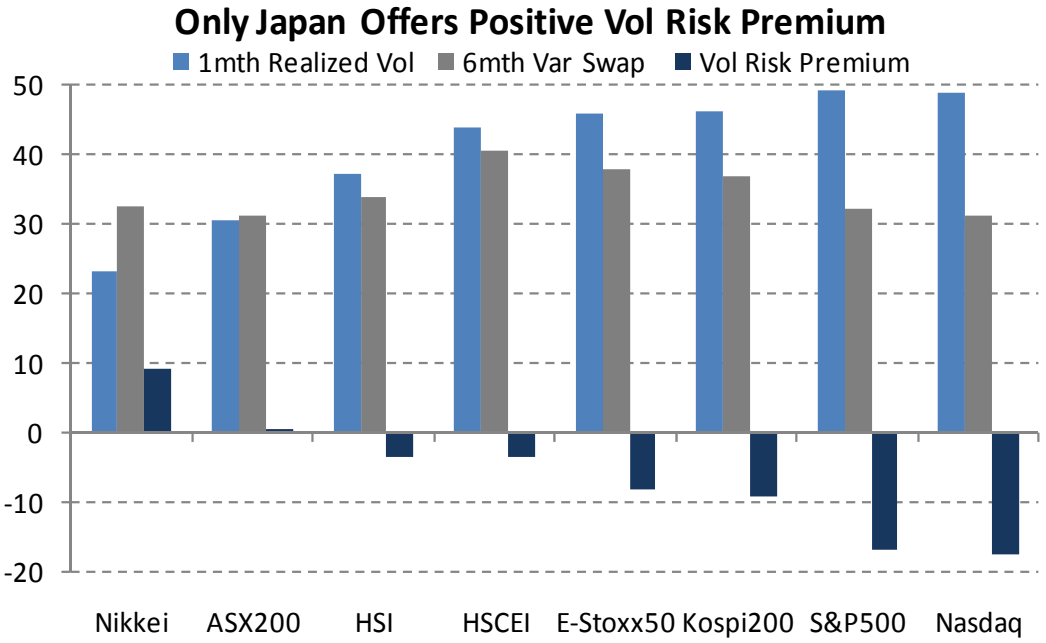
Equity Volatility – A Regime Shift (Part II)

Only in Japan does equity volatility look expensive currently;
More generally, call-overwriting can generate yield in a secular range-bound market



Source: DB GMR, Bloomberg.

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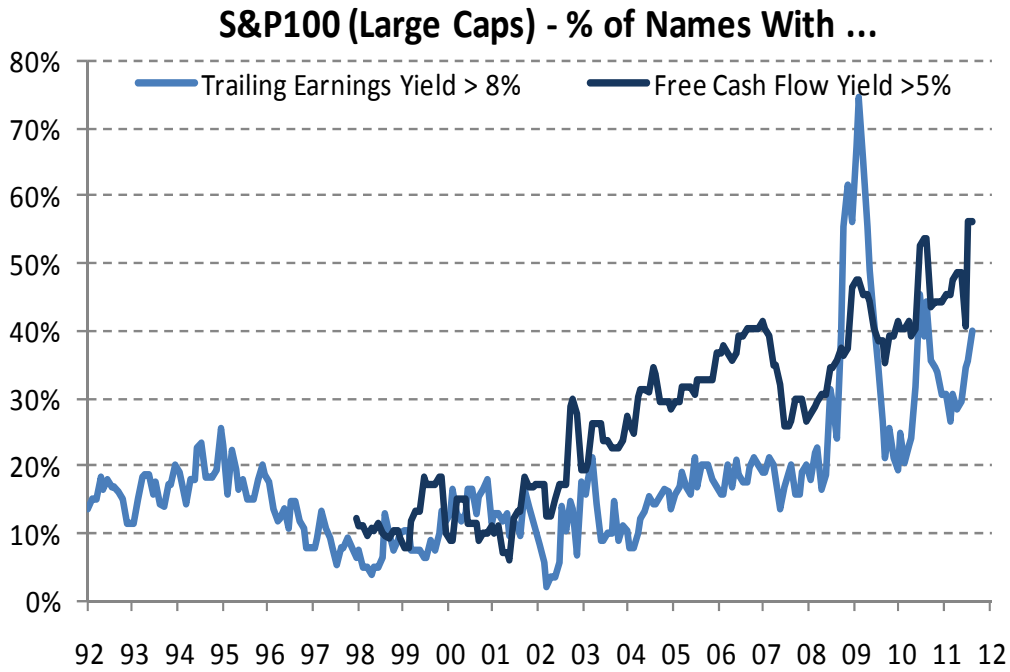
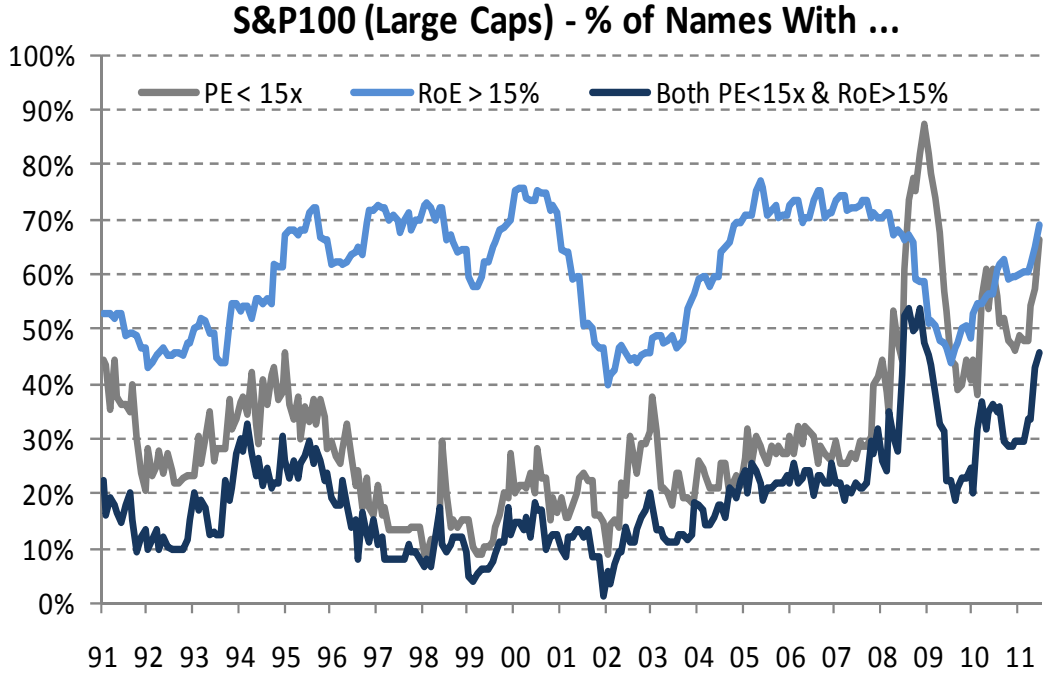
US Mega Caps – The Fusion of Value & Quality

Perhaps Replace G3 Govt Bond Holdings with Some of These …

Cash Rich, Inexpensive, Inflation-Hedged, and Profitable





Source: DB GMR, Bloomberg

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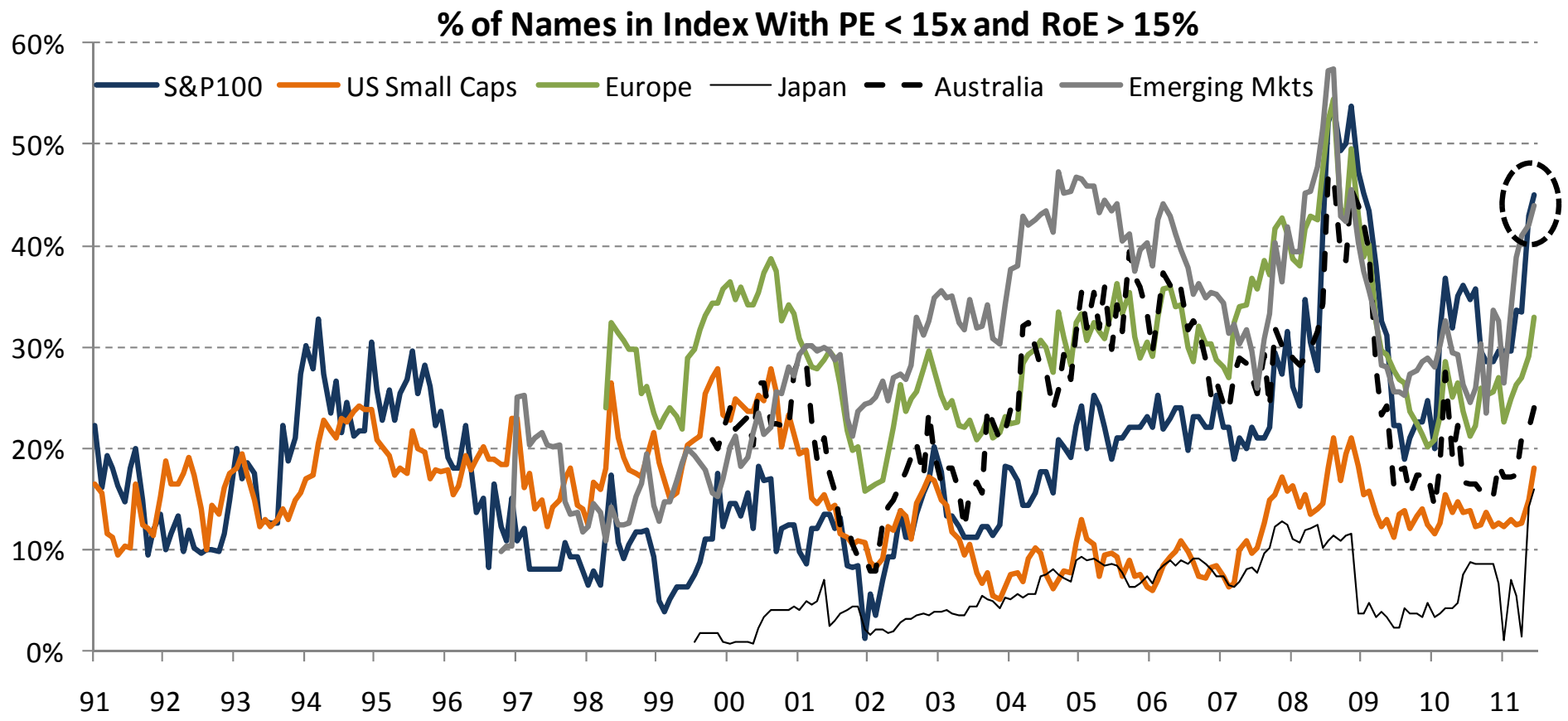
The Fusion of Value & Quality Around the World

There is a Higher Proportion of US Mega Caps Offering Quality-Adjusted Value than Anywhere in the World (… unlike 1999!)

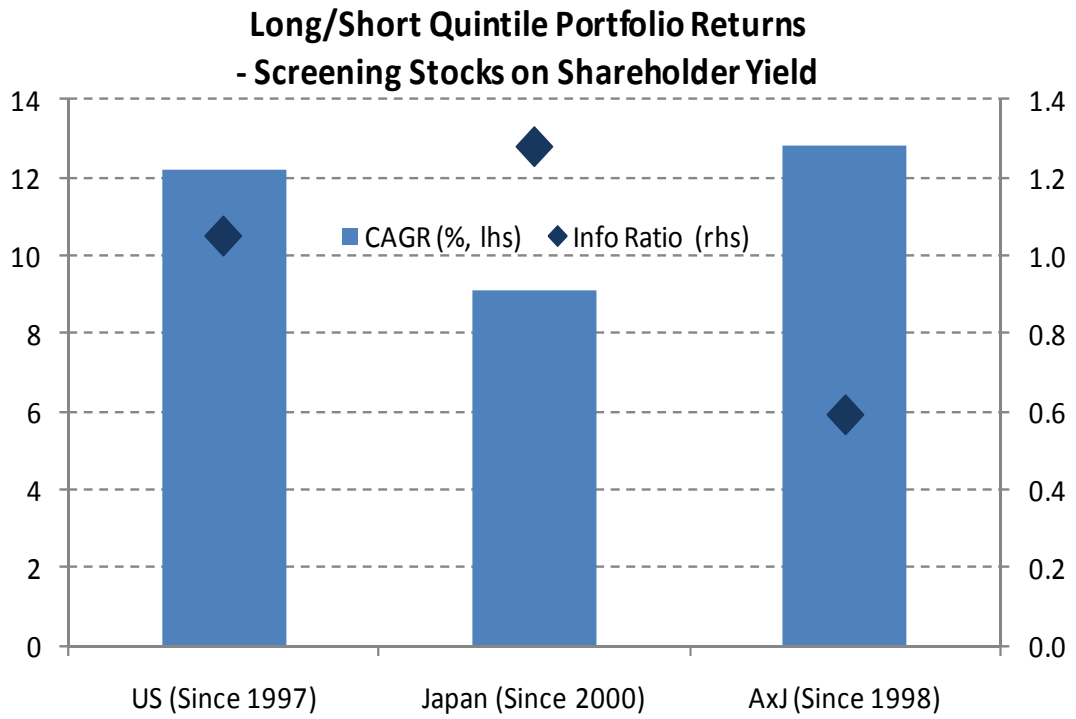


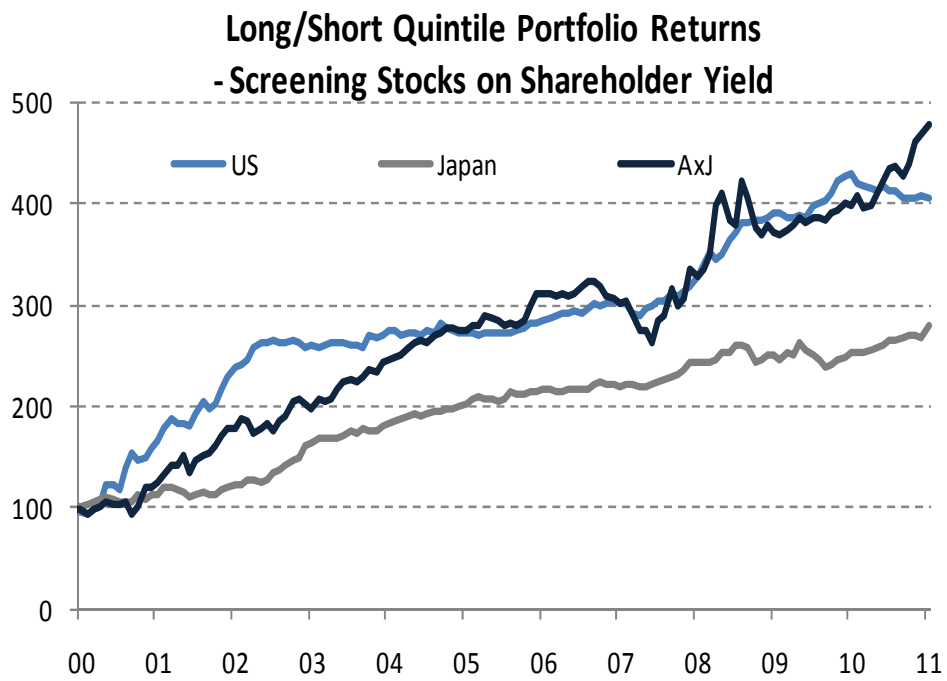
Source: DB GMR, Bloomberg

Shareholder Yield – Trust Companies that Pay Out

Cash is King When it Ends Up in Our Pocket … Not in Capex!

Buybacks & Dividends – Driving Cross-Sectional Return Dispersion Around the World



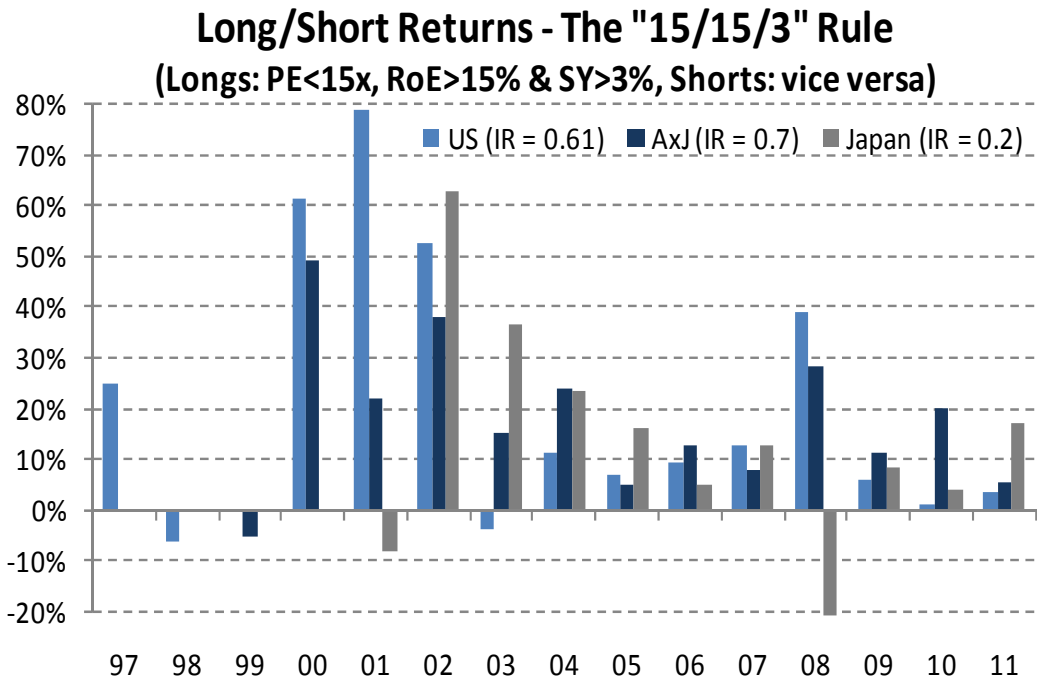


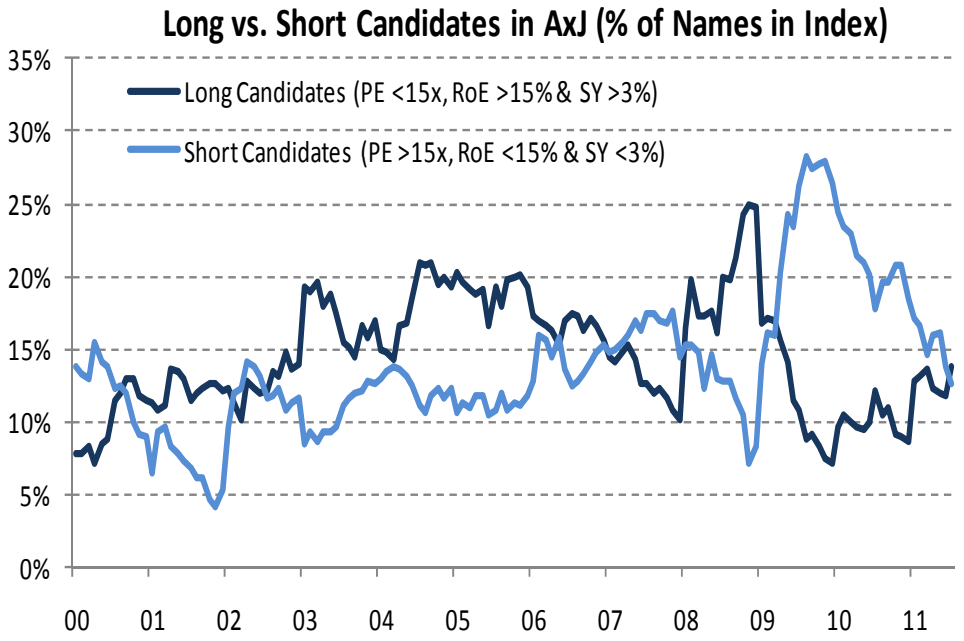
Source: DB GMR, Bloomberg. Long/short quintile portfolios (sector unconstrained) are based on the sum of trialing buyback and dividend yield, and rebalanced monthly. Universe is the largest 1000 stocks by market cap, and accounts for survivorship bias. Transaction costs not included.

Adding Shareholder Yield to the Value/Quality Nexus

The Case for a Simple Fusion of Value, Profitability and Payouts

Long/Short Portfolio Construction – Value, Profitability and Yield Screens
- Long Candidates now exceed Short Candidates in AxJ for the first time since March-2009





Source: DB GMR, Bloomberg. Long/short quintile portfolios are sector unconstrained. Universe is the largest 1000 stocks by market cap, and accounts for survivorship bias. Transaction costs not included.

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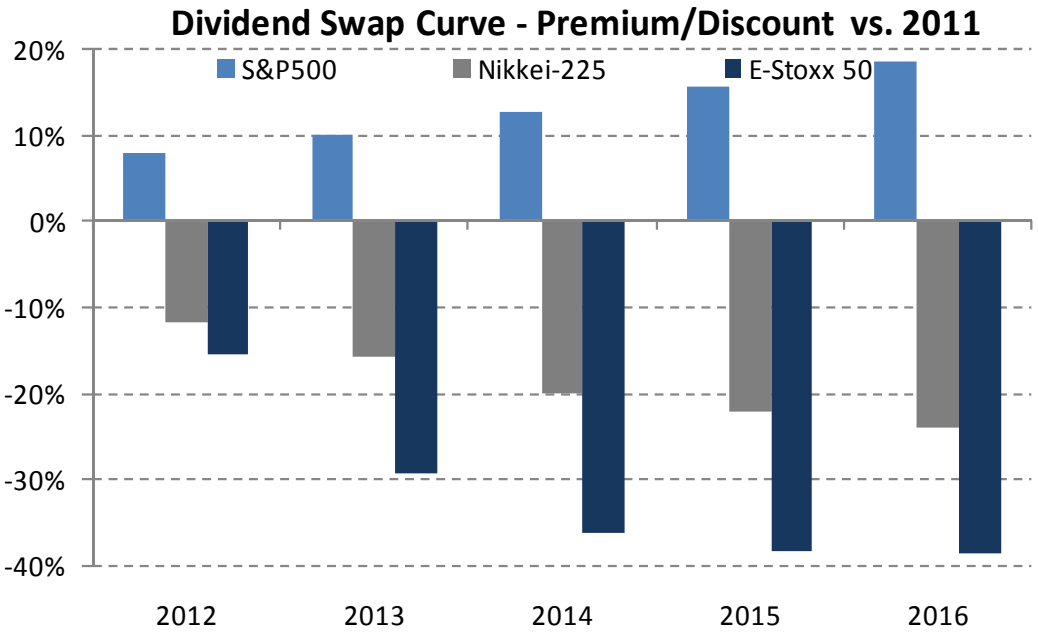
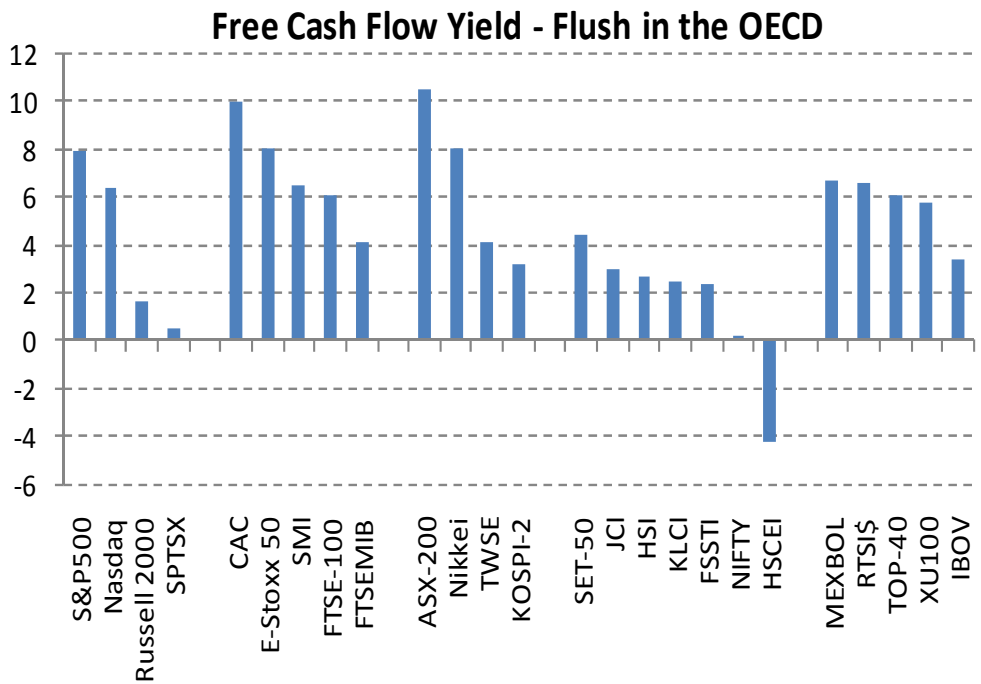
Dividend & Free Cash Flow Yield

Recession and/or Deflation Looks Fully Priced in Japan & Europe

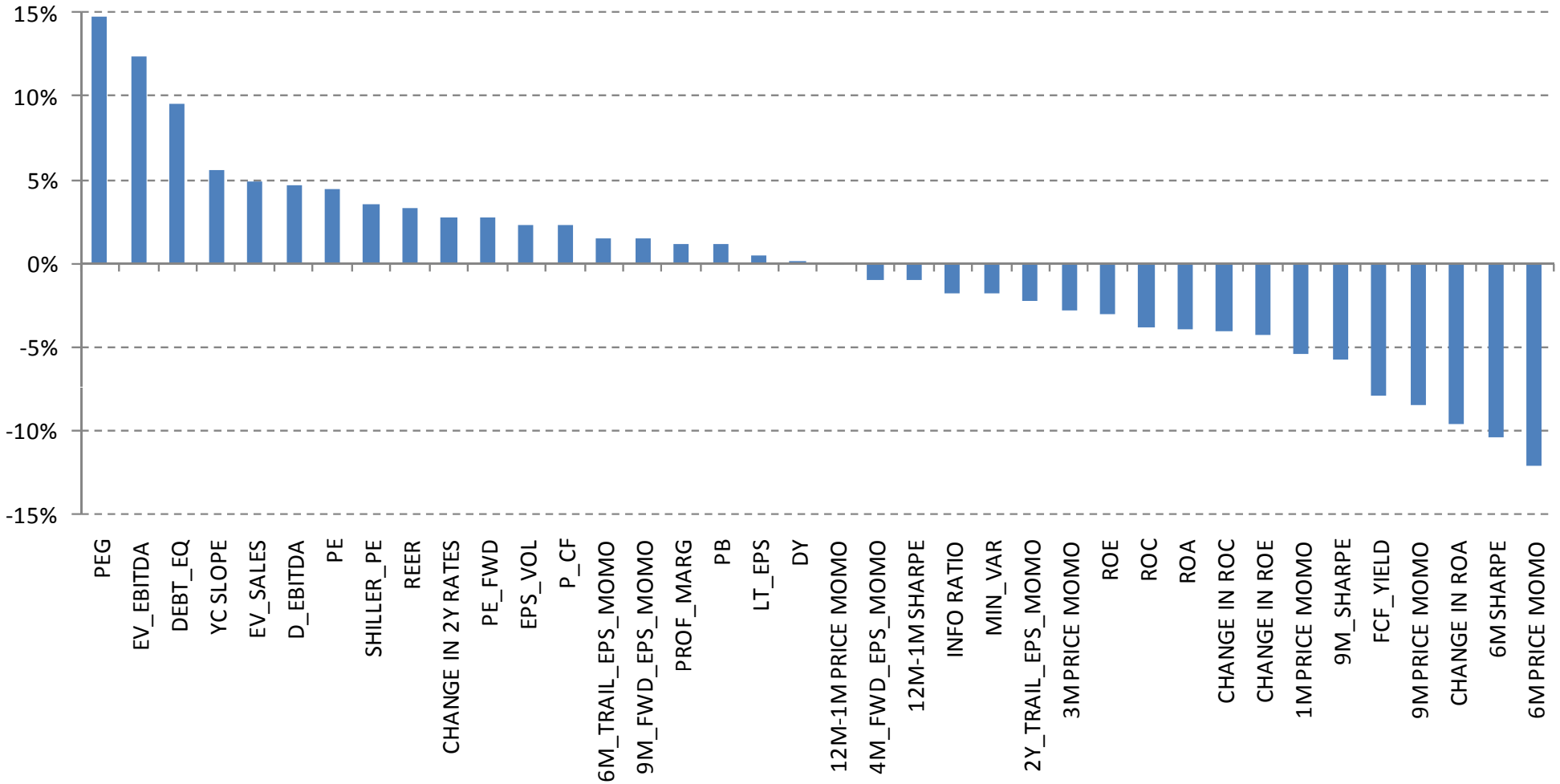




Source: DB GMR, Bloomberg

Global Equity Allocation – Factor Returns This Year

Year-to-Date (Long/Short) Factor Returns For Global Equity Indices

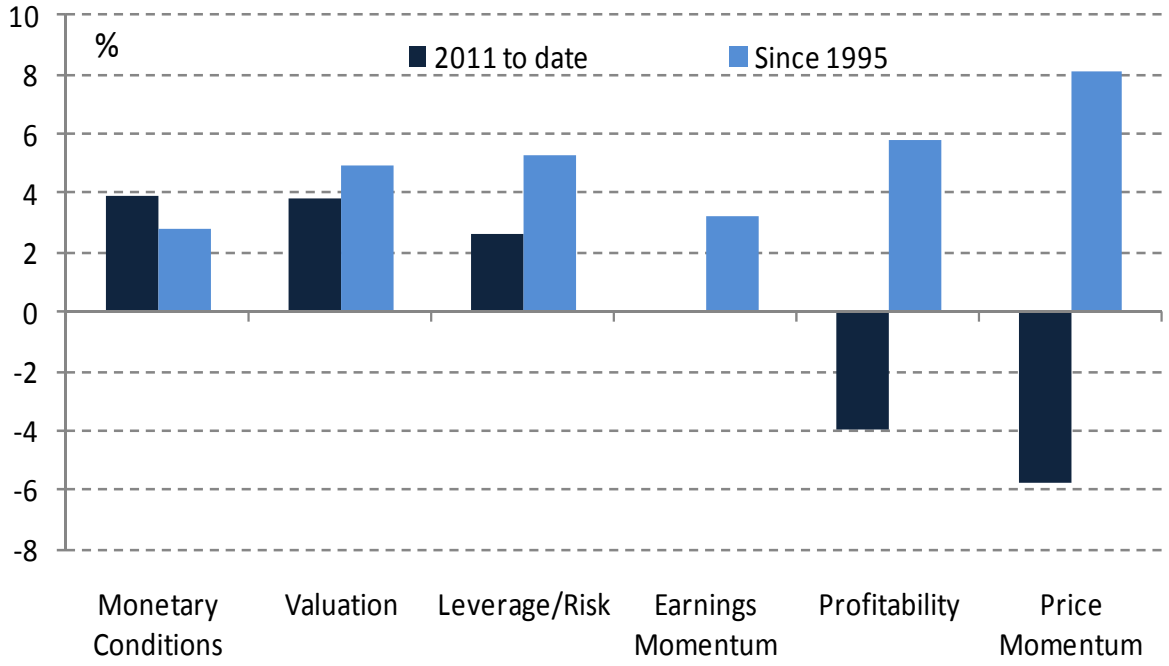


Source: DB GMR, MSCI, Bloomberg. Long/short quintile portfolios are formed across 38 factors and 43 countries, rebalanced monthly.

Global Equity Allocation – Factor Returns in 2011

Easy Monetary Conditions, Cheap Valuation and Low Corporate Leverage is Working

Long/Short Factor Portfolio Returns - Global Equity Indices



Country Model Recommendation Across 38 Factors:

Longs	Shorts
US	Belgium
Germany	Portugal
UK	Greece
New Zealand	Australia
Indonesia	Japan
Korea	India
Thailand	Peru
Poland	Ireland

Source: DB GMR, MSCI, Bloomberg. Long/short quintile portfolios are formed across 38 factors (grouped into six broad categories above) and 43 countries, rebalanced monthly.

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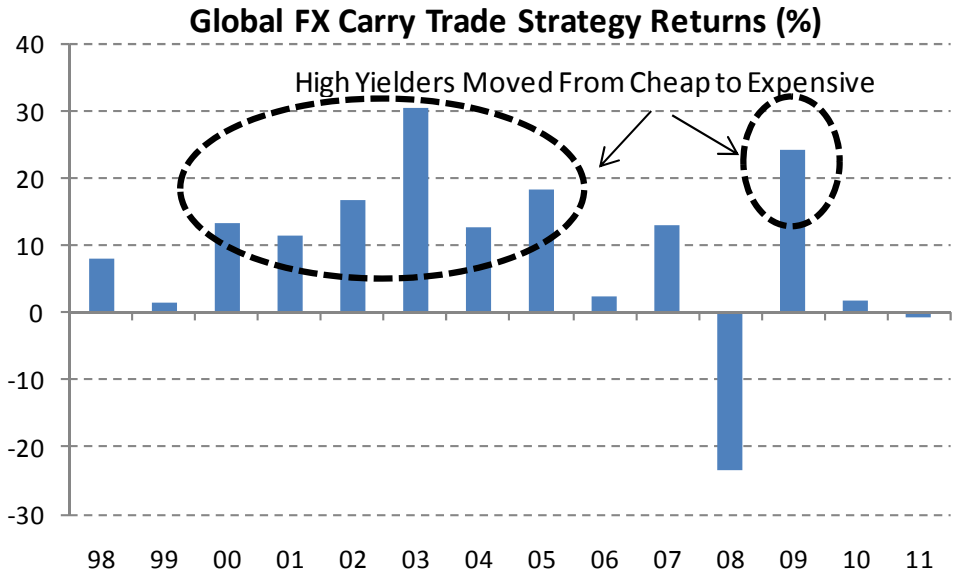
FX Carry – Watch the Red Flags

Some High Yielders are Expensive or Running Big Deficits

	3m Carry (%)	Curr Acct (% GDP)	Deviation from 7yr Ave REER (%)
ARS	13.6	0.8	-16%
EGP	9.1	-2.0	37%
INR	8.9	-3.4	8%
BRL	8.1	-2.3	31%
TRY	7.5	-8.1	-7%
VND	6.7	-6.0	1%
IDR	6.2	0.8	10%
RON	6.1	-4.0	1%
ZAR	5.5	-1.7	9%
AUD	5.3	-2.1	20%
CLP	5.2	0.6	8%
PEN	4.9	-1.6	3%
PLN	4.6	-3.4	1%
RUB	4.6	4.4	17%
ISK	4.1	-7.4	-20%
HUF	3.6	2.1	5%
MYR	3.3	11.5	4%
MXN	3.2	-1.3	0%
NZD	3.0	-4.3	8%
NOK	3.0	12.2	3%
ILS	3.0	0.6	13%
KRW	2.6	2.8	-7%
SEK	2.5	6.8	1%
COP	2.3	-3.3	12%
SKK	1.5	-1.2	10%
DKK	1.4	2.6	1%
CAD	1.3	-3.2	9%
GBP	0.9	-3.1	-13%
TWD	0.9	9.0	-5%
THB	0.3	4.7	6%
SGD	0.3	22.2	13%
HKD	0.2	6.5	-12%
JPY	0.2	3.4	7%
CHF	0.0	15.0	20%
CZK	0.0	-4.7	10%
PHP	-0.7	3.9	10%
CNY	-2.0	4.1	7%

Returns to FX Carry Trades
-High When Starting Valuations For the High Yielders Are Cheap/Fair



Source: DB GMR, Bloomberg, IMF. Countries in red (green) have a CA deficit (surplus) in excess of 3% of GDP, or are more than 20% above (below) their 7yr average real effective exch rate.

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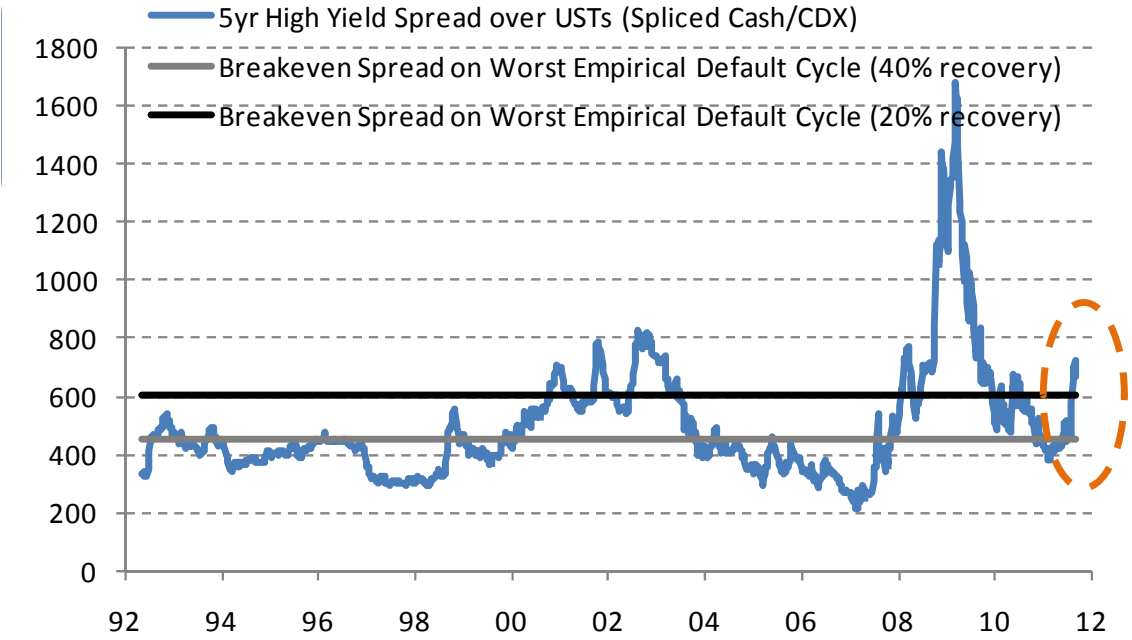
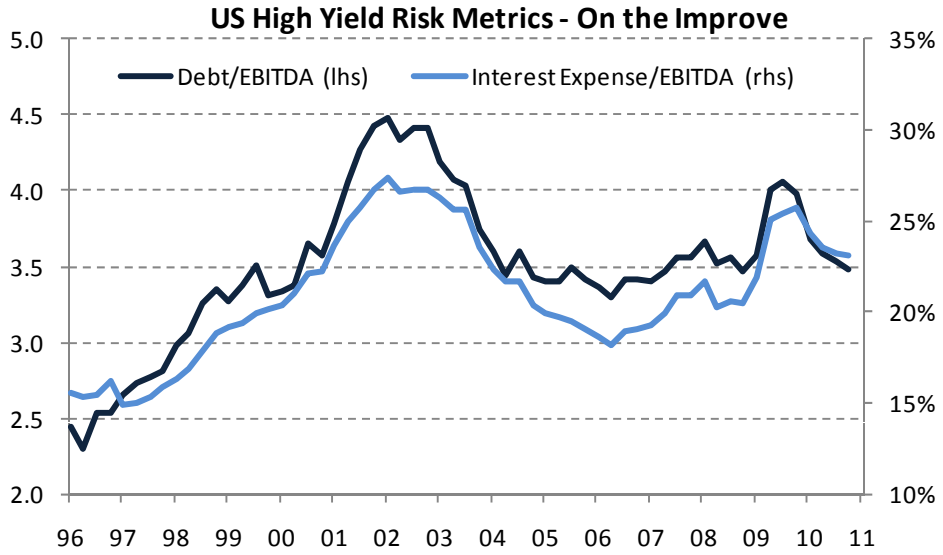
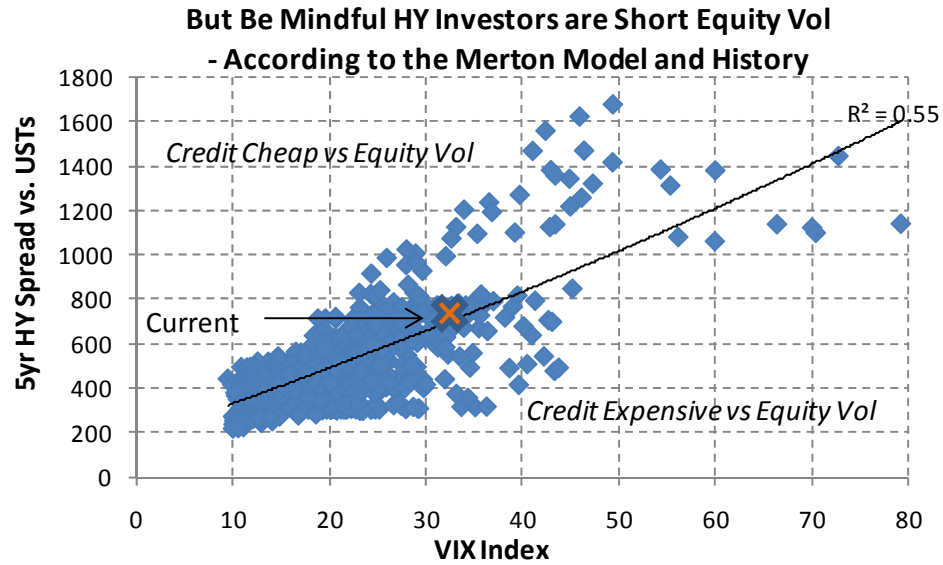
Excess Risk Premia Has Returned to Credit Markets

HY Now Offers Yields of ~8% with Half the Volatility of Equities … Alluring for Pension Funds?



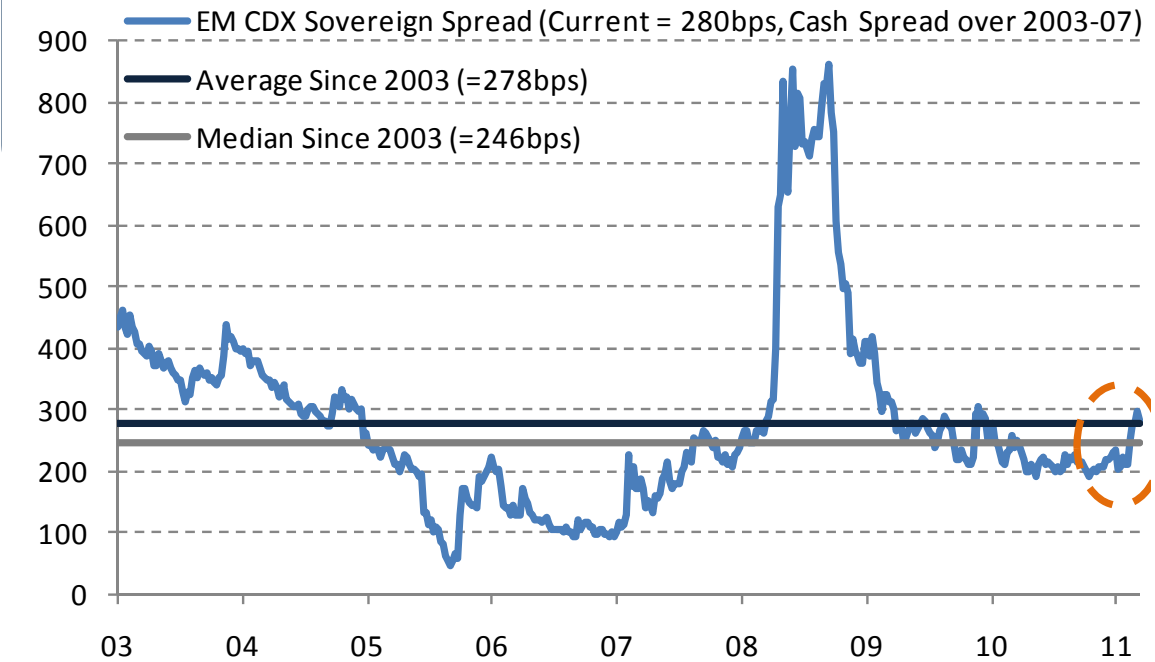


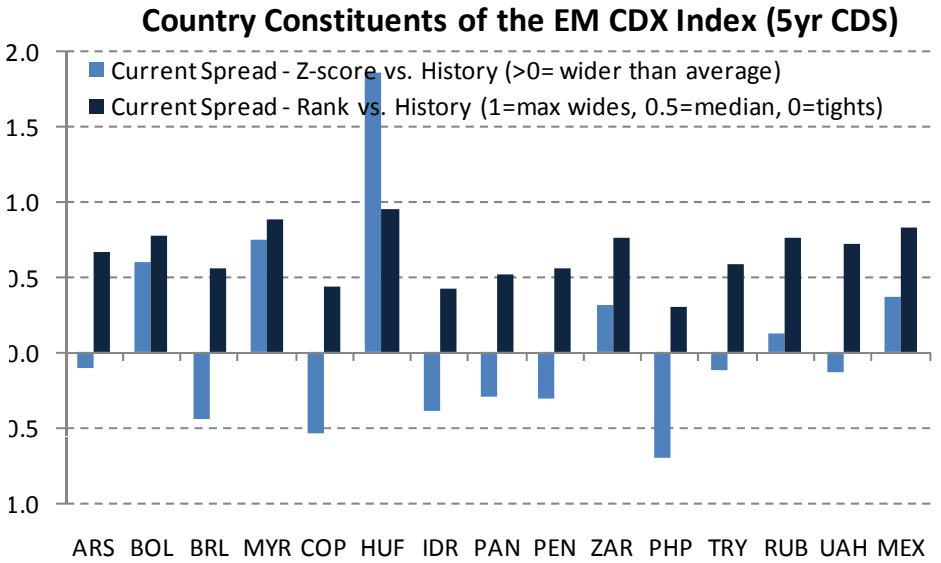


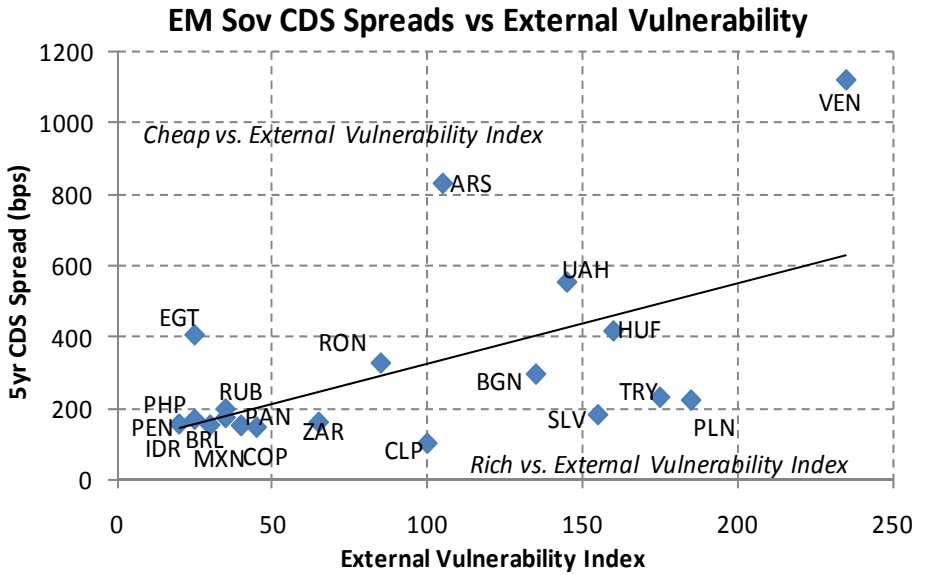
Source: DB GMR, Moody's, Bloomberg. The worst ever cumulative default cycle for HY has been 31.5%, and 5.8% for BBB Credit. Breakeven spreads in this instance were 453bps (20% recovery) or 605bps (20% recovery) for High Yield (vs. 680bps currently), and 72bps (40% recovery) or 96bps (20% recovery) for BBB (vs. 195bps currently).

Some Risk Premia Creeping Back into EM Sovereigns

A Number of EM Credits Are Trading Wider vs. the Post-2004 Ave.



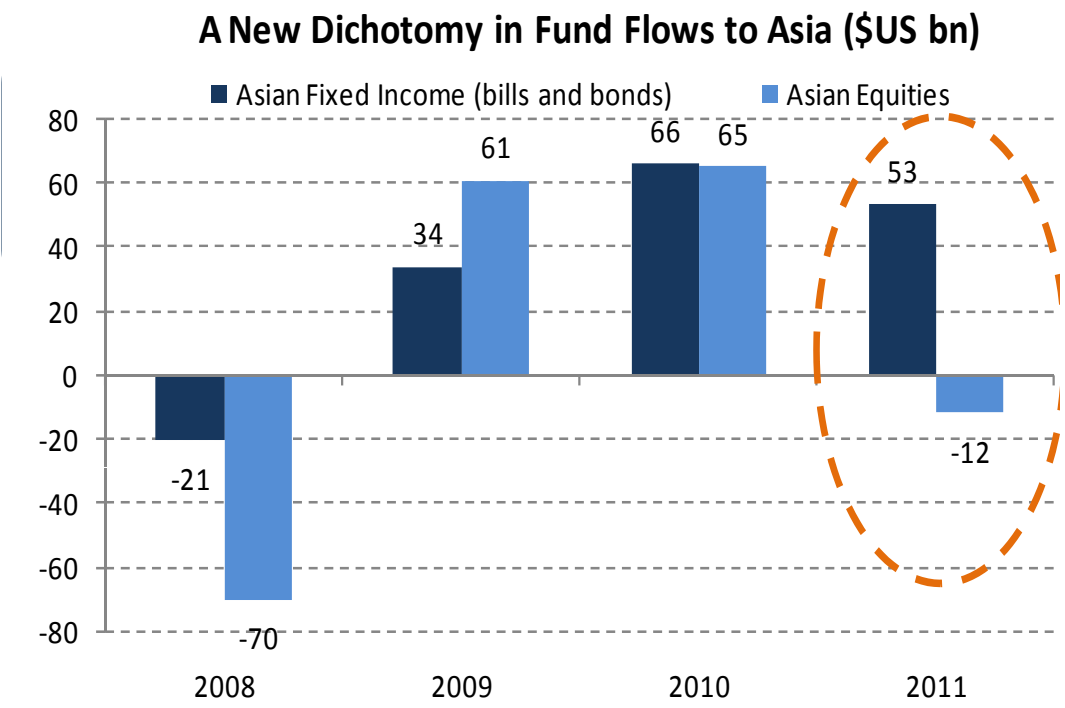


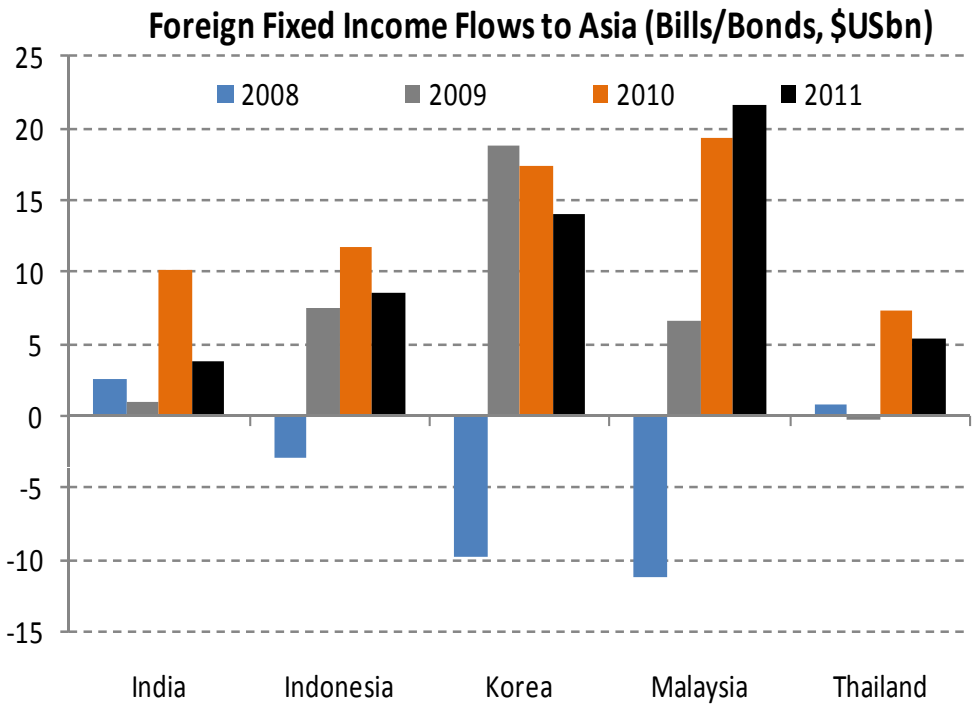


Source: DB GMR, Markit, Bloomberg. External vulnerability index = (short-term external debt + maturing long-term external debt + nonresident deposits < 1yr) / FX reserves

Asian Local Ccy Fixed Income – Adjustment is Underway

Deepening Ahead in Asian Debt Markets





Source: DB GMR, Bloomberg. Fixed income flows as at 31-July 2011 for India, Indonesia, Korea, Malaysia and Thailand. Equity flows as at 6-Sept 2001 for India, Indonesia, Korea, Taiwan, Thailand and Philippines

Still +100bps of Bond Risk Premia in Lowly Indebted EM

Of the 8 steepest forward curves globally, 5 are lowly indebted EM countries

	5y5y - 1y1y	Debt/GDP (%, 2011)
PHP	**5.40**	**47**
IDR	**3.87**	**25**
COP	**3.34**	**36**
GBP	3.15	83
MXN	**2.97**	**42**
USD	2.86	98
FIM	2.83	51
ZAR	**2.73**	**41**
ILS	2.66	73
CAD	2.64	83
NLG	2.61	66
HKD	**2.51**	**4**
FRF	2.49	85
SGD	**2.48**	**93**
ATS	2.47	71
DEM	2.31	82
DKK	2.23	46
TRL	**2.16**	**40**
CHF	2.05	53
RUB	**2.04**	**11**
ESP	2.00	68
NZD	1.92	36

Continued …

	5y5y - 1y1y	Debt/GDP (%, 2011)
NOK	1.65	54
PEN	**1.47**	**22**
AUD	1.39	24
ITL	1.28	121
JPY	1.25	233
CZK	**1.22**	**42**
HUF	1.18	77
CLP	**1.01**	**11**
SEK	0.96	37
TWD	0.67	34
MYR	0.62	55
THB	0.56	44
PLN	0.51	57
CNY	0.36	17
BEF	0.31	97
KRW	0.25	29
RON	0.25	38
BRL	0.21	66
INR	0.11	66
ISK	-0.32	103
PTE	-2.08	91
IEP	-2.09	114

Source: DB GMR, Bloomberg, IMF. Countries ranked by the steepness of forward swap curves (5y5y – 1y1y). Figures in gray are EM countries with forward curves steeper than 100bps and public debt/GDP ratios < 50%

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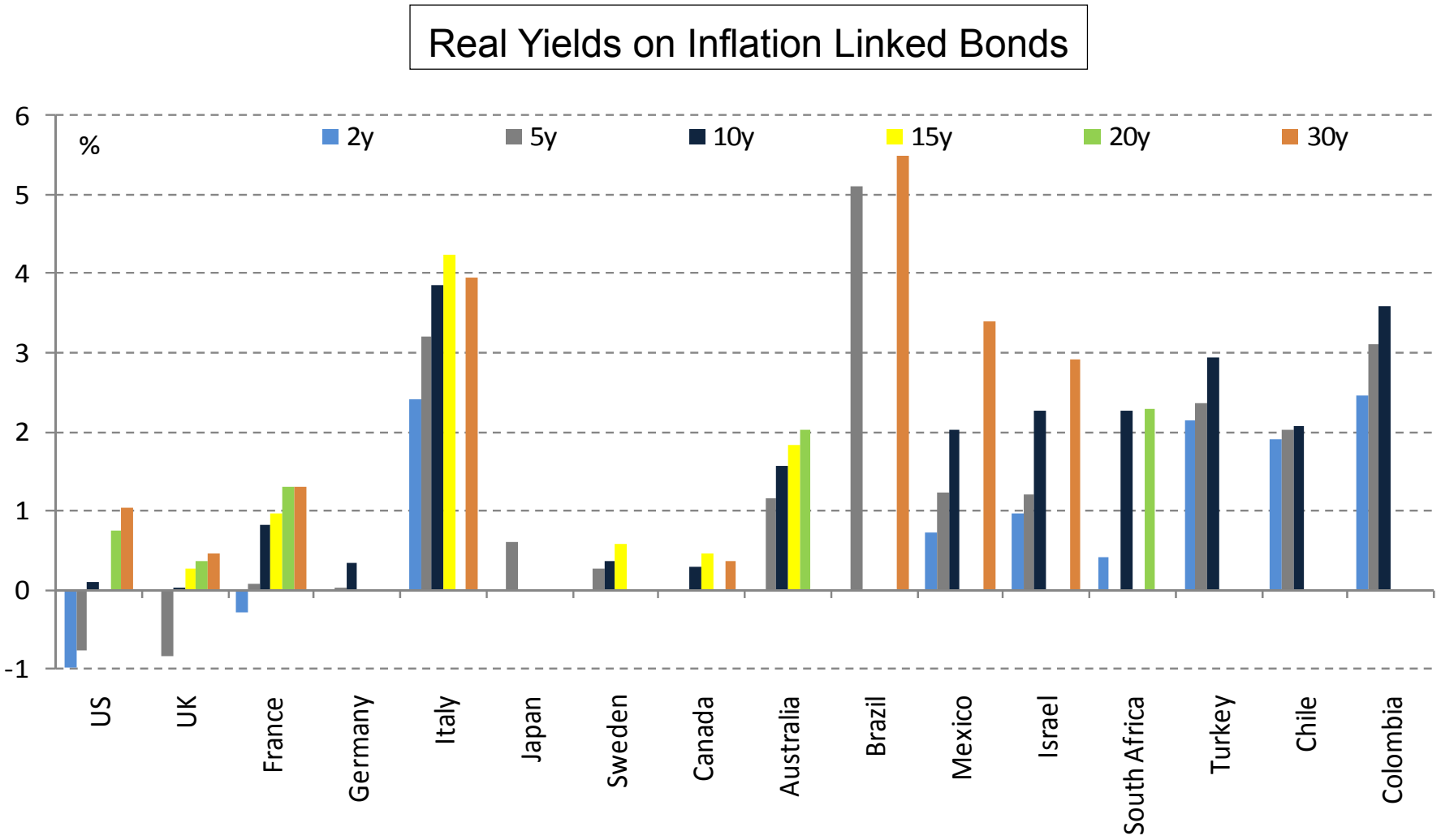
Negative Real Yields for OECD Bonds...

… But At Least There Are Positive Real Yields in EM



Source: DB GMR. Real yields for France, Germany & Italy based on EZ HICP ex-tob. In developed markets, all ILBs have a deflation floor except for the UK, Japan and Sweden. Chile yields are based on swaps.

Appendix # 1.

Building an Investment Defense Against Behavioural Biases

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Can A Process Triumph Over Behavioural Biases?
Defending Ourselves From … Ourselves

- We roamed the African savannah for 130,000 years, but have been trading stocks and bonds on organized exchanges for just 400 years* – our biological processes have not kept pace with developments in our career paths!
- This leaves us vulnerable to an array of behavioural biases that while optimal for survival in the jungle, are sub-optimal for decision-making under uncertainty
- 250 years ago, Adam Smith characterized the behaviour of humans as one of conflict between 'passions' and 'an impartial spectator', but for much of the past century, the assumption of rational expectations has dominated in economics
- Only in the past 15-20 years have we started to fuse findings from behavioural neuroscience and cognitive psychology into a new discipline that addresses suboptimal decision making – neuroeconomics, or behavioural finance
- We cannot cure systematic biases – these are generally efficient and helpful for daily life (our brains engage in 'heuristics', 'satisificing" and 'boundedly rational' decision-making, preventing paralysis-by-analysis for trivial matters)…
- … But we can develop processes to ameliorate the debilitating effects of behavioural biases in investment decision-making in the face of uncertainty

* *The Dutch East India Company was the first to issue stock and bonds to the general public in a limited liability structure via the Amsterdam Stock Exchange in 1602 (Exchange Handbook).*

The Case for Process over Discretion

Behavioural Biases Help in Life, But not in the Markets

- In response to the collapse of the South Sea Bubble, Sir Isaac Newton declared he could calculate the motion of heavenly bodies, but not the madness of people
- When faced with heightened uncertainty, behavioural biases trump rational thought
- Financial losses are processed in the same areas of the brain that respond to mortal danger – this only serves us well in running away from lions!
- Worse still, in the face of large potential losses, we exhibit risk-seeking behaviour, but turn risk-averse when faced with gains – we let losses run, but cut short winners!
- It is the release of chemical compounds that affect our decision-making:
  - Oxytocin is associated with the herding effect (and feelings of trust/security)*
  - Dopamine (affecting our pleasure/reward senses) is released when we anticipate the prospect of unusually large returns – the neural activity of a trader on a hot streak can be indistinguishable from someone on cocaine*
- Deep value investing is so difficult in practise because isolation from herds leads to stimulation of the amygdala (fight/flight) which can overwhelm the analytical brain (prefrontal cortex) – bucking the consensus can activate the same areas of the brain that are triggered by physical pain* – it literally hurts to be a deep value investor!

* *"Your Money and Your Brain" (2007), Jason Zweig*

The Case for Process over Discretion

More than 100 Behavioural Biases Have Been Documented!

- Overconfidence bias – the majority believe they are superior to the average
- Cognitive dissonance – the tendency to seek only evidence supporting one's thesis
- Regret avoidance – a poor outcome in the past prevents objective appraisal in subsequent periods ("I will never buy tech stocks again")
- Disposition effect/Asymmetric loss aversion – we take large risks in attempting to avoid any loss, but are risk averse (take profits early) in the face of potential gains
- Hindsight bias (Monday morning quarterbacking) – ex-post rationalization makes events seem more predictable than was the case in real time ("it was so obvious")
- Self attribution bias – positive (negative) outcomes are due to us (exogenous events)
- Endowment affect – we value owned items higher than identical unowned items
- Sadness effect – in order to bring about change, it increases the value placed on unowned items, and decreases that of owned items (antidepressants have been prescribed for compulsive shoppers and traders!)
- Familiarity bias – gives a false impression of control
- Anchoring effect – placing too much weight on just one piece of information ("I won't swim in Australia as they have sharks in the water down there")

Appendix # 2.

Noise vs. Signal

– The (Non-Linear) Role of Time

Noise vs. Signal

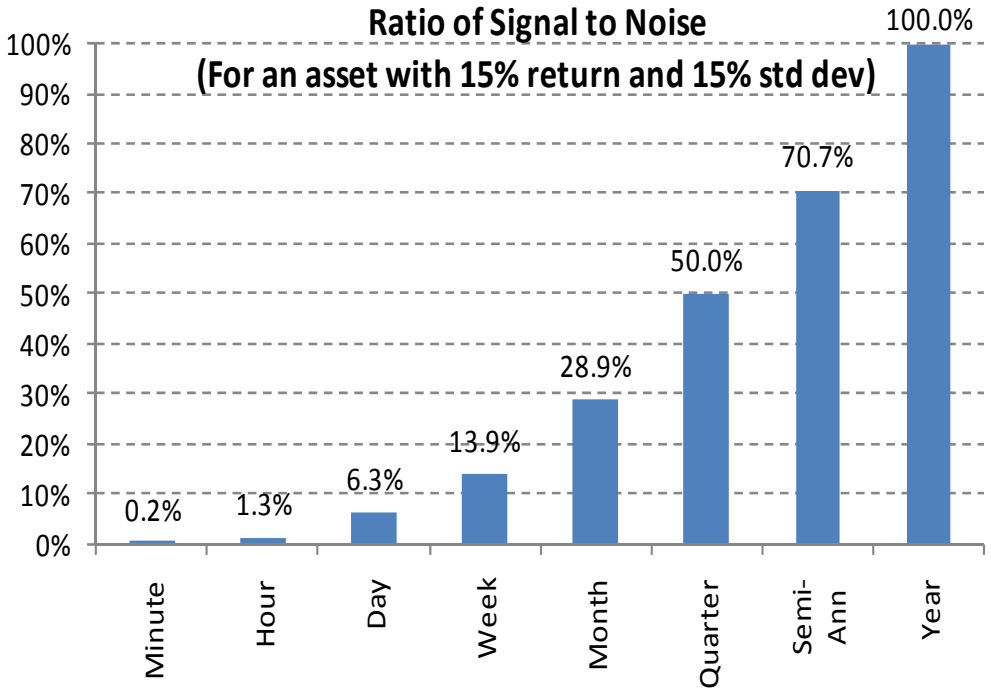
Why Monitoring Your Portfolio Each Hour Won't Help Performance

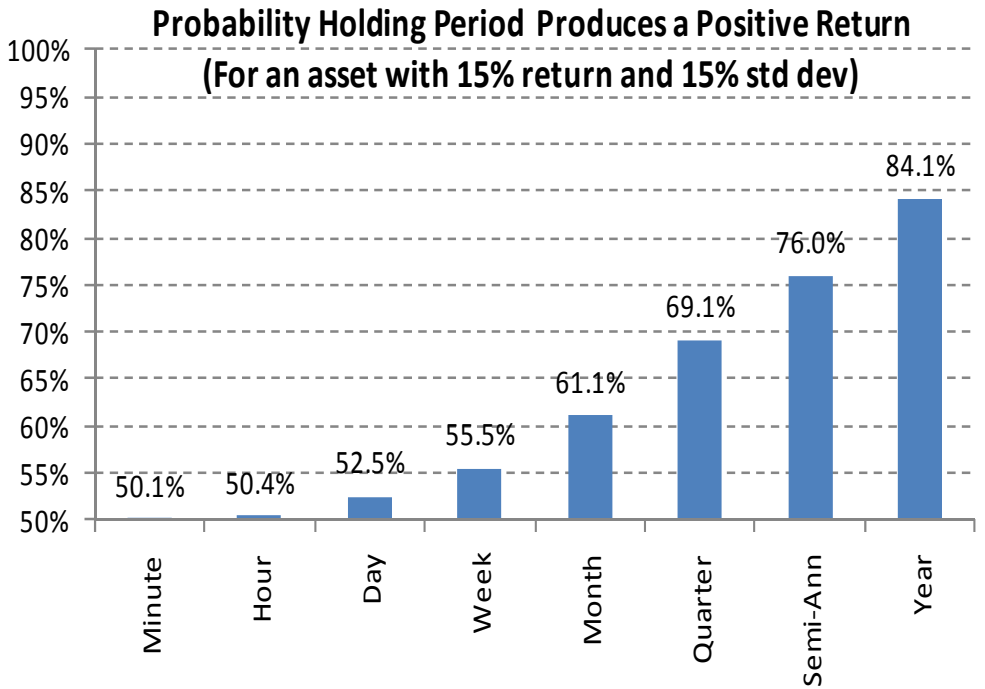
- The return generating process is a function of signal (return) and noise (volatility)
- The signal/noise ratio varies dramatically through time – return (or drift) grows as a linear function of time, but standard deviation grows more slowly (at the root of time)
- There are significant implications from this time-dependent non-linear relationship:
  - at high frequencies, volatility swamps the drift (you only observe noise!)
  - for instance in the case of an asset with 15% return and 15% volatility, the signal/noise ratio is just 1% at 1-hourly frequency, but 29% at monthly frequency
  - put another way, the probability of this asset being higher over any given 1-hr period is just 50.4% (a coin toss), but 61.1% over any given monthly period
  - because we feel losses more intensely than gains of the same magnitude, *high frequency trading will likely impose enormous emotional costs over time*
  - at high frequencies, the ratio of transaction costs/returns is also very large (an asset appreciating 15% p.a. will rise just 0.06% on average each day, < bid/ask!)
  - lowering the observation frequency increases signal/noise, but at the potential cost of missing big turning points (there is a trade-off or optimization problem)
  - the largest gains in statistical efficiency (and hence emotional benefit) likely occur when measuring volatility daily, but observing returns weekly or monthly

Noise vs. Signal

Why Monitoring Your Portfolio Each Hour Won't Help Performance

- Time is a natural filter for noise
- Drift can 'out-run' volatility only as the length of holding period increases (volatility is a sprinter and will dominate over short periods, drift is a marathon runner)
- Increasing the observation period (up to a point) can help save emotional calories!



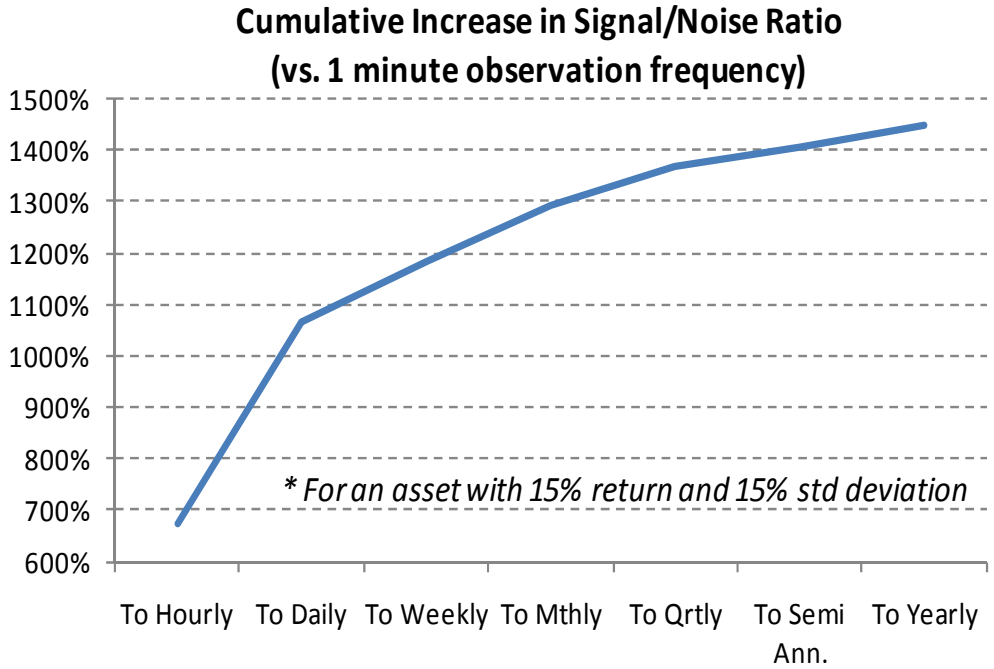


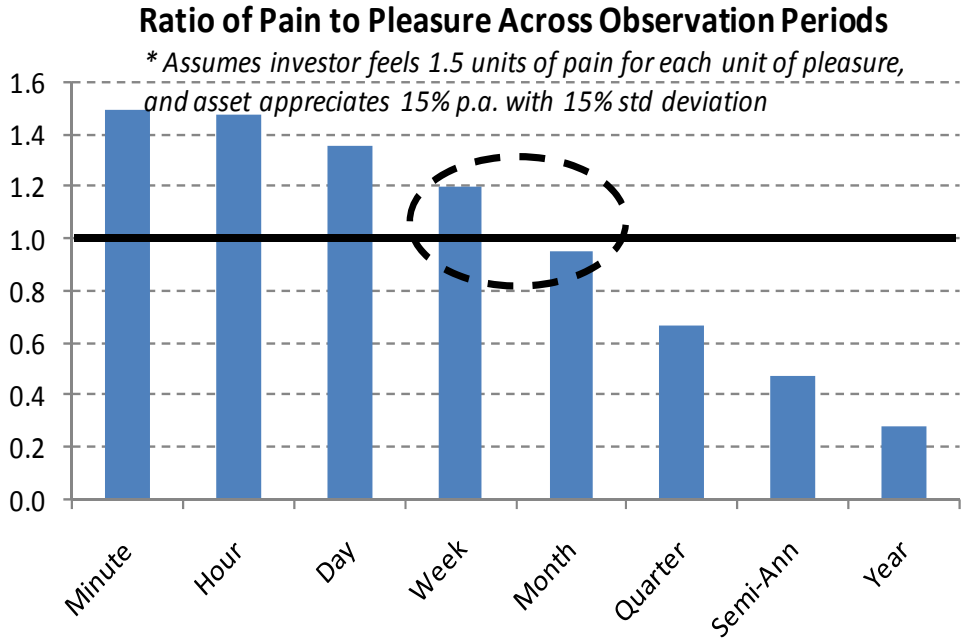
Source: DB Global Markets Research, Bloomberg

Noise vs. Signal

Why Monitoring Your Portfolio Each Hour Won't Help Performance

- The more volatile the asset, the longer time period typically required in order to observe a reasonable amount of 'signal'
- Incremental benefits from extending the observation period seem to level out beyond the monthly frequency (and may be overtaken by other considerations)





Source: DB Global Markets Research, Bloomberg

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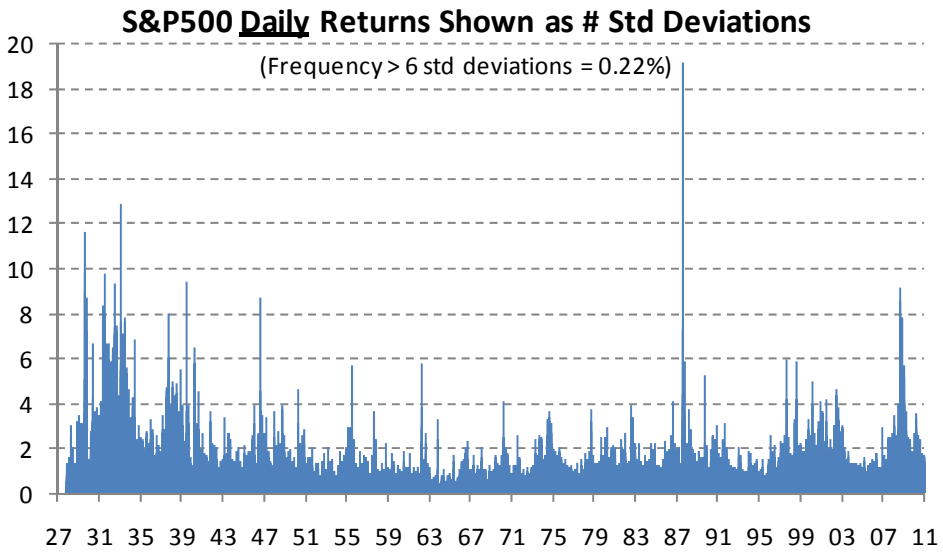
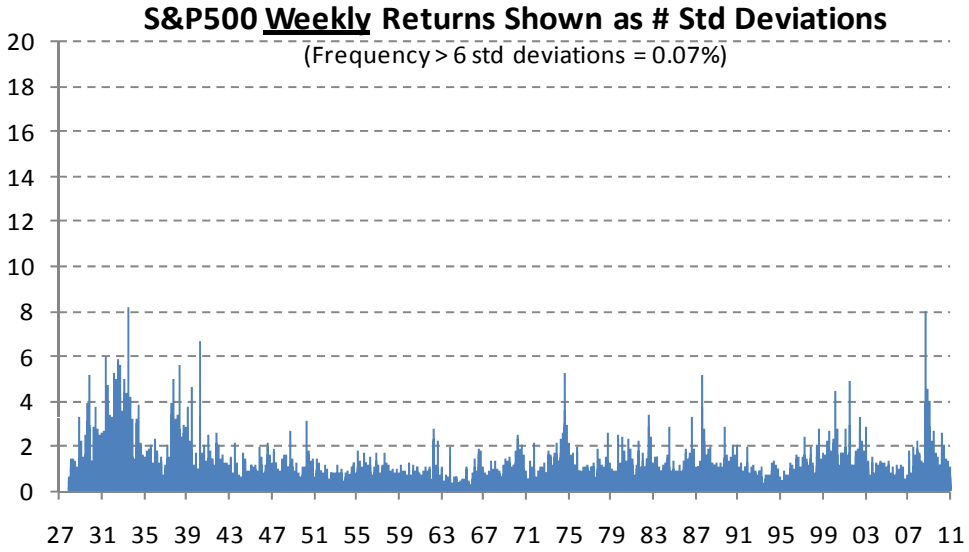
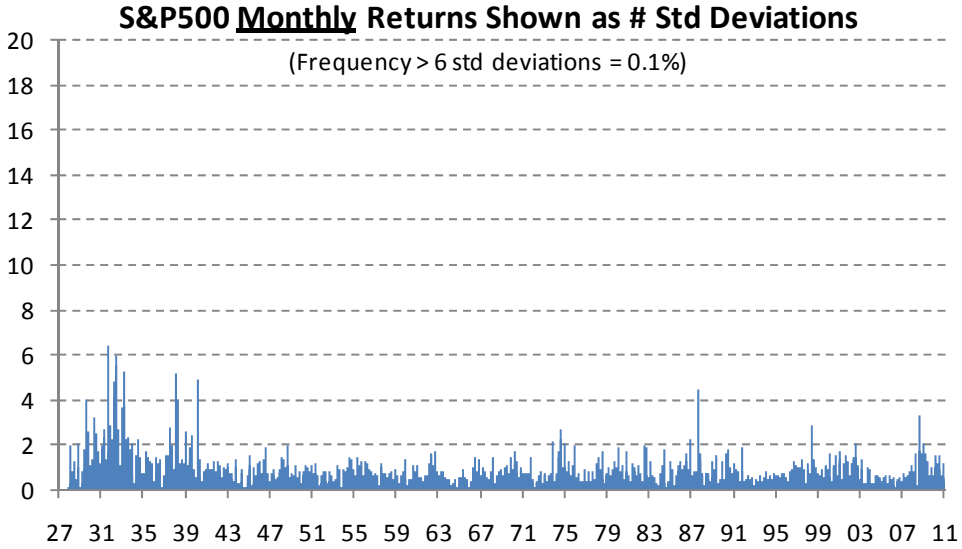
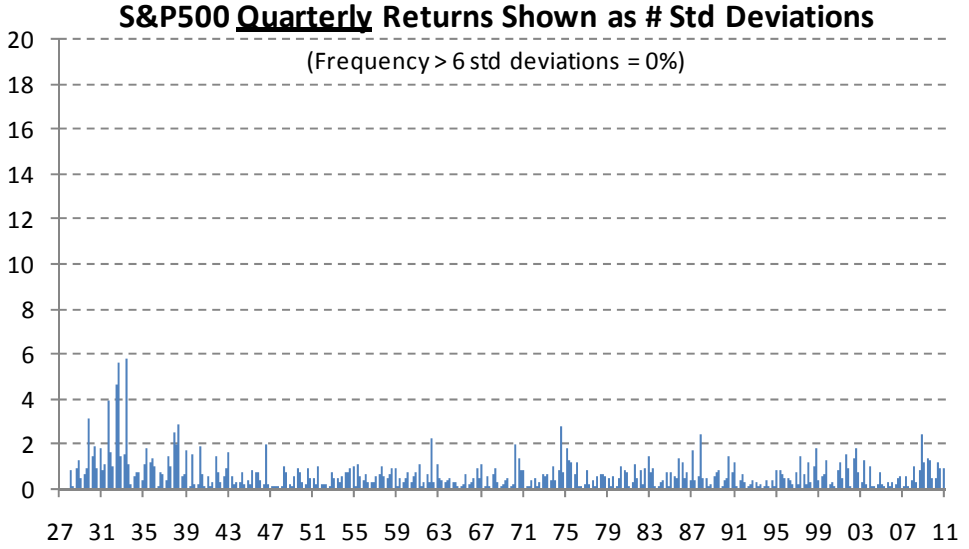
Noise vs. Signal

As the Holding Period Increases, Noise Eventually Washes Out









Source: DB Global Markets Research, Bloomberg

Appendix 1
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