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Portfolio Management of Risk Premia Factor Strategies

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Alternative Beta Factors and the Portfolio Management Process

- Recent studies have established the role of alternative beta factors in portfolios
- A significant portion of active returns beyond the benchmark have been shown to be explained by exposures to known alternative beta factors

Example Portfolio Management Process

Benchmark	**Market Beta**	**Equity Market**	**Rates Market**	**Credit Market**	**Other Markets**
Active Management	**Alternative Beta Factors**	**Size**	**Term Premium**	**Quality Prem.**	**FX Carry**
		Value	**Vol Premium**	**Term Premium**	**EM Premium**
		Momentum	**Liquidity**		
	Alpha	**Security Selection**			

Alternative Beta Factors as "Risk Premia" Strategies

- Alternative beta factors can themselves be considered strategies that capture a systematic source of return, or risk premia
- These returns and risk premia are beyond those usually associated with broad market exposure
- Risk premia strategies look to earn an additional return in compensation for accepting some known risk
- Typically, risk premia strategies are expected to have positive risk-adjusted return over the long run
- However, they may also be subject to sharp losses or drawdowns as and when risks are realized

Example Strategies Capturing Risk Premia

- Although much industry and academic debate surrounds the existence and identification of risk premia strategies, a set of standard strategies has emerged
- In the equity markets, the value vs. growth and small cap vs. large cap factors have been extensively studied
- Some examples from the fixed income and currency space include
  - **Rates Term Premium –** The additional return for accepting long duration risk over short duration risk
  - **Credit Quality Premium –** The additional return for taking low quality credit risk versus high quality
  - **Volatility Premium –** The additional return for taking tail risk in selling options
  - **FX Carry –** The additional return from high yielding versus low yielding currencies in stable markets

Portfolio Management of Risk Premia Factor Strategies

- Exposure to alternative beta / risk premia strategies in a portfolio is not static
- Within the limitations of mandates, portfolio managers can make active decisions directly on risk premia strategies
  - **Selection of risk premia strategies on which to take exposure**
  - **Sizing of exposures**
  - **Timing of exposures**
- Such management can be done on a discretionary or systematic basis, or using a combination

Portfolio Management of Risk Premia Factor Strategies

- As with any other aspect of portfolio management, it is necessary to be able to assess or estimate
  - The long-run expected performance of each strategy
  - The risk profile of each strategy
  - The correlation and tail dependence
- **Barclays Capital Investable Indices** provide access to a wide range of directly tradable investment strategies. Each is replicable using standard liquid instruments and incorporates full trading costs
- In this presentation, we analyze the use of risk premia strategies in a portfolio using five strategies selected from the Barclays Capital Investable Index family

Flagship Indices from the Barclays Capital Investable Index Family

- Investable indices provide access to a broad range of strategies from beta to alpha across asset classes

	Commodities	Rates	Inflation	Credit	FX	Equity	Emerging Markets
β	Single-Commodity	BCSI (Curve)	Inflation Swaps	Credit Beta (Swaps)	Borrowing Units	CEEMEA Sectors	EM Swaps
	BGCI (Carbon)	BISI (Swaps)	INSTEP	Steepener / Flattener	Trade-weighted FX	Vertex	GEMS
	US Power	VOX / BPX	INSPIRE	Credit Vol Premium	CPCI	Dividend Swap	**Alternative**
	Pure Beta	RIVA	TWIST	NEMO	BetaVol	Renewables	Hedge Fund LBAR / SBAR
	Momentum Alpha	Atlantic Exceed	Real Income	BLSC	Intelligent Carry	Paris	
	ComBATS	Target Exceed	AIMS		FX Value	GSP	
	CORALS	Trend STAR			Adaptive Trend	QBES	
α	Everest Alpha	CRYSTAL			FX Switch	In Tune	
					AlphaVol	Navigator	

Source: Barclays Capital.

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Three Questions

We address three questions key to the management of these strategies

1) What are the risk profiles of these strategies?

2) Is there diversification value across strategies?

3) Is there evidence that rules-based signals can help management of risk premia strategies?

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Five Risk Premia Strategies Based on Investable Indices

Foreign Exchange	• **G10 FX Carry –** Maximize expected yield pickup subject to 5% volatility on G10 currencies
Credit	• **Credit Quality Premium –** Long high-yield, short investment grade using on-the-run CDX IG and HY 5yr
Emerging Markets	• **EM Premium –** Earning the premium over USD for investing in 15 EM money markets using rolling forwards
Interest Rates	• **Term Premium –** Long UST 10yr rolling futures, short UST 2yr rolling futures, 1:1
Volatility	• **Volatility Premium –** Short rolling delta-hedged short ATMF 3m10y IR straddles, 5x leverage

All strategies are unfunded excess returns in USD

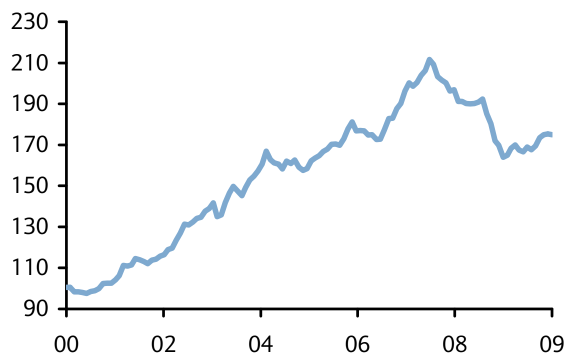
What Are the Risk Profiles of the Risk Premia Strategies?

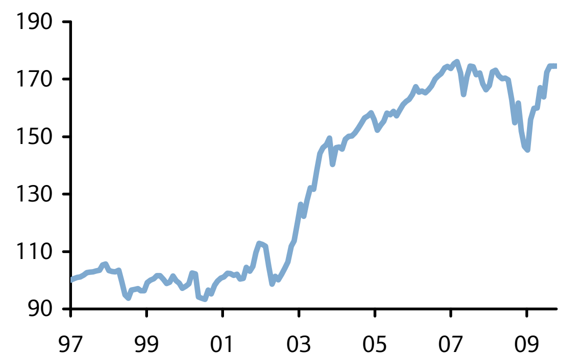
Characteristics and Risk Profiles of Risk Premia Strategies

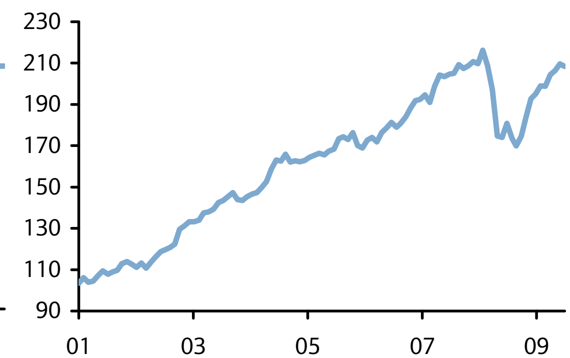
- Robust analysis of risk premia strategies requires very long histories (20 years+)
- However, we can assess these tradable implementations in terms of the general characteristics associated with risk premia strategies
  - **Long-run performance –** In theory, investors should be rewarded for assuming greater risk by receiving a positive long-run return
  - **Fat negative tails –** Less frequent but more severe losses than gains
  - **Draw-downs –** Can experience severe and extended drawdowns
  - **Broad market correlation –** Typically expected to be correlated with each other and with other market betas, especially in periods of underperformance

Characteristics and Risk Profiles of Selected Strategies

	G10 FX Carry	Credit Quality Premium	EM Premium
Sample period	2000–2009	1997–2009[1]	2001–2009
Long-run performance			
Annual excess return	5.8%	4.8%	8.6%
Annual volatility / Sharpe Ratio	6.3% / 0.9	8.3% / 0.6	7.8% / 1.1
Fat negative tails			
Worst month return	(4.7%)	(7.8%)	(11.4%)
Worst 10% vs. Normal Distribution	1.6x	1.6x	1.7x
Drawdown			
Maximum peak-trough	22.5%	17.5%	21.4%
Broad market correlation			
Mthly correl w/Global Agg ER	23%	31%	64%
Mthly correl w/S&P500 ER	9%	37%	65%





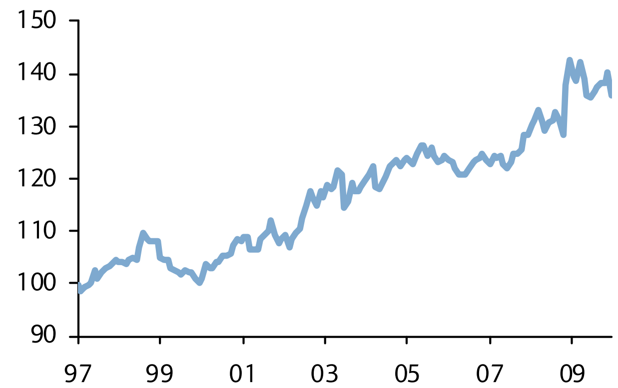


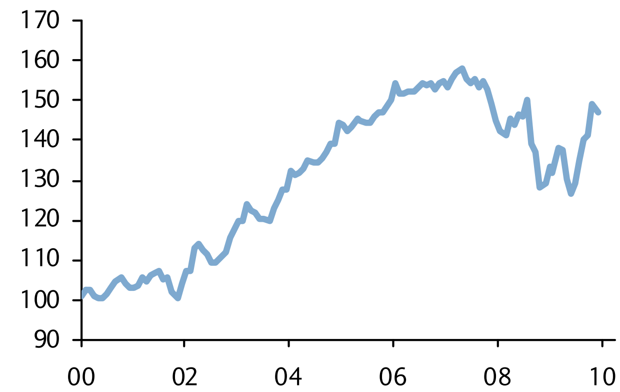
Source: Barclays Capital.

1. Pre-2004 returns based on reconstructed hypothetical CDX levels and were not investable.

Characteristics and Risk Profiles of Selected Strategies

	Term Premium	Volatility Premium
Sample period	1997–2009	2000–2009
Long-run performance		
Annual excess return	2.5%	4.1%
Annual volatility / Sharpe Ratio	5.0% / 0.5	7.1% / 0.6
Fat negative tails		
Worst month return	(5.1%)	(7.2%)
Worst 10% vs. Normal Distribution	1.4x	1.4x
Drawdown		
Maximum peak-trough	8.6%	19.9%
Broad market correlation		
Mthly correl w/Global Agg ER	(7%)	33%
Mthly correl w/S&P500 ER	(14%)	25%





Source: Barclays Capital.

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Is There Diversification Value Across These Strategies?

Correlation Properties Indicate Limited Diversification

- Correlations can be unstable between strategies and hard to estimate
- Negative correlations in particular need not be robust

Full Sample Monthly Correlations (2000–2009)

	FX Carry	Quality Premium	EM Premium	Term Premium
Quality Premium	(1%)			
EM Premium	**31%**	**46%**		
Term Premium	**(3%)**	**(24%)**	9%	
Volatility Premium	**26%**	12%	**19%**	7%

Excluding Credit Crisis (2000–2007)

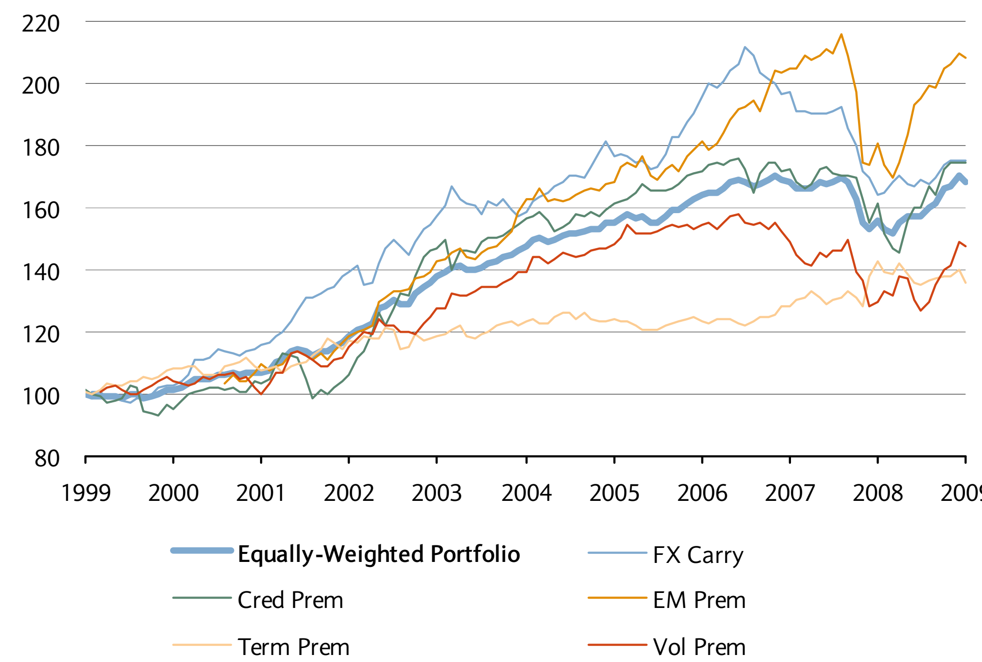
	FX Carry	Quality Premium	EM Premium	Term Premium
Quality Premium	(5%)			
EM Premium	**22%**	**39%**		
Term Premium	**4%**	**(28%)**	1%	
Volatility Premium	**19%**	5%	**22%**	14%

Source: Barclays Capital.

Forming an Equally Weighted Portfolio of the Five Strategies

- Short sample, but risk-adjusted statistics are superior to most individual strategies
- Correlation with S&P is higher, though, and the drawdown is still significant

	Equally Weighted
Sample period	2000–2009
Long-run performance	
Annual excess return	5.3%
Annual volatility / Sharpe Ratio	3.9% / 1.3
Fat negative tails	
Worst month return	(4.7%)
Worst 10% vs. Normal Distribution	1.7x
Drawdown	
Maximum peak-trough	10.8%
Broad market correlation	
Mthly correl w/Global Agg ER	58%
Mthly correl w/S&P500 ER	47%



Source: Barclays Capital.

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Can Rules-Based Signals Help Timing of Risk Premia Strategies?

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Rules-Based Timing Signals – Pros and Cons

- Maintaining static allocations to these strategies is unlikely to be optimal
- Dynamic allocation can be made on either a discretionary or a systematic basis
- For example, a rules-based signal can be used to reduce exposure, or even go short the strategy, in periods of anticipated higher risk
- However, there are **challenges** in finding robust signals
  - Strategy **histories are short** with typically only one or two cycles
  - Data mining can lead to misleading in-sample performance; genuine **out-of-sample testing difficult**
  - Signals add turnover and **transaction costs** that may outweigh benefits

Some Commonly Used Signal Themes and Drawbacks

Risk Aversion / Volatility Signals

- Many risk premia strategies have an empirical and/or theoretical short-volatility profile
- Increases in market volatility may coincide with and/or lead periods of underperformance
- **May generate false positives in the event of volatility spikes**

Momentum Signals

- Some risk premia strategies demonstrate persistence in returns
- Identifying and underperformance trend in could be sufficient to reduce exposure
- **Vulnerable to sharp drops, and choppy periods of performance**

Expected Return

- Fixed income strategies typically have a natural “expected” return based on yield pick-up or roll-down, assuming no market moves
- Could be useful directly, or risk-adjusted, as a performance signal
- **However, link between expected and actual performance unclear / unproven**

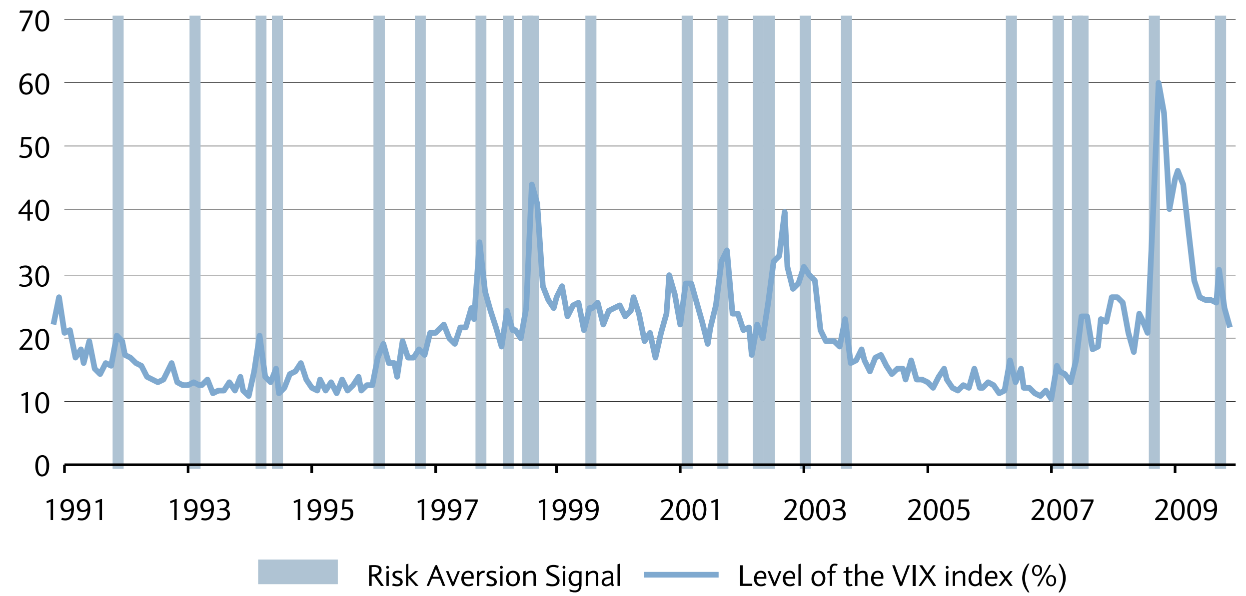
Value Signals

- Fundamental models that establish “fair value” for the asset class can be used
- Reduce exposure when deviation from fair value beyond acceptable limit
- **Very hard to calibrate reliably, often lead to premature signals**

Can We Encapsulate Risk Aversion Using the VIX Index?

- Performance of risk premia strategies may be connected to market risk appetite
- As an illustration, we use a signal based on the classic risk-aversion measure: the VIX index. Although perhaps counter-intuitive on non-equity strategies, it serves as a simple, broadly accepted measure that is not fitted to any particular strategy
- There are many ways to define such a signal – we use rapid increases in VIX over one month, calibrated so that the signal triggers in roughly 10% of months

VIX-Based Market Risk Aversion Signal

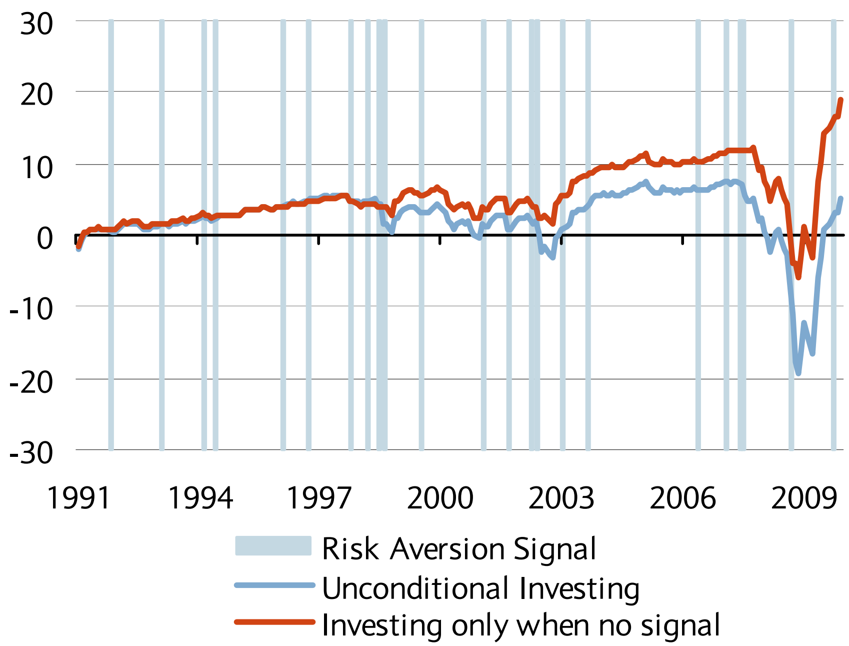


Source: Bloomberg, Barclays Capital.

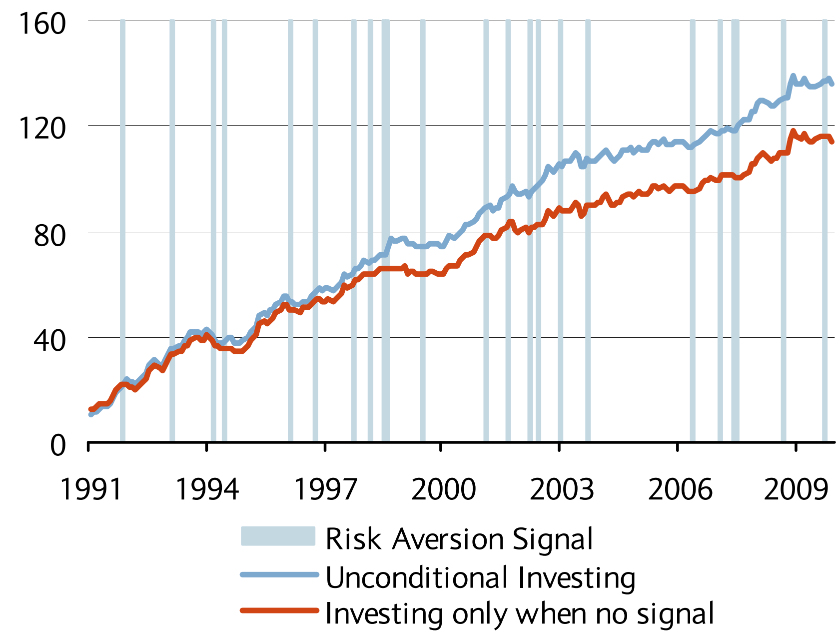
Conditioning Risk Premia Using the Risk Aversion Signal

- We test a strategy of reducing the exposure to zero in the period following VIX trigger, paying associated transaction costs[(1)] for any additional rebalance
- We first test the signal on two longer time-series of pure market betas – US corporate credit and US treasuries
- Intuitively, the signal consistently identifies periods of increased market risk during which US credit underperforms and US Treasuries outperform

Applied to US Corp Credit



Applied to US Treasuries

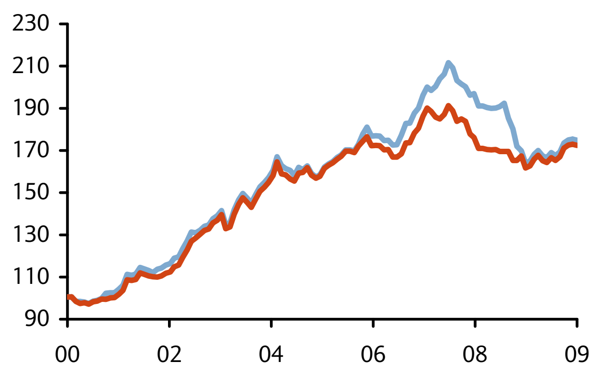


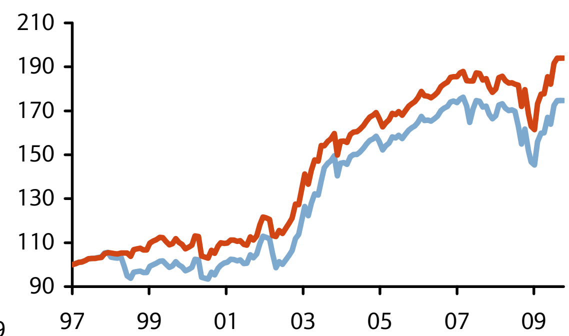
Source: Bloomberg, Barclays Capital.

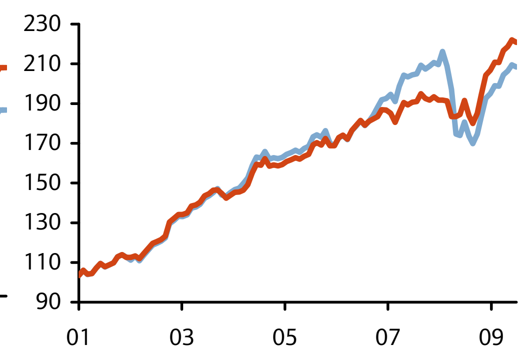
1. *Where possible we use the assumptions as in the index itself, or restrict additional rebalances to occur on built-in rebalance days.*

Statistics for Original and Conditional Strategies

	G10 FX Carry		**Credit Quality Premium**		**EM Premium**	
Sample period	2000–2009		1997–2009		2001–2009	
Long-run performance						
Annual excess return	5.8%	**5.6%**	4.8%	**5.5%**	8.6%	**9.2%**
Annual volatility / Sharpe Ratio	6.3% / 0.9	**5.9% / 1.0**	8.3% / 0.6	**7.5% / 0.7**	7.8% / 1.1	**6.0% / 1.5**
Fat negative tails						
Worst month return	(4.7%)	**(4.7%)**	(7.8%)	**(7.8%)**	(11.4%)	**(4.1%)**
Worst 10% vs. Normal Distribution	1.6x	**1.6x**	1.6x	**1.5x**	1.7x	**1.5x**
Drawdown						
Maximum peak-trough	22.5%	**15.5%**	17.5%	**14.1%**	21.4%	**7.7%**
Broad market correlation						
Mthly correl w/Global Agg ER	23%	**11%**	31%	**28%**	64%	**47%**
Mthly correl w/S&P500 ER	9%	**(1%)**	37%	**30%**	65%	**54%**



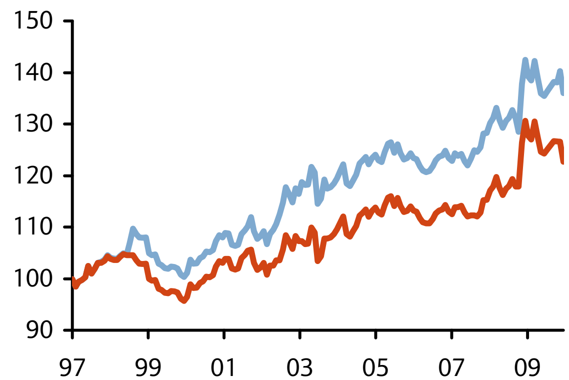


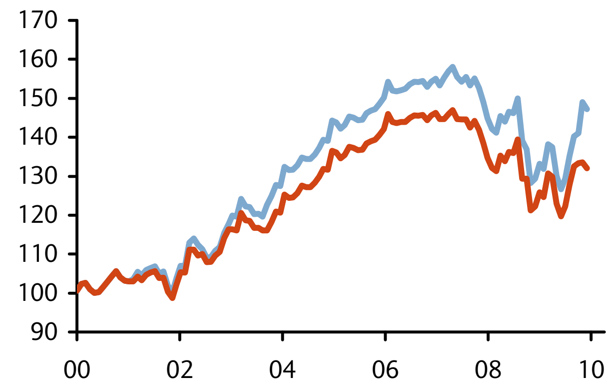


Source: Barclays Capital.

Statistics for Original and Conditional Strategies

	Term Premium		Volatility Premium	
Sample period	1997–2009		2000–2009	
Long-run performance				
Annual excess return	2.5%	**1.7%**	4.1%	**3.0%**
Annual volatility / Sharpe Ratio	5.0% / 0.5	**4.8% / 0.4**	7.1% / 0.6	**6.7% / 0.4**
Fat negative tails				
Worst month return	(5.1%)	**(5.1%)**	(7.2%)	**(7.2%)**
Worst 10% vs. Normal Distribution	1.4x	**1.4x**	1.4x	**1.4x**
Drawdown				
Maximum peak-trough	8.6%	**8.7%**	19.9%	**18.6%**
Broad market correlation				
Mthly correl w/Global Agg ER	(7%)	**(12%)**	33%	**29%**
Mthly correl w/S&P500 ER	(14%)	**(15%)**	25%	**18%**





Source: Barclays Capital.

Mixed Performance of the VIX Signal by Strategy Type

- Investing only when the risk aversion signal is not triggered appears to **improve the risk and performance profile in the “risky asset class strategies”:** G10 FX Carry, Credit Quality and EM Premium
- However, the conditional strategy appears to **consistently detract from performance for the rates-based strategies:** Term Premium and Rates Volatility premium
- It is difficult to draw conclusions from short samples but these results do agree with the intuition that the **rates strategies may *benefit* from a flight to quality** during a period of increased risk aversion
- The “risk” for which there may be a premium in rates strategies may be more associated with other factors such as inflation

Using VIX Signal in Equally Weighted Portfolio Shows Modest Improvement

- Using the VIX signal other than on the rates strategies leads consistently to reduced performance in stable markets, but improved risk-profile in volatile times, with broadly similar overall performance

		Enhanced Portfolio
Sample period	2000–2009	
Long-run performance		
Annual excess return	5.3%	**5.3%**
Annual volatility / Sharpe Ratio	3.9% / 1.3	**3.4% / 1.6**
Fat negative tails		
Worst month return	(4.7%)	**(3.1%)**
Worst 10% vs. Normal Distribution	1.7x	**1.5x**
Drawdown		
Maximum peak-trough	10.8%	**6.6%**
Broad market correlation		
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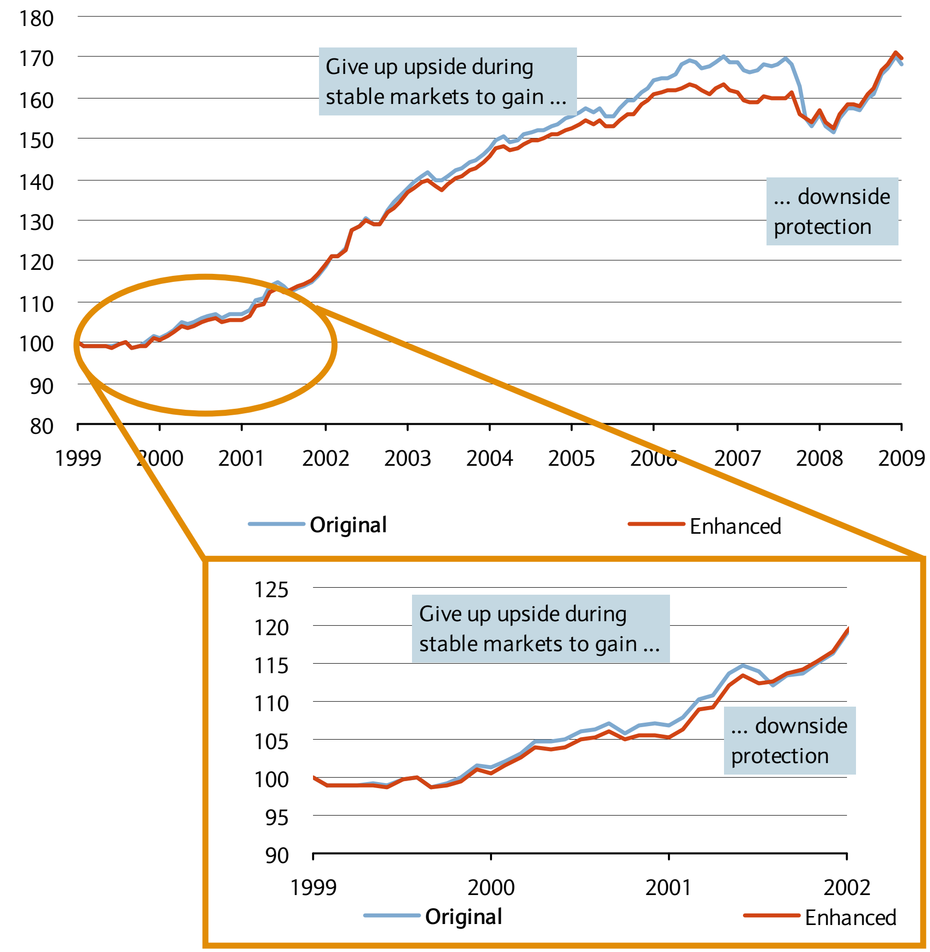

Source: Barclays Capital.

Conclusions

- Barclays Capital Investable Indices provide the tools to access and analyze a wide variety of directly tradable investment strategies, including risk premia strategies
- Selecting five strategies, reflecting FX carry, term premium, quality premium, EM premium and vol premium, overall characteristics are in line with expectations
  - Positive long-run risk-adjusted return
  - Significant fat negative tail and drawdown risk
  - Positive correlation with broad markets and each other, except for term premium
- We find that a static combination of these strategies offers some limited diversification value and has attractive overall characteristics over the short sample history (10 years)
- Finally, we show that even using a simple rules-based "risk aversion" signal based on VIX, timing exposure to some of these strategies can modestly improve performance and risk profile

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