

Factor Timing with Cross-
Sectional and Time-Series
Predictors

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Early in the game

- Two main problems in investing:
 - Selecting the stocks: factors
 - Timing: how to do it?



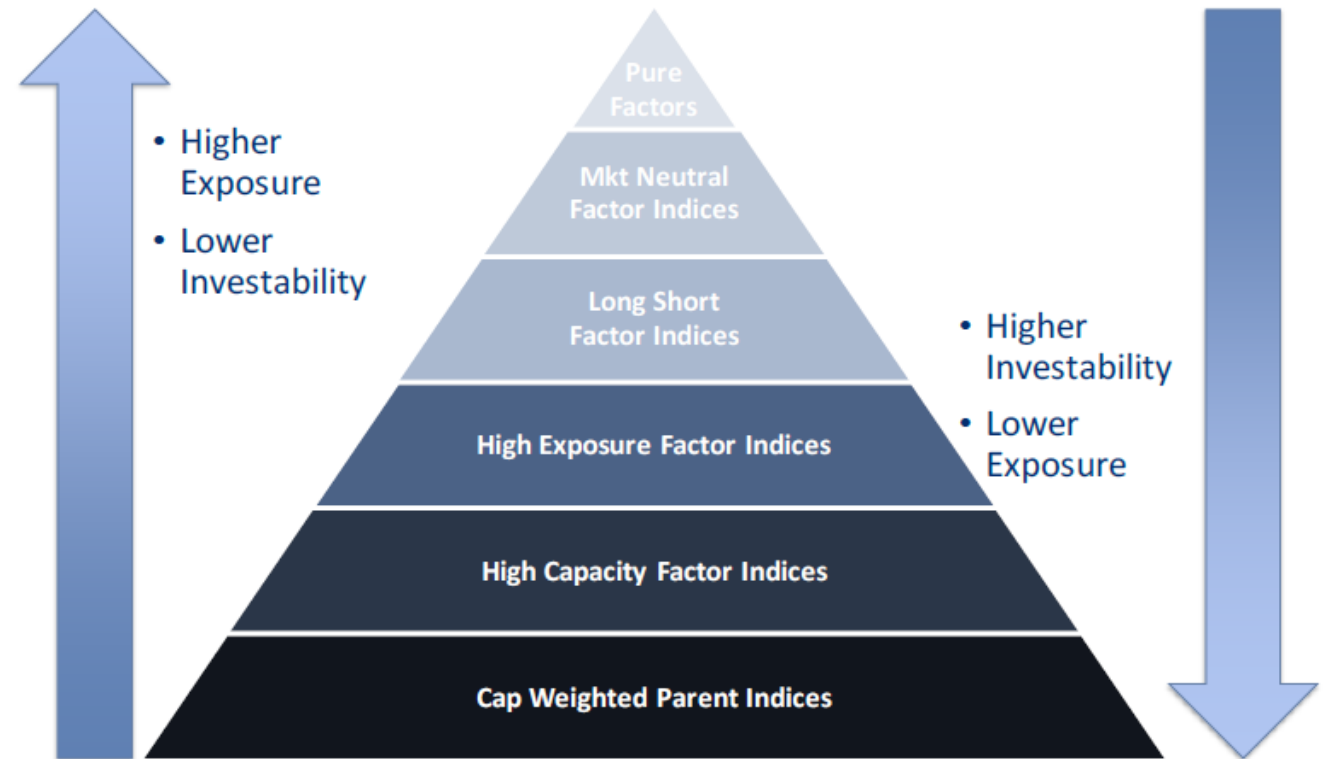
How do they predict timing of factors?

- Business cycle / economic regimes definitions and timing.
- Cross-sectional are stocks characteristics, then doing it bottom-up to assess a systemic signal for factor investing.
- The factors studied are: value, quality (profitability), size, momentum and minimum-volatility strategies.

Data and methodology

- They use MSCI smart beta indexes for factors: value, quality, momentum, size and minimum volatility.
 - Long-only
 - Fully transparent on the weightings, with this one can compute the characteristics of a portfolio based on a factor.
 - From June 30, 1988 to September 30, 2016.

Exhibit 9: Capturing Factors Through Indexation

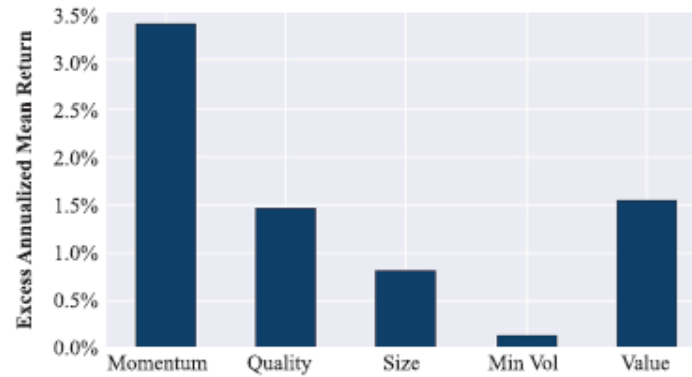


Source: Bender et al. (2013)

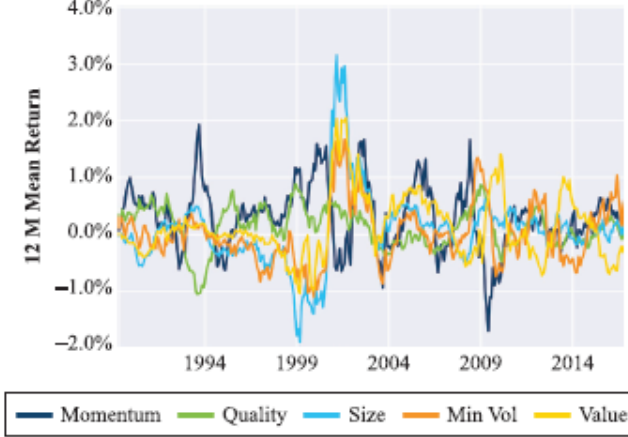
EXHIBIT 1

Smart Beta Excess Returns, June 30, 1988–September 30, 2016

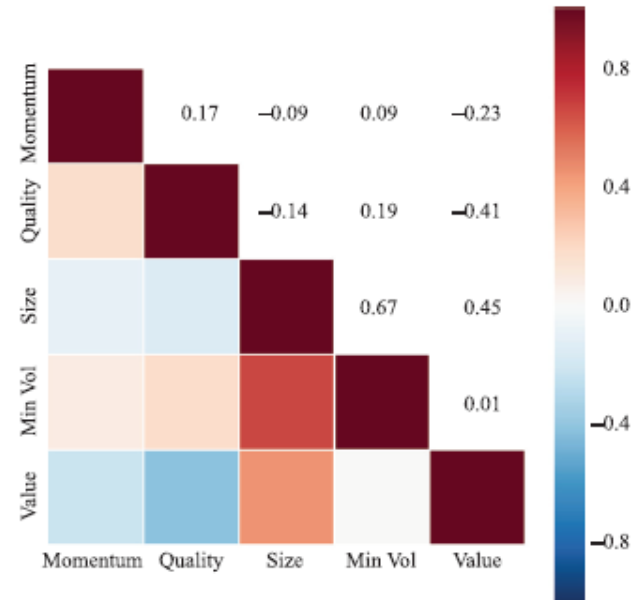
Panel A: Average Excess Returns



Panel B: Rolling 12-Month Excess Returns



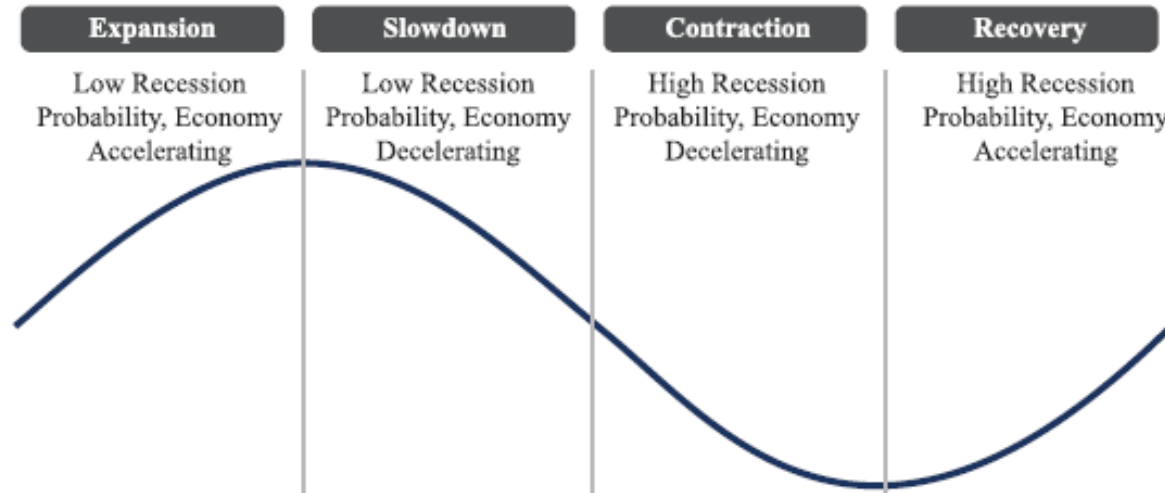
Panel C: Correlations of Excess Smart Beta Returns



Note: The panels show smart beta factor returns in excess of the MSCI USA Index.

EXHIBIT 2

Stylized Economic Regimes



Accelerations (decelerations) are increases (decreases) in growth in excess (below) of one standard deviation *{rolling-window or historical data?}*, using Citi U.S. Leading Indicator.

Probability to enter a recession regressing three-months ahead on current leading Chicago Fed National Activity Index *{method?}*.

Business cycle indicator /
economic regimes

Stock level / cross-section predictors

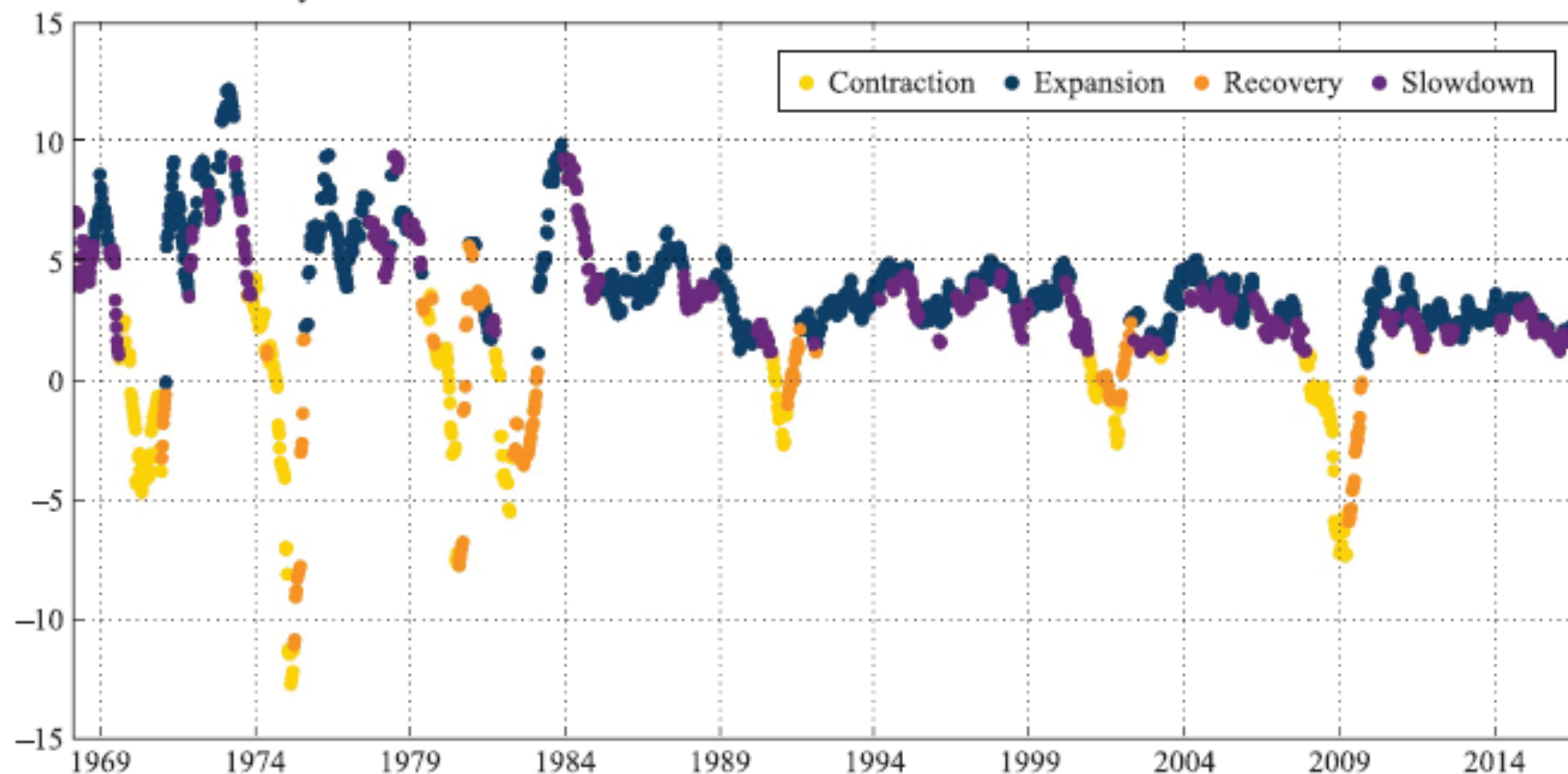
- Forward earnings yield per share is from Thomson Reuters I/B/E/S Database, and CFO yield from Worldscope *{equal combination?}*
- Relative strength is 12-months moving average of factors excess returns wrt market returns.

EXHIBIT 3

Bottom-Up Smart Beta Characteristics

Signal	Metric	Economic Intuition
Valuation	Forward Earnings to Price Cash Flow from Operations to Price	Valuations measure the richness or cheapness of a particular strategy: for a factor's valuations relative to its past valuations and the factor's valuation compared to other factors.
Relative strength	Excess benchmark returns	Factors exhibit time-series momentum effects.
Dispersion	Cross-sectional standard deviation of signals related to the characteristics used to construct the factors	The greater the dispersion, the larger the investment opportunity set.

Panel A: Business Cycle Identification



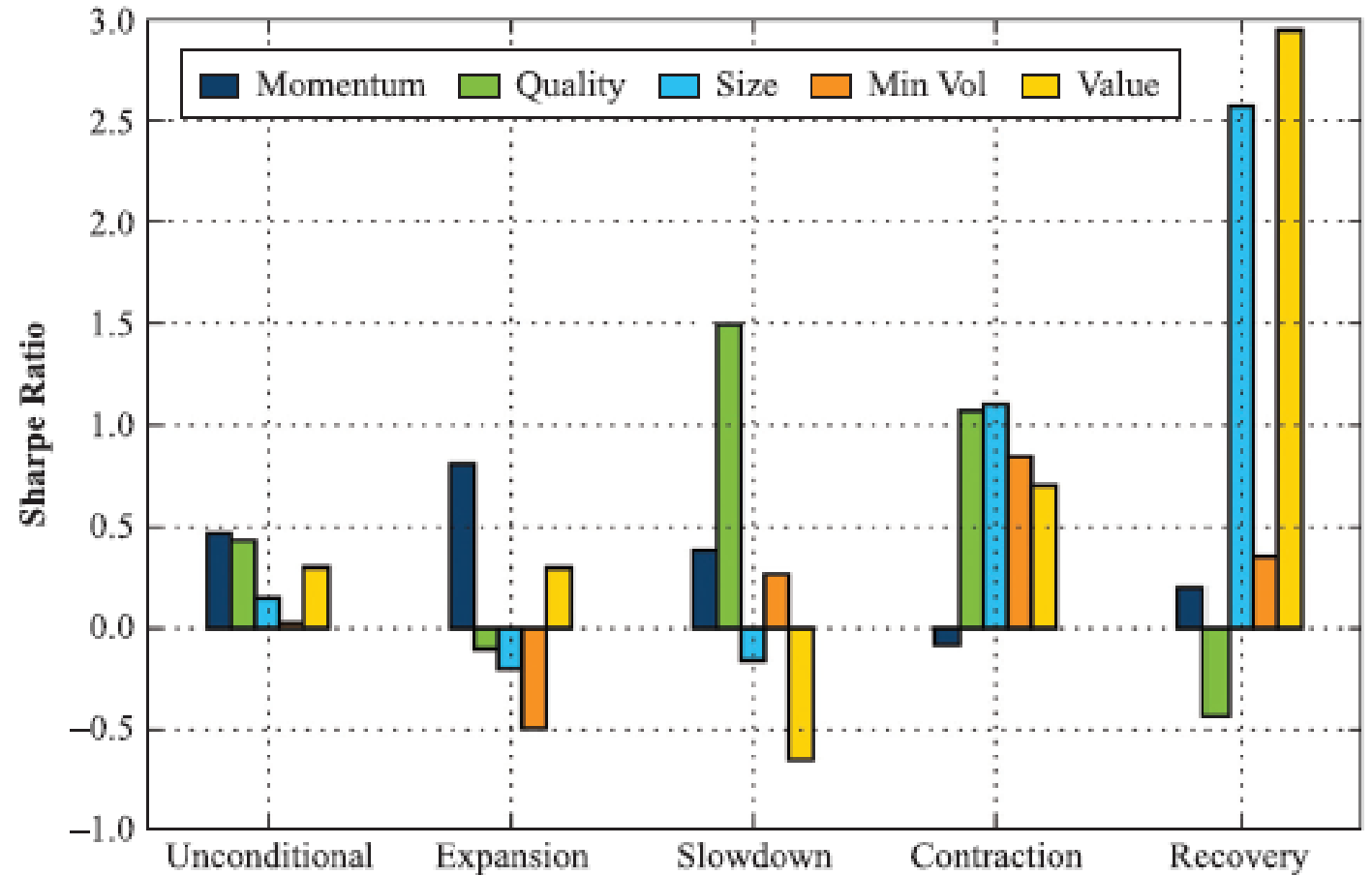
Regimes aligned with NBER ex post classification.

Quarterly annualized real growth rate for the US.

Empirical results – Business cycle identification

Empirical results
– Sharpe ratios
conditional on
economic regimes

Panel B: Sharpe Ratios of Factors Conditional on Economic Regimes



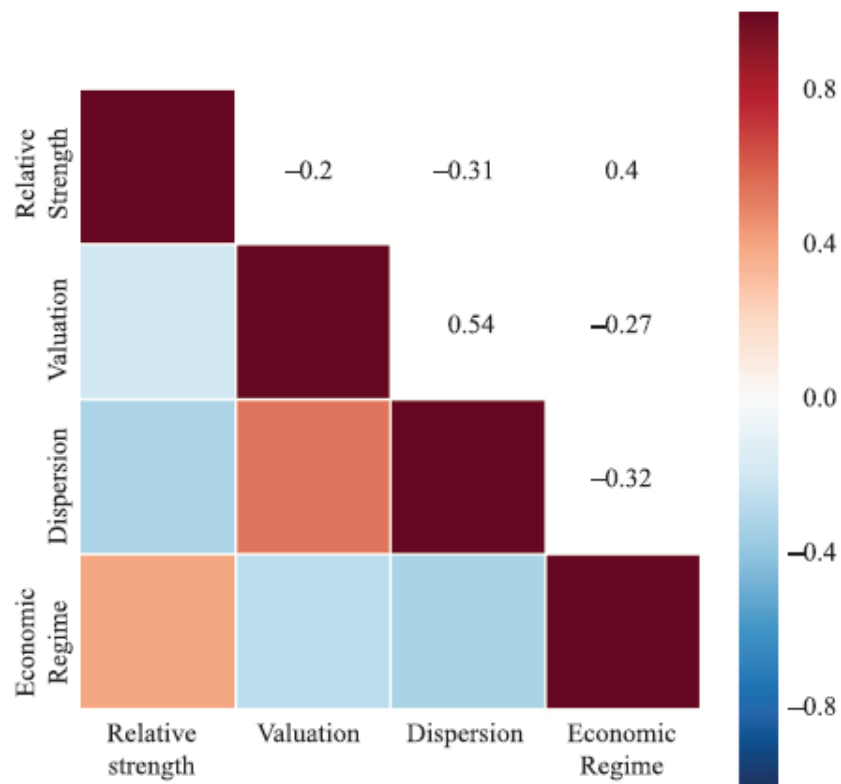
The timing strategy assign positive weight to those factors that outperform in a given regime, and penalize those that underperform. Which results in a long-short factor portfolio. With 1% target risk level.

EXHIBIT 5

Performance of Timing Factors with the Business Cycle Indicator



Panel B: Indicator Return Correlations



Panel A: Stand-Alone Indicator Performance

Signal	Sharpe Ratio	Max Drawdown	Max Drawdown Range
Business Cycles	0.71	-1.6%	Oct 2003–Jun 2008
Relative Strength	0.42	-2.3%	Mar 2000–Jul 2003
Valuation	0.48	-1.4%	Sep 2002–Aug 2006
Dispersion	0.38	-1.6%	Jun 2008–Feb 2009

Results – Cross-sectional signals

- Relative strength: overweight the factors with high 12-month returns, u/w the under. After GFC there was a mean-reversion.
- Valuations: majority of gains after market extremes (e.g., GFC cheap value, and expensive momentum and minimum-vol).
- Dispersion: weakest performance, but since it has negative correlation with other timing strategies, this signal is valuable.

EXHIBIT 6 (continued)

Timing Smart Beta Factors

Panel C: Performance of Timing Factors with Various Indicators

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Positive Excess		Regime 0.90								Valuation 1.14						Regime 0.80
		Rel. Str. 0.69	Dispersion 0.45		Rel. Str. 0.46	Rel. Str. 0.49		Valuation 1.29		Dispersion 1.07	Dispersion 0.24	Regime 0.79	Valuation 0.30	Valuation 1.06		Valuation 0.80
	Dispersion 2.08	Valuation 0.44	Regime 0.11		Dispersion 0.21	Valuation 0.28	Regime 0.11	Rel. Str. 0.83	Regime 1.49	Regime 0.90	Valuation 0.10	Valuation 0.50	Regime 0.10	Regime 0.61		Rel. Str. 0.47
	Valuation 0.75	Dispersion 0.37	Valuation 0.06	Regime 0.30	Valuation -0.44	Dispersion -0.05	Rel. Str. 0.09	Dispersion 0.56	Rel. Str. 0.69	Rel. Str. 0.08	Regime -0.08	Dispersion 0.16	Dispersion 0.06	Rel. Str. 0.41	Rel. Str. 0.01	Dispersion 0.34
Negative Excess	Regime -0.17		Rel. Str. -0.93	Dispersion -0.02	Regime -0.70	Regime -0.23	Dispersion -0.26	Regime -0.10	Dispersion -0.93		Rel. Str. -0.22	Rel. Str. -0.08	Rel. Str. -0.32	Dispersion -0.05	Dispersion -0.03	
	Rel. Str. -1.30			Valuation -0.07			Valuation -0.30		Valuation -0.99						Valuation -0.24	
				Rel. Str. -0.30											Regime -0.33	

Combining factor timing indicators

- Equal weight each of the four indicators with 1% ex ante risk. They obtain diversification benefits, so they scale the portfolio up to 1%.
- Not only the combined indicators have a higher Sharpe ratio, but the maximum drawdown is lower than every stand-alone signal.

Panel A: Stand-Alone Indicator Performance

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Panel A: Combined Indicator Performance (1% Ex Ante Risk)

Signal	Sharpe Ratio	Max Drawdown	Drawdown Range
Aggregate Signal	0.88	−1.4%	Sep 30, 2002–Apr 30, 2005

Adding both smart betas and timing

- Aggregate smart beta is the equally weighted factor positions (strategic).
- The timing signal is the equal-weight four signals.
- Panel C is the B discounted with market returns.

Panel B: Predictive Performance of Aggregate Smart Beta Timing Signal



Panel C: Predictive Performance of Aggregate Style Factor Timing Indicator



Conclusion

- Constructing an aggregate indicator from economic regime, valuation, relative strength, and dispersion indicators produces better results than using those predictors on a stand-alone basis.
- Their caveat and observation:
 - Portfolios are still theoretical and there may be additional costs in implementation.
 - The use of long-only smart beta factors is optional, and one can use long-short factors.

Some caveats

- Non-reproducible (at least with their inputs).
- Some obscure procedures.
- Very implementation focused, lots of economic intuition (which makes a lot of sense), but no theoretical basis for these.