

QES US Broad Risk Model – Model Summary

Introduction:

The Luo’s QES team has been top-ranked in the Institutional Investor magazine’s research surveys in the Quantitative Research, Portfolio Strategy, Economics, and Accounting & Tax Policy categories in the past decade. The QES risk model suite leverages our expertise in factor construction, our experience with risk model design, and our understanding of systematic drivers of equity risk. This broad US model includes fundamental, technical, macro, positioning, and alternative data factors that explain systematic risks and return dispersion for US stocks. Intended users include both fundamental and quantitative PMs, CIOs, risk managers, and traders.

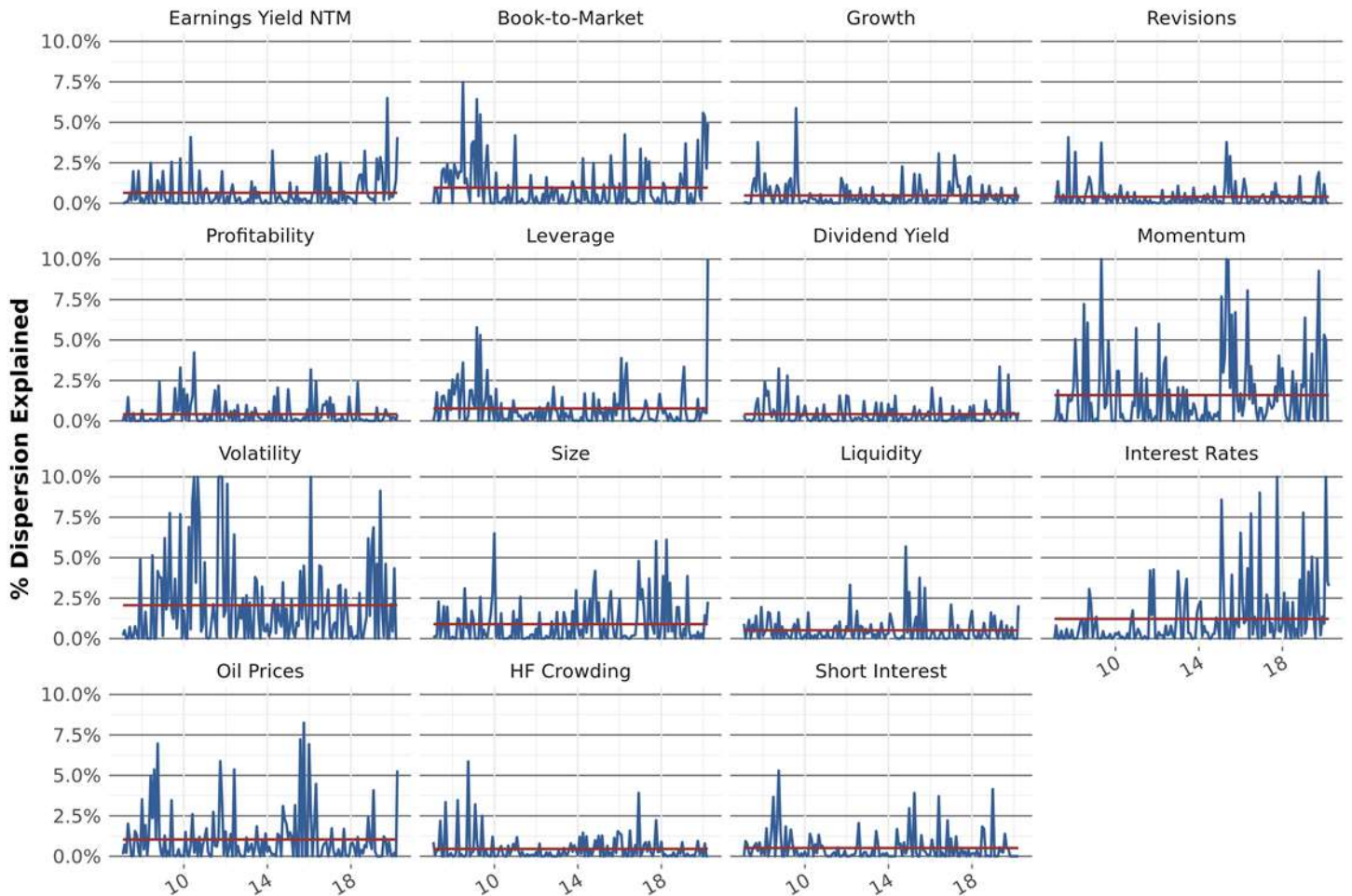
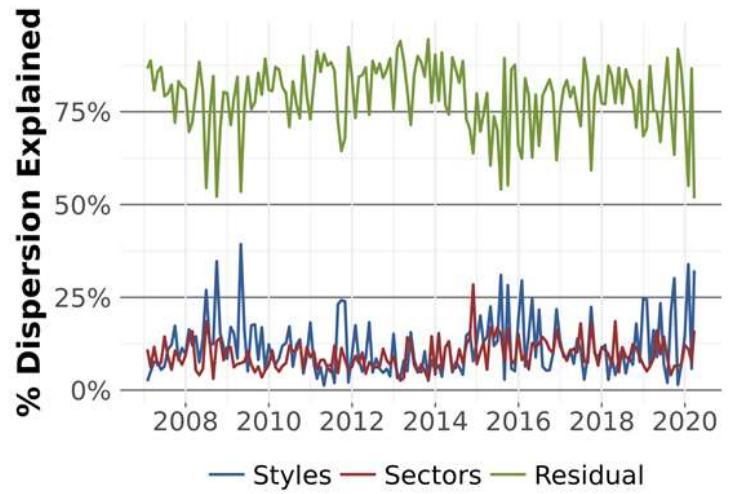
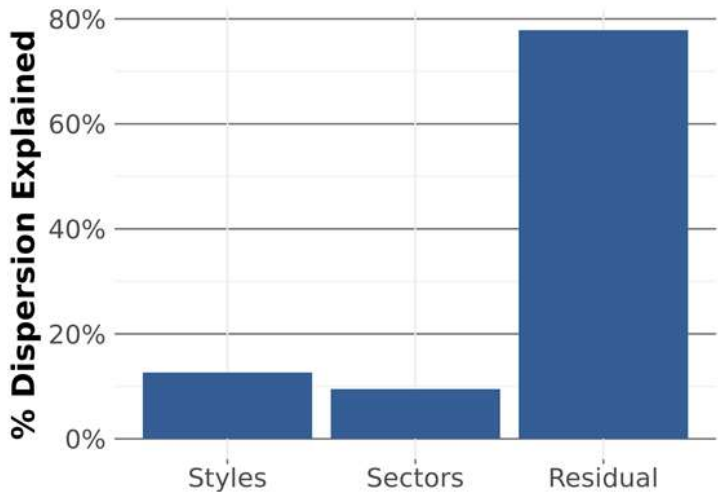
Coverage

- Risk Estimation Universe: US All-Cap Equities
- Investment Horizon: Medium-term
- Securities Coverage: Global equities (~40,000) plus US-listed equity ETFs (~1,000)
- Model History: January 2007 to present

Factors & Descriptions

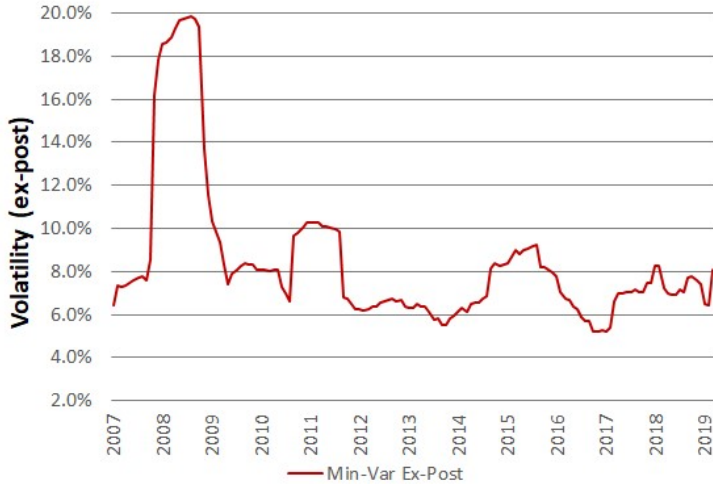
QES Factor Name	Signal Description
Earnings Yield	Next 12-month median consensus EPS divided by current share price.
Book-to-Price	Ratio of book value of equity to market value of equity.
Growth	Combination of mean consensus EPS growth and sales growth over the next 12-months.
Revisions	Combination of 3M changes in mean consensus EPS and Sales over next 12-months.
Profitability	Combination of trailing ROE and ROA.
Leverage	Combination of total debt to stockholders’ equity and total debt to total capital at market value.
Dividend Yield	Ratio of trailing 12M dividend per share divided by current share price..
Momentum 12M-1M	Total return of the past 12M excluding the most recent 1M.
Volatility	Realized volatility, based on daily returns over the past 12M.
Size	Market capitalization, common shares outstanding multiplied by the current share price.
Liquidity	Notional value traded over the past 20 trading days divided by the market capitalization.
Interest Rates	Beta to interest rate changes for US Treasuries approximately equivalent to the 10Y.
Oil Prices	Beta to weekly return of crude oil WTI Futures TR after controlling for market beta.
HF Crowding	Combination of hedge fund intensity (% of float) and level (market value) based on 13F filings.
Short Interest	Ratio of shares borrowed for shorting to inventory available for lending.
QES Industries	Binary one or zero values identifying each stock’s QES Industry classification

Explanatory Power for Opportunity Set



Minimum Variance Portfolio

*long-only portfolio optimization



Mean-Variance Portfolio with Random Alphas

*long-short portfolio optimization

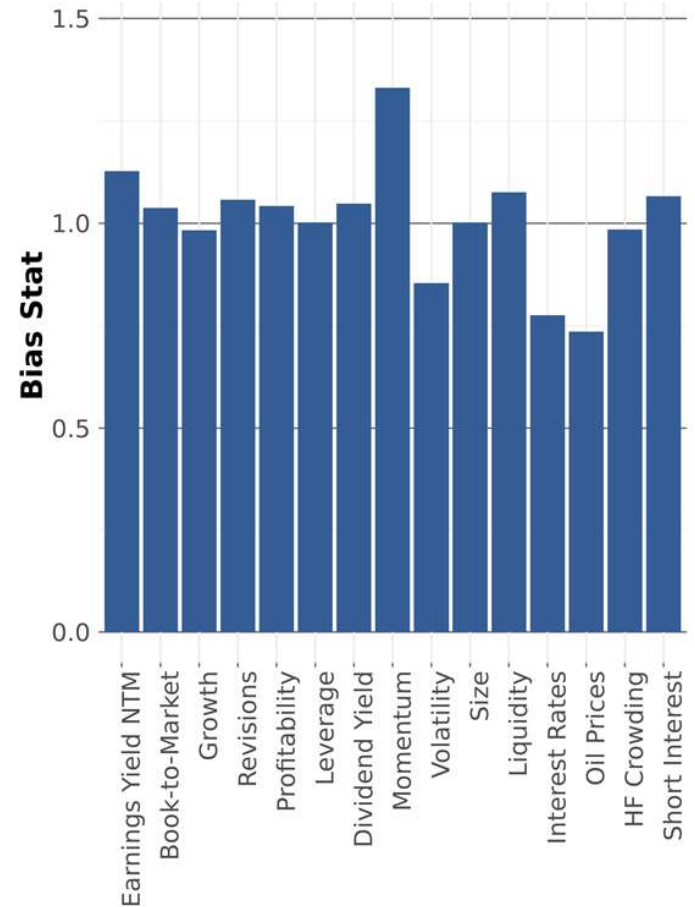


Factor Correlations

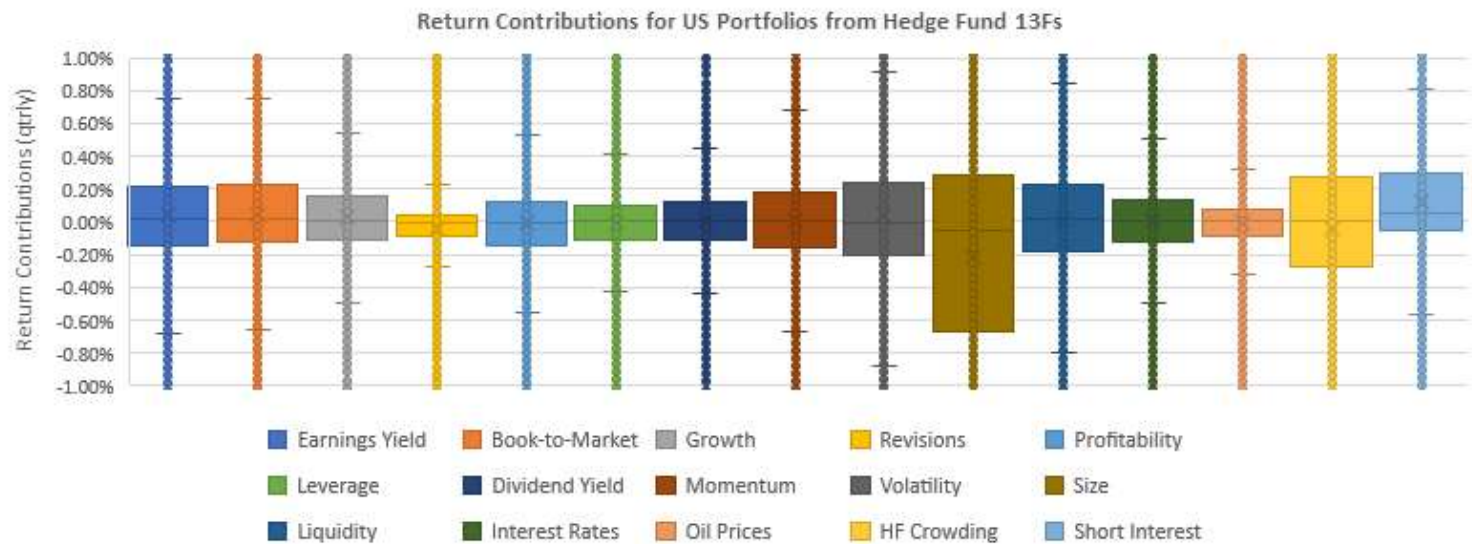
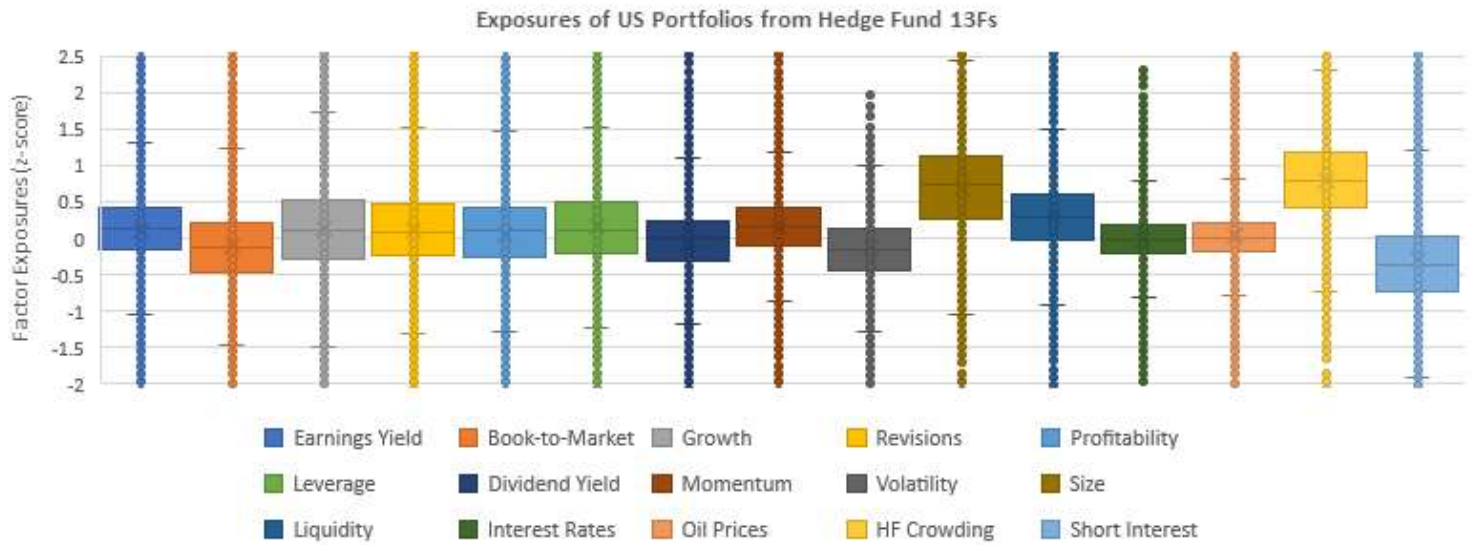
*Signal Rank (Upper) and FMPs Ex-Post (Lower)

	Earnings.Yield	Book.to.Market	Growth	Revisions	Profitability	Leverage	Dividend.Yield	Momentum	Volatility	Size	Liquidity	Interest.Rates	Oil.Prices	HF.Crowding	Short.Interest
Earnings.Yield	22	-4	-10	18	24	19	-15	-8	12	11	5	4	9	-14	
Book.to.Market	3	-22	-20	1	1	-1	-30	22	-33	5	17	12	-5	-1	
Growth	-8	8		3	9	6	-17	29	-1	9	0	-4	-2	3	-2
Revisions	-15	-2	-7		3	0	-15	33	1	7	0	-2	-2	4	-4
Profitability	-3	3	3	-4		15	15	37	36	-9	-18	-12	0	-11	
Leverage	-10	20	3	16		17	8	-28	30	-4	-13	-10	3	-9	
Dividend.Yield	3	11	-3	-4	5	6		-8	32	18	-12	-15	-10	-6	
Momentum	-15	-22	8	22	-12	-15	-5		-13	17	-9	-5	-6	5	-14
Volatility	1	17	13	13	-3	10	-13	-9		33	34	27	3	27	
Size	-14	-6	-12	2	-3	-3	-14	1	2		5	-12	-4	34	-29
Liquidity	-8	-5	7	-2	-8	14	-13	-4	-26	30		15	16	37	29
Interest.Rates	16	10	-1	0	3	-2	-16	-14	43	8	-11		39	4	5
Oil.Prices	-1	24	19	6	1	29	-7	-16	34	7	11	24		8	5
HF.Crowding	5	7	19	0	2	26	1	2	-27	-11	29	-17	4		-21
Short.Interest	1	4	-25	-17	1	-7	-3	-17	3	14	-2	4	2	-17	

Bias Statistics



Analysis of Hedge Fund 13Fs



DISCLOSURE SECTION

Other Disclosures:

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