

Volatility, Quality & Sentiment Trading Strategy



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Outline

- Problem Statement
- Review of Traditional Strategies and Literature of Related work
- Progress Update Since Midterm Presentation
- Data Universe
- Model and Factors considered
- Methodology
- Results and Analysis
- Effect of Parameter tuning
- Next Steps

Related Work: Quality Anomaly

Bouchaud et al 2016: The Excess Returns of “Quality” Stocks: A Behavioral Anomaly

	Mistake		Forecast		Realized	
	(1)	(2)	(3)	(4)	(5)	(6)
Op. Cash Flows	-.063*** (-6.2)	-.069*** (-6.4)	-.012** (-2.4)	-.005 (-1.1)	.05*** (6.5)	.064*** (7.1)
Rolling volatility		.14*** (14)		.13*** (32)		-.0075 (-1)
Book to Market		-.044*** (-3.8)		-.011** (-2.5)		.033*** (3.6)
r2	.27	.28	.24	.29	.26	.27
N	136967	133917	136967	133917	148975	145486
Month FE	YES	YES	YES	YES	YES	YES
Cluster	Firm	Firm	Firm	Firm	Firm	Firm

Related Work: Value + Quality + Size

Kozlov M. et al (2012): Global Returns Premiums on Earnings Quality, Value and Size

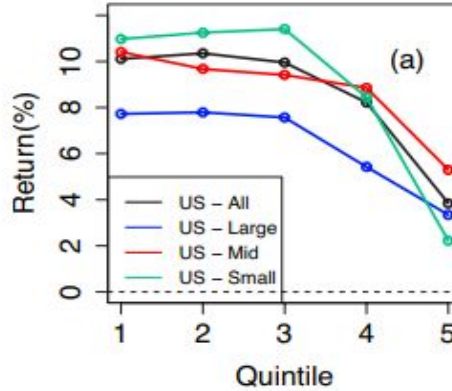
Region	Excess Return									
	MktRf	SMB	HML	CME	CME+HML	CME+HML	CME+HML	CME	CME+HML	CME+HML
					+HML	+SMB	+MktRf	+HML rw	+SMB rw	+MktRf rw
Global	4.0%	0.7%	4.7%	2.2%	7.0%	7.7%	11.1%	6.3%	8.2%	9.3%
North America	7.0%	1.5%	3.3%	2.3%	5.7%	7.2%	12.7%	5.3%	7.7%	9.5%
Europe	5.9%	0.2%	5.4%	3.5%	8.9%	9.0%	15.2%	8.8%	9.6%	14.3%
Japan	-1.9%	3.4%	4.4%	0.7%	5.0%	8.5%	3.2%	4.3%	7.8%	2.4%
Asia Pacific	8.0%	2.7%	4.6%	4.3%	8.9%	11.7%	17.0%	8.7%	11.5%	15.2%

Region	Volatility									
	MktRf	SMB	HML	CME	CME+HML	CME+HML	CME+HML	CME	CME+HML	CME+HML
					+HML	+SMB	+MktRf	+HML rw	+SMB rw	+MktRf rw
Global	15.9%	7.2%	4.9%	2.8%	5.4%	9.2%	15.6%	4.9%	7.2%	7.1%
North America	15.3%	10.0%	6.8%	4.2%	8.3%	13.4%	15.9%	7.7%	11.0%	10.3%
Europe	17.9%	7.3%	6.0%	4.4%	6.4%	10.0%	19.4%	6.3%	9.2%	11.0%
Japan	21.9%	11.5%	9.7%	9.5%	10.1%	16.1%	21.3%	10.2%	15.6%	14.9%
Asia Pacific	21.4%	9.8%	12.4%	9.5%	12.9%	17.9%	24.9%	12.3%	17.6%	19.7%

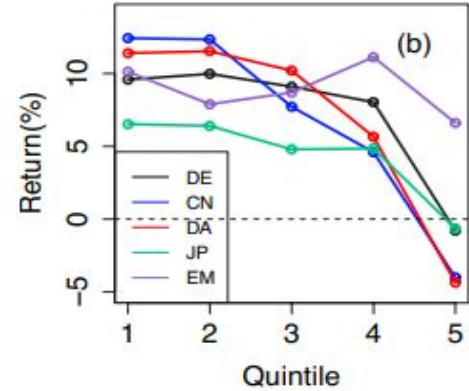
Region	Sharpe Ratio									
	MktRf	SMB	HML	CME	CME+HML	CME+HML	CME+HML	CME	CME+HML	CME+HML
					+HML	+SMB	+MktRf	+HML rw	+SMB rw	+MktRf rw
Global	0.25	0.10	0.97	0.80	1.28	0.83	0.71	1.28	1.13	1.32
North America	0.46	0.15	0.49	0.56	0.68	0.53	0.80	0.69	0.70	0.93
Europe	0.33	0.02	0.90	0.79	1.37	0.90	0.79	1.41	1.05	1.30
Japan	-0.08	0.30	0.45	0.07	0.50	0.53	0.15	0.42	0.50	0.16
Asia Pacific	0.38	0.28	0.37	0.46	0.69	0.65	0.68	0.70	0.65	0.77

Related Work: Low-Volatility Anomaly

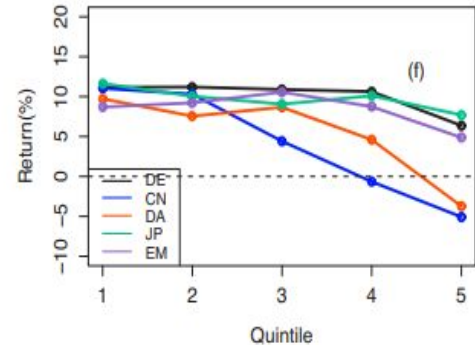
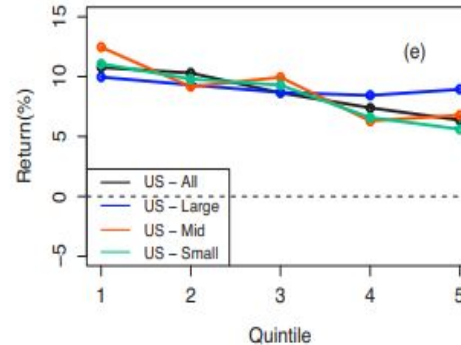
Vieira M and Hugh G(2019):
Volatility, returns and the
sharpe ratio in domestic and
global equity markets



08/2013 to 07/2019



08/2013 to 07/2019



Related Work: NLP ~Return Signals

Tweets + Commercial Tools

- Bollen et al (2010):
- specific public mood dimensions but positive returns
- Features and Tools-Tweets, Opinion Finder and Google Profile of Mood States

Sec 8-K Text Data

- Lee et al (2014):
- accuracy over 10% (relative) over financially-rooted features
- Features -unigram words and event categories on 8-k reports

Article News Text , No Com. Tools

- Ke et al (2019):
- Outperformed RavenPack based on L/S trading strategy.
- Tools- real time news , predictive screening, topic modelling and penalised likelihood

How are we Different? ~ Our Model Features

Model Features

Feature	Information Captured	Data Source
Cash return	value	Morning star
Long term debt/equity (leverage)	quality	Morning star
FCF Yield	value	Morning star
ROIC	quality	Morning star
Quality composite(ROIC + Leverage)	quality	Morning star
Value composite(cash return + FCF Yield)	quality	Morning star
News articles sentiment score)	News sentiment	Sendex
Volatility of Tweet sentiment message ratio	Social media mood	Psych Signal
Volatility (SD of Prices) & Beta	Risk- vol by sector	US1500-Quantopian

Data Universe

Quantopian S&P1500 universe

- Updated daily
- Backtest period from Jan 1, 2015 - Dec 31, 2019

Fundamental data: Morningstar + Quantopian factors

- Updated quarterly

NLP data: PsychSignal (Stocktwits, Twitter)

- Updated daily, quantopian

Update Since Midterm Review

- Transitioned to using Quantopian API (computing resources)
- Additional data sources
- Added Volatility Factor
- Got hold of processed, ready to use Sec text data set

Methods: Fundamental and Sentiment Analysis

Created scoring methods to long/short the top n stocks with the lowest or highest score

Baseline: Simple ranking

- Score by equally weighting each feature

Correlation

- Score by equally weighted correlation
- Score by exponentially weighted correlation

Linear Regression

- Score by linear regression

Methods: Low/High-Vol Strategy

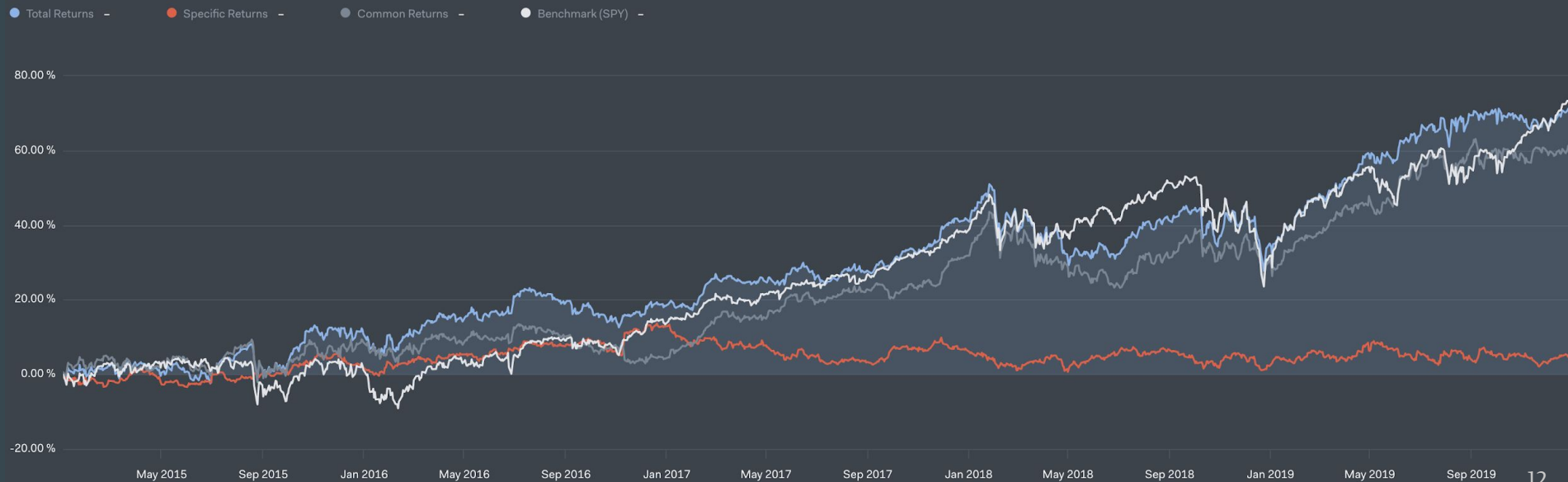
1. Measure volatility
2. Long the top n stocks with the lowest or highest volatility
3. Rebalance

Variations considered:

- Different value of n stocks
- Different rebalance rates
- Long the top n stocks with the lowest or highest volatility for each sector
- Different investment universe: S&P1500 vs S&P500

Results: Low-Volatility

Brief description	Universe	Long Freq	Total Returns	SPY Returns	Beta	Sharpe	Max Drawdown
Longs the top 10 low vol stocks	S&P500	Monthly	71.26%	72.82%	0.7	1.2	-15.35%



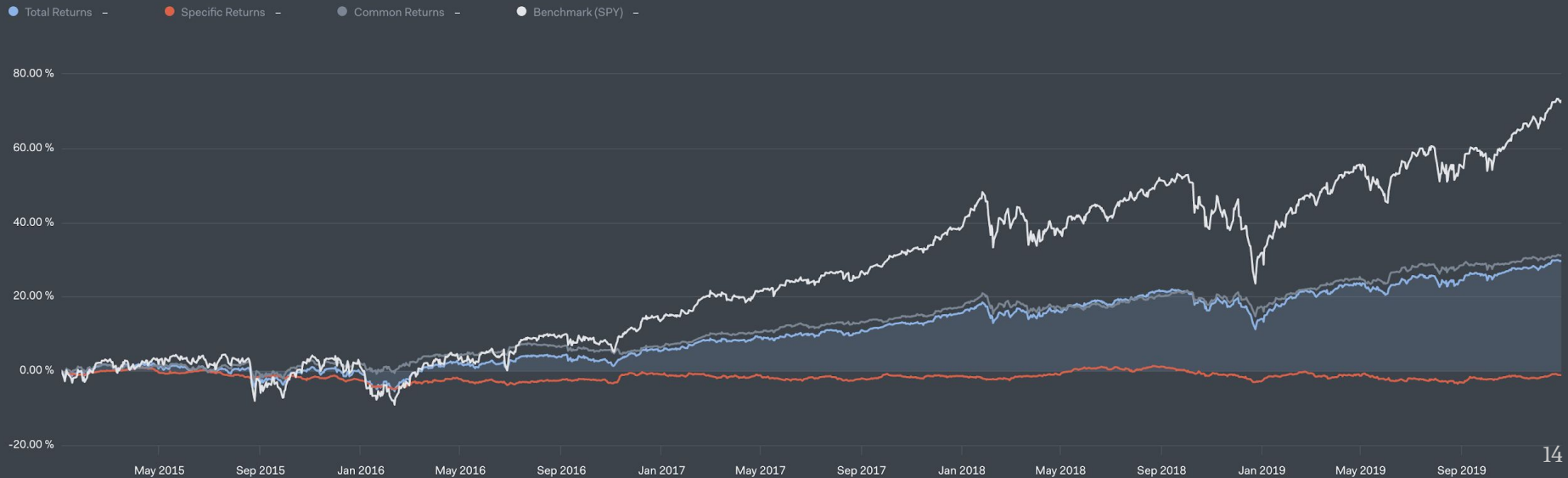
Results: High-Volatility + Quality

Brief description	Universe	Long Freq	Total Returns	SPY Returns	Beta	Sharpe	Max Drawdown
From top 50 high vol companies. Long top 10, short bottom 10 based on quality	S&P1500	Monthly	9.92%	72.82%	0.3	0.48	-7.19%



Results: High-Volatility + Quality By Sector

Brief description	Universe	Long Freq	Total Returns	SPY Returns	Beta	Sharpe	Max Drawdown
Get high vol companies per sector, then get the top 10 quality and long	S&P1500	Monthly	29.65%	72.82%	0.43	1.11	-8.79%



Results: High-Sentiment Volatility + Quality By Sector

Brief description	Universe	Long Freq	Total Returns	SPY Returns	Beta	Sharpe	Max Drawdown
From top 50 high vol measured by psychsignal tweets then get the top 10 quality and long	S&P1500	Daily	228.71%	72.82%	5.57	0.81	-80.26%



Effect on Capital, Slippage + Cost per share

High-Volatility + Quality			
Capital = 10 Million	CPS = 0	CPS = 25 bps	CPS = 50 bps
Slippage= 0	9.92% (7.19%)	9.81% (7.22%)	9.71% (7.25%)
Slippage= 25 bps	9.86% (7.21%)	9.76% (7.23%)	9.65% (7.27%)
Slippage= 250 bps	9.38% (7.34%)	9.28% (7.37%)	9.17% (7.39%)
Capital = 100 Million	CPS = 0	CPS = 25 bps	CPS = 50 bps
Slippage= 0	9.92% (7.19%)	9.82% (7.23%)	9.71% (7.25%)
Slippage= 25 bps	9.87% (7.21%)	9.76% (7.24%)	9.65% (7.27%)
Slippage= 250 bps	9.39% (7.34%)	9.28% (7.37%)	9.17% (7.40%)
Capital = 1 billion	CPS = 0	CPS = 25 bps	CPS = 50 bps
Slippage= 0	9.92% (7.19%)	9.82% (7.22%)	9.71% (7.26%)
Slippage= 25 bps	9.87% (7.21%)	9.76% (7.24%)	9.65% (7.27%)
Slippage= 250 bps	9.38% (7.34%)	9.28% (7.37%)	9.17% (7.40%)

Effect on Capital, Slippage + Cost per share

High-Volatility + Quality By Sector

Capital = 10 Million	CPS = 0	CPS = 25 bps	CPS = 50 bps
Slippage= 0	29.65% (8.79%)	29.58% (8.79%)	29.51%. (8.79%)
Slippage= 25 bps	29.62% (8.79%)	29.54%. (8.79%)	29.47% (8.8%)
Slippage= 250 bps	29.28% (8.8%)	29.21% (8.81%)	29.14% (8.81%)
Capital = 100 Million	CPS = 0	CPS = 25 bps	CPS = 50 bps
Slippage= 0	29.65% (8.79%)	29.59% (8.79%)	29.51%. (8.79%)
Slippage= 25 bps	29.63% (8.79%)	29.55% (8.79%)	29.48% (8.79%)
Slippage= 250 bps	29.29% (8.8%)	29.22% (8.8%)	29.14% (8.80%)
Capital = 1 billion	CPS = 0	CPS = 25 bps	CPS = 50 bps
Slippage= 0	29.65% (8.79%)	29.59% (8.79%)	29.52% (8.79%)
Slippage= 25 bps	29.63% (8.79%)	29.55% (8.79%)	29.48% (8.79%)
Slippage= 250 bps	29.29% (8.8%)	29.22% (8.8%)	29.14% (8.8%)

Takeaways and Further Research

Takeaway: Low-Vol Strategy has the highest sharpe ratio and robust to capital and costs

- Additional risk/performance attribution
- Scenario testing to understand when to be risk-on or risk-off
- Curate our own dataset and features